1st class

DATE 27 01 2016

Advanced Management Accounting

Costing (70)	O.R (30)
(1) Marginal Costing	1) Assignment
(2) Standard Costing	2) Transportation
(3) Budgetary Control.	3) Simulation
	4) Learning Curve
	5) Linear Programming
	6) Network Construction. (PERT/CPM)

(1) Marginal Costing (Relevant Costing / Decision Making)

(i) Second shift working vs overtime
(ii) Shut down or Continue
(iii) Quatation of Minimum Price.
(iv) Acceptance of offer.
(v) Joint Product & by Product
(vi) Labour Related Decision.
(vii) Divestment Strategy
(viii) Abondoned Decision
(ix) Make / buy Decision, key factor, out sourcing
(x) Transfer Price (International Taxation + Calculus)
(xi) Developement under business Environment (Just In Time, Total Quality mgmt, Through Put, Target Costing)
(xii) Service Sector
(xiii) Pareto Analysis
(xiv) Kaizen Concept
(xv) Back Flush Costing
(xvi) Value Added Costs.
(xvii) Balance score Card. [Case studies].
(xviii) Activity Based Costing.
(xix) Direct Product Profitability. [Costing of super Market) eg big bazar
(xx) Cost Volume Profit Analysis (CVP Analysis)

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Chapter-1

Relevant Costing

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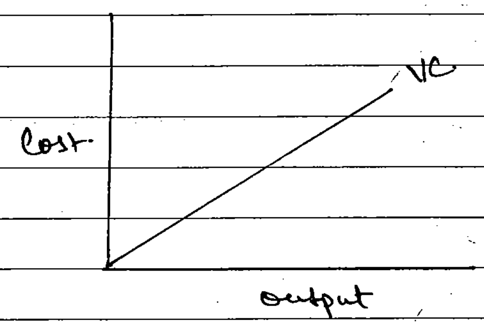
Basic Concepts

(1) **Variable Cost :-** Variable Cost is Cost which remains Same in per unit (when it behave normally) & increase in totality as level of output increases.

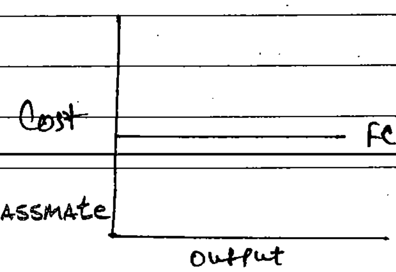
Includes	Direct Material	xx
	Direct Labour	xx
	Direct ~~overhead~~ / exp.	xx
	Prime Cost	xxx
	+ Variable overhead	xx
	Variable ~~overhead~~ cost.	xxx

Variable Cost = Prime Cost + Variable overhead



Variable O/H is a part of Variable Cost but not itself Variable Cost.

(2) **Fixed Cost** (fixed overhead) :- Fixed Cost is a Cost which remains Same in Total (behave normally). It does not change due to change in level of output. It Includes Manager Salary, lease Rent, Machine Rent, Depreciation.



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(3) **Mixed Cost :-** Mixed Cost is a Combination of Variable Cost & [Silent] fixed Cost (When behave normally) i.e. to be known as Total Cost. Change from offers only Variable Cost.

behave normally means Variable Cost/unit remains same
Fixed Cost will remain same in total.

(4) **Differential Cost :-** Differential Cost is a Combination of VC & FC
Discount offer/Export Incentives. (When behave Not normally/exceptionally)
Exceptionally means (a) VC/unit change Change in cost
or (b) FC will change in Total Should be Charged (Relevant) from offer.

Explanation
Variable Cost/unit change due to
(a) Discount offered from supplier.
OR
(b) Benefit of Excise Duty from Govt. Due to Export.

eg	Unit	VC/unit	VC	FC	Total	
	8000	10 (5 Mat, 4, 1)	80000	10000	90000.	Differential Cost
	10000	9	90000	15000	1.05000	

Application Part

	Quantity	V/C/unit	VC	FC	Total.
Mixed Cost	1	10	10	10000	10,010.
	2	10	20	10,000	~~2000~~. 10,020.
	3	10	30	10,000	10,030
	4	10	40	10000	10040.
	⋮				
	8000	10	80000	10,000	90000

(#) If we export 2000 units (over 8000 units), then benefits of Excise Duty will be available on $\boxed{\text{all}}$ unit. (Excise Duty: 1/-)

Differential Cost	10000	9	90000	15000	105000

(#) For Extra 2000 Units we will have to incur special Packing charge i.e. ₹ 5000.
upto which level it is Mixed → 8000 unit
Differential → 10

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~~Continue the last example~~

(#) Application Part (objectivity)

If we have the following data. We would like to identify VC/unit & FC.

Qty	Cost	Mixed Cost
7000	80000	$TC_1 = VC/unit\, x_1 + FC$
8000	90000.	$TC_2 = VCPU\, x_2 + FC$

$$\text{or, } TC_1 - TC_2 = VCPU_{x_1} - VCPU_{x_2}.$$

$$\text{or, } TC_1 - TC_2 = VCPU\,(x_1 - x_2)$$

$$\boxed{\frac{\text{Change in Total Cost}}{\text{Change in Qty}}} \rightarrow \boxed{\text{or, } \frac{TC_1 - TC_2}{x_1 - x_2} = VCPU.}$$

$$\frac{90000 - 80000}{8000 - 7000} = \frac{10000}{1000} = 10/\text{unit}.$$

Total Cost = 80000

VC = 10 × 7000

FC = 10000.

(#) Note However if we have the following data

i.e,

Qty	Cost (₹)
8000	90000
10000.	105000..

V/C/unit change due to excise duty, benefit & extra Fixed cost incurred.

Results [CRUX]

(#) It's not possible to apply the relation of $\boxed{\frac{\text{change in Cost}}{\text{change in Qty}}}$ for Differential Cost.

i.e This relation is to be apply only in case of mixed cost.

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(#) If question is silent then Total Cost represent Mixed Cost only

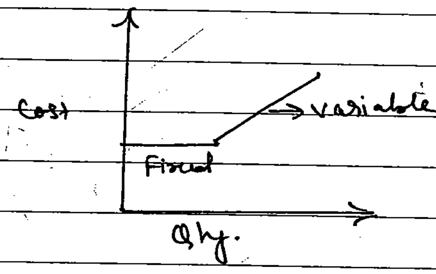
(#) If Variable Cost/unit change $\boxed{\&/\text{or}}$ fixed Cost change, It represent Differential Cost.

(#) Differential Cost is also known as Relevant Cost

(5) Semi-Variable Cost

⇒ [Type I] ⇒ The Cost which remains fixed upto certain level & becomes Variable after that level for example Electricity bill, Telephone bill,

		₹	
eg	upto 200 calls	500	
	Excess of 200 calls @ 2 per Call.		
	∴ For 300 Call →	700	[500 + (100 x 2)]
	∴ For 400 Call →	900	[500 + (200 x 2)].



Note In Semi Variable Cost (Type-I), Variable Cost occur only after the Completion of Fixed Cost. While Formula Provides VCPU from Initial Unit. Hence It's not possible to apply formula.

$$\frac{\text{"Change in Cost"}}{\text{Change in Qty}}$$ in Semi Variable Cost (TYPE I)

⇒ [Type II] = Lot wise, batch wise, Group wise.

eg	Lot (units)		₹	
	0 - 100	1 box	1000.	
	101 - 200	2 box	2000	(1000+1000)
	201 - 300	3 Box	3000.	(2000+1000)
	301 - 400	4 box	4000	(3000+1000).

$\boxed{100\text{ units}}$ → box.

1 Box = 100 unit

2 box = 200 unit.

Cost | Box = 1000

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Feature

1. Cost per lot **ALWAYS** remain same.
2. TC will Increase as no of lot Increase
3. Size of the lot $\boxed{\text{always}}$ remain Constant.
4. lot wise ⇒ Variable.
   within the lot ⇒ fixed.
5. Not possible to segregate with in Variable & fixed.
   eg:- Hire charges of the bus.
   Packing charges of box.
   Cost & No. of lot always maintain a linear relation.

6. Semi Fixed Cost

Opposite of Semi Variable Cost. (Type II)

eg Entrance fee at Park.

Fees charge by authority for every entry in Park. is as follows.

Student (No)	₹ (Entry Fees).		Student	Fees.
0-100.	500		0-100	500
101-300.	900.	OR	101-200	750
301-400	1000		201-300	1100
401-1000	1500.		301-400	1400.

Every lot has its own Cost.

Lot size are not uniform.

Cost will increase as no. of lot increase but never maintain linear relation.

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7) # 7 Discretionary Cost & Comitted Cost

Discretionary Cost

Features #1) Event has been decided but amount is uncertain.
i.e Amt to be incurred is depend upon circumstances.

2) Future Cost, It ~~will~~ Shall be incurred in future due to decision taken at the beginging of period.

3) eg. (a) Increase in salary (how much % increase, not decided)
(b) Staff Welfare Activities to be carried on
(c) Research and Developement Exp, Advt. Expenditure (uncert

(8) Committed Cost:-

1) Future Cost, the obligation of which has been already decided.
2) It does not include any $\boxed{\text{past Cost}}$
3) Event and Amount both have been fixed Certain
4) It is a $\boxed{\text{part}}$ of Sunk Cost. eg → Increase in Salary Amt with fixed % (say 5%), lease Rent, Patent Cost, Design.

Discretionary	Committed
Event decided & but Amt not decided	Event decided & Amt decided

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1) Increase in salary & wages with fixed % (5%) is considered as Committed Cost because
Event (Increase in salary & wages) &
Amt (5%) have been decided.

2) Amt to be incurred on Advertixement is Considered as Discretionary Cost because only event
Event (Expenses on Advt) has been decided.
& Amt decision is still pending.

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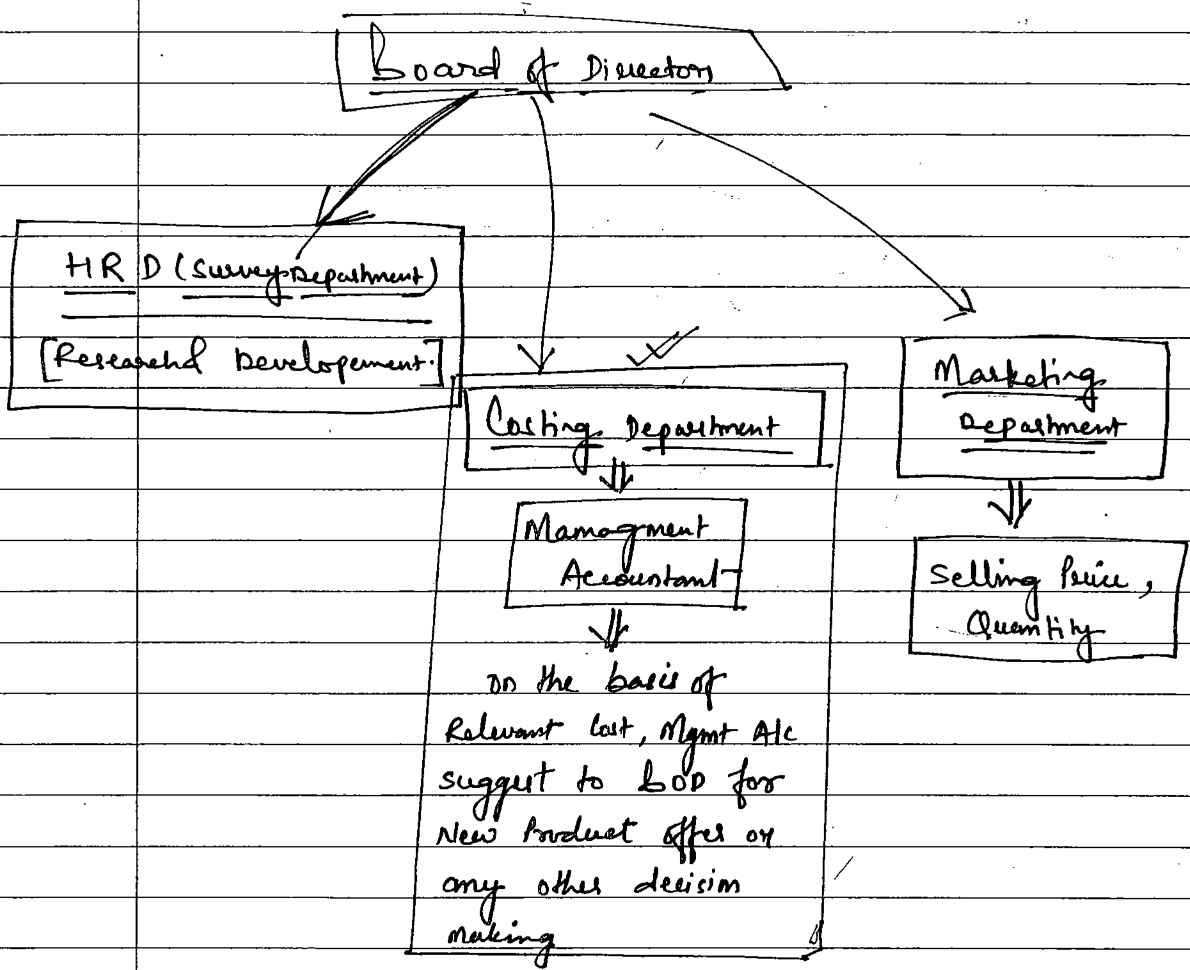
(3) Rent to be paid for next 6 month is considered as Committed Cost because event (Rent) and Amt (how much) have been decided in lease agreement.

(4) Amt to be incurred on Introducing a new cheaper subsitute Input to fuel the competition is considered as discretionary Cost because only event (Introducing Input) has been decided.

(5) Legal Consultancy fees payable is considered as Committed Cost because
Event (Legal fees) &
Amt (How much) have been decided.



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(Q1) Define the term "Relevant Cost"

OR

Explain Relevancy of Cost in the Context of decision Making.

Ans- (i) Relevent Cost means future Cost
(ii) It has an Influence over the decision of Decision Makes.
(iii) Cost to be incurred due to Acceptance of offer
(iv) Relevant Cost means the minimum amt to be charged from Customer.
(v) Relevant Cost Means the minimum Price referred to management.
(vi) Relevant cost does not include Past, sunk Irrelevant Cost.

"Offer" here means
(a) New Customer from New Market
(OR) (b) New Product having distinct feature

eg A Company produces 7000 Units & sales in local market. but has Capacity 10000 units
VC = 70/unit
FC = 10/unit (70000 - Rent, Depⁿ etc).
S.P. = 100.

Now Company receives an offer for ~~3000units~~ 3000 units & in order to accept this offer the Company will have to Incur extra supervisor Salary 25000. what should be the Relevant Cost (Minimum price) for this offer?

Sol Statement of Relevant Cost

Cost to be incurred due to offer :— ₹ 70 X 3000 unit (VC) = 2,10000
(FC) = 25000
Relevant Cost ⟹ 2,35000

Fixed Cost 10/unit i.e. 7000 otherwise will have to be incurred hence not to be charged.

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(9) # Sunk Cost ⇒

Features

① Past Cost (Incurred before taking the Decision)
OR
② Future Cost (obligation of which has been already decided)
[Committed Cost]

③ Sunk Cost has no relevance for decision making i.e, it should be ignored for all decision making.

eg-(a) Research & Development Cost incurred before taking the decision.
(b) Factory Rent
(c) Manager Salary
(d) Depreciation.

[Unavoidable Fixed Cost]

Company (Management)

[R&D ₹ 500000 Cost Incurred]

Costing Dept

⇓

features: Acceptable

Decision ⇒ Either to introduce such New Product / Not

S.P = 100 × 10000 Units = 1000000
V Cost 800000

∴ Sunk Cost not relevent for decision.
∴ Offer is Acceptable because.

X SP	1000000		S.P	10,00,000
V. Cost	800000		V Cost	800000
Sunk Cost =	500000		Profit	200000
X Loss	300000 X			

Because it is already incurred and if offer not accepted then it is can't avoidable.
then Loss = 500000 otherwise Loss = 300000 / Profit 200000

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(10) Lease Rent :- Salary

Regular Product [Capacity = 10000 units]

Qty	7000		
S.P.	100		
V.C	80	Now, Offer →	3000 units
F.C.	10 (7000)	V.C =	85.

Relevant Cost = 85 i.e, Cost to be incurred due to offer.
Fixed Cost = sunk Cost due to future obligation already decided.

(Q) "All sunk Cost are irrelevant, but irrelevant Cost are not sunk." Explain the Concept in the Context of decision making.

Answer

	Selection	~~Acceptance~~
~~Sunk Cost~~	✗	✗
~~Relevant Cost~~	✓	✓
~~Irrelevant Cost~~	✓	✓

eg Total Capacity = 10000 units
Qty (Regular Production) = 8000 units
Spare Capacity = 2000 units

VC = ₹ 70 PU
FC = ₹ 20 PU (₹160000)
S.P = ₹ 100 PU.

Co. receive two (2) offers from outside market for 2000 units

Customer x		Customer y	
S.P =	95 P.U.	S.P =	98 P.U
V.C =	70 P.U	V.C =	70 P.U
Packing (Other V.C) =	XX	Packing =	2 P.U.
FC =	20	F.C =	20 P.U.
~~Profit~~	25/- ✗	Profit =	26/- ✓

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Decision = which one should be selected & identify.

Relevant Cost = ₹21-
Sunk Cost = FC 20 (future obligation)
Irrelevant Cost = ₹70.

	Acceptance	Selection.
Relevant Cost	✓	✓
Sunk Cost	X	X
Irrelevant Cost	✓	X

[Q-1] "All Sunk Cost are irrelevant', but IRRelevant Cost are not Sunk", Explain the concepts in Context of decision making.

Answer All sunk Cost are irrelevant means Sunk Cost should be ignored for ~~eg~~ every decision due to either past or future obligation already decided. but irrelevant Cost means the Cost which ~~will~~ incurred with same amount ~~with~~ in each alternative & not to be Incurred in case of no alternative is going to select, hence we can say It becomes relevant for the decision of acceptance of offer. but it has no role for the decision of selection.

Decision	Relevant	Sunk	Irrelevant
(i) Either to Accept offer OR Not	Consider	Ignore	Consider.
(ii) Selection between alternatives	Consider	Ignore	Ignore.

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Benefits & Profit (Differences)

Sales	XX
(-) Variable Cost	XX
Contribution	XX
(-) Semi Variable Cost I, II	XX
(-) Semi Fixed Cost	XX
(-) Avoidable Fixed Cost	XX
Benefits	XXX
(-) Unavoidable Fixed Cost (sunk cost)	XXX
PROFIT ⟹	XXX

(II) Opportunity Cost ⟹

Opportunity Cost means benefits to be lost due to acceptance of offer.

Cost of next best alternative.

Benefits (Maximum benefits) which could ~~be~~ ~~ach~~ have been realised from next best alternative is the opportunity cost for the selected alternative.

Concept of Opportunity Cost is applied when
① we have different alternative
② All alternative to be considered as Mutually Exclusive event. (Means anyone could be considered)

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eg Mr x. CA

He is in Practice.

Client A = ₹ 50,000 P.a.

Client B = ₹ 60000 P.a.

Client C = ₹ 70,000 P.a.

What is the opportunity Cost for Client 'C'.

Answer Opportunity Cost ⇒ Zero. Because nothing to loose in favour of Client 'C'. All are not mutually exclusiven event

eg 'X' he is looking for a Job. At present he has no work to do.

Offer from Maruti Co. ⇒ 1200000 P.a.

Opportunity Cost ⇒ Nill. Because there is no alternative or nothing to loose.

(eg) Offer from Maruti Co. ⇒ 1,20,000 P.M.

offer from Nestle Co ⇒ 1,40,000 P.M

offer from Dabur Co ⇒ 1,50,000 P.M.

offer from A4. Co ⇒

Opportunity Cost for A4 = 1,50,000 P.M. because if he ~~not~~ not taken offer from A4 then he loose next Best offer from Dabur for ₹150000 P.M.

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Statement of Contribution

Product	A	B	C	D
Production (Qty)	$\frac{1000\ hr}{1\ hr}$ = 1000 unit	$\frac{1000\ hr}{1.25\ hr}$ = 800 units	$\frac{1000\ hr}{1.25\ hr}$ = 800 units	$\frac{1000\ hr}{2.00\ hr}$ = 500 units
Sale (Qty)	1000	600	900	600
Possible units (i)	1000.	600.	800	500
Contribution/units. (ii)	40-30= 10	50-20= 30	60-20= 40	70-30= 40.
Total Contribution (ii) x (i)	10,000	18000	32000	20,000.
Opportunity Cost.	32000	32,000	20,000	32,000.

(12)

Second Shift Working Vs Overtime Working.

If Demand for the product increase and its not possible to meet such demand (entire demand) in single shift. then Management would like to consider the following options.

I (a) Introduce a second shift

or

II (b) Either to introduce second shift or overtime.

Second Shift	Overtime.
# 6 p.m to 2. A.M. (8hrs)	6 p.m to 10. P.m [maximum 4hours]
# Always New Workers	Always Existing workers.
# Extra Labour Cost [Night Shift Allowances]	Extra Labour Cost [overtime Premium]
# Extra Fixed Cost always to be incurred [Extra managers " supervisors]	No Extra Fixed Cost.

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[I] Either to introduce second shift :- For this purpose/decision we should prepare "Statement of Cost benefits"

"Statement of Cost benefits"

Incremental Revenue		XX
Incremental Benefits		XX
	(a)	XXX
Less Incremental Cost		
Material	XX	
Labour	XX	
Variable O/H	XX	
Additional FC	XX	XX
	(b)	XXX
NET BENEFITS (a-b)		XXX

Incremental Cost Includes only the Cost which we will have to incur due to second shift. (Relevant). It does not include Existing FC (Sunk Cost)

[II] Management would like to consider either to introduce second shift OR Overtime

Statement of Comparative Cost

	Second Shift		Overtime	
(1)	Extra Labour Cost (Night shift Allowance)	XX	Extra Labour Cost [Overtime Prem]	XXX
	Extra fixed Cost	XX	Extra fixed Cost	—
		XXX		XXX

Select the option having least Cost.

Basic Material, Labour & Variable overhead were Continue to occur in each alternative, Hence called Irrelevant Cost.

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Working	Single Shift.	Overtime	Second shift
Qty	8000	7000	8000
FC	30000	—	6000 p.m.
VC.	10.	12. (2/- overtime Premium)	10.50 [Night shift Allowance

Statement of Comparative Cost. (Qty:-2000)

Second shift		Overtime.	
Extra Variable Cost = 0.5×2000 = 1000.		Extra Variable Cost 2×2000	= 4000.
Extra Fixed Cost	6000	Extra Fixed Cost	—
Cost.	7000	Cost	4000

Decision We should recommend to the management to introduce overtime working for next 2000 units. & basic V.C = ₹10/units is considered as irrelevant Cost.

(ii) let 'x' be the level of output where we have equal Cost

Relevant Cost in second shift = Relevant Cost in overtime.

$0.5x + 6000 = 2x$ till

$= 2x - 0.5x = 6000$

$= 1.5x = 6000$

$= x = 4000$ units.

Statement of Range.

Level	Preference.
0-3,999.	Overtime Working
4000	Second shift / overtime
4000 to 8000	Second shift.

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(iii) Working = ⇒ Single shift = 8000 units

⇒ Extra demand predicted = 6000 units

⇒ Accordingly: Second shift Introduced.

Actual Total Demand was found = 11000 → 8000 Single shift; 3000 Extra unit.

Indifference point = 4000 → Higher → second shift; Lower → overtime.

(iii) 3000 units (Extra demand) produced in the second shift due to incorrect demand prediction. However if we had predicted correct demand then such 3000 units would have been produced in overtime.

Statement of Comparative Cost. 3000 units

Second shift	₹	Overtime	₹
Extra Labour Cost (0.5 × 3000)	1500	Extra Labour Cost (2 × 3000)	6000
Extra Fixed Cost	6000		
	7500		6000

∴ Cost of Prediction error = 7500 − 6000 = 1500 ₹

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(i) Statement of Comparitive Cost — 200000 units

Second shift		Overtime	
Extra Labour Cost Nigh shift allowance. (40000 x 0.6)	24000	Extra Labour Cost (overtime Prem) (40000 Hrs x 3.5)	1,40,000
+ Extra fixed Cost		Extra fixed Cost	Nill
(a) Supervisory fees	3000		
(b) Security & Administrative Cost	40500		1,40,000
	94500		

∴ If 200000 units had been produced in Second shift then Cost would have been 94,500 instead of 140000. Hence ~~Profit~~ saving in cost = 45,500. obviously increase the profit by ₹ 45,500

(ii) Let 'x' be the Labour Hours where we have equal Cost in second shift and overtime.

Relevant Cost in second shift = Relevant Cost in overtime.

$x \times 0.6 + 70500 = x \times 3.5$

$= 0.6x + 70500 = 3.5x$

$\therefore 3.5x - 0.6x = 70500$

$\therefore 2.9x = 70500$

$\therefore x = \frac{70500}{2.9} = 24310.3448275$ hrs.

OR.

24310.3448275×5 units $= 1,21,551.724137$ units.

∴ Total Units = 500,000 + 1,21,551 units

= 6,21,551 units (Indeference Point)

Statement of Range.

Level (Units)	Preference
1,21,551.724137	Second shift / overtime
More than 121551.724137	Second shift
less than 121551.724137	Overtime.

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(iii) Working Note

500000 units —— 100000 D.L. Hour

1 units —— $\frac{100000}{500000}$ "

8,40000 units —— $\frac{1}{5} \times 840000$ "

= 1,68000 Hrs.

Statement of Profit

	₹
Revenue (2.75 X 840000)	23,10,000
Less:- Variable Expenses.	
Direct Material $\left[\left(\frac{280000}{700000} \times 840000\right) \times 1.05\right]$ (0.40) or [0.42 X 840000]	3,52,800
Direct labour [1,68,000 X 3.8]	6,38,400
Overtime Premium. (68000 X 3.8)	2,58,400.
Miscellaneous $\left[\frac{210000}{700000} \times 8,40000\right]$	2,52,000
Contribution Margin	8,08,400
Less:- Fixed Cost	5,30,000
Net Income. ⟹	2,78,400

Statement of Comparative Cost. [68000 Hrs]

Second shift		Overtime	
Night shift Allowance [68000 X ₹ 0.66/hr]	44800	Overtime Premium [₹3.8 X 68000 Hrs)	2,58,400
Extra fixed Cost [30000 + 40500]	70,500		
	1,15,380		2,58,400

∴ Saving in Cost due to second shift working
= [258400 - 115380] = ₹ 143020/-

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(13) **Concept of Efficiency :-**

(#) Efficiency has inverse relation with time. i.e, time reduce mean Higher Efficiency and vise-versa.

$$\therefore \boxed{\text{Efficiency} = \frac{\text{Standard Hrs}}{\text{Actual Hours}} \times 100}$$

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Statement of Cost Benefits $5\% \times 8 = 0.40$

		₹ in Lakh
Incremental Revenue (₹25 × 400000)		100
Incremental Benefits (0.4 × 800000)		3.2
	(a)	103.2
Less:- Incremental Cost [(2-5%) × 4kg]		
Material (7.6 × 400000)		30.40
Reduce by 20% ← ~~Labour~~ ($\frac{2hr}{80\%}$ i.e. $\frac{2}{80} \times 100 = 2.5hr$) [2.5 hrs × 2.75 ₹ × 400000 units]		27.50
[2.5 + 10%] Variable overhead [₹2 × 400000 units]		8
Avoidable Fixed Cost		30
	(b)	95.9

$\therefore$ Net Benefit (a-b) = ₹ 7.3 lakhs.

16.875x + 30 =

$\therefore$ Second shift would provide a benefits of ₹ 7,30,000.

Let 'x' be the unit to justify the second shift i.e

Total Revenue - Total cost = 0.

(#) Note At 400000 units we have benefits but we require No benefits hence Qty. would be less than 400000 units which mean total unit less 12 lakhs. Hence Discount cannot be availed.

$\therefore x \times 25 - [8 + (2.5_{hr} \times 2.75_{₹}) + 2]x - 30,00,000 = 0.$

$25x - 16.875x = 30,00,000$

$8.125x = 30,00,000$

classmate $\therefore x = \frac{30,00,000}{8.125} = 3,69,230.76923$ units Ans PAGE

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(A) Shut Down Vs Continue

A1 Here Shut down mean temporary closed & then Re-Continue the business, Temporary closed due to either recession period or off ~~session~~ season.

A2 Here Continue mean Continue the Business without shut down (uninterrupted).

[Q-] What are the Non Costing factors to be Considered in shut down | Continue Decision?

Ans ※ **Non Costing Factors**

(1) Labour Problem :- Some Expert (existing) may not be available at the time of Re-Start.

(2) Market share :- Competator may develope.

※ **Costing Factors**

There are three (3) types of Costs.

(1) $\boxed{\text{Unavoidable Fixed Cost}}$:- Such type of Cost will Continue to occur in both Case, Hense called Sunk Cost like Lease Rent, Permanent Labour Cost, Telephone bill (minimum) Cost, Depreciation, Manager salary.

(2) Avoidable Fixed Cost :- Such type of Cost to be incurred only when we decides to continue the business and will not incurr in case of shut down, Machine Rent, Temporary Supervisor. Always Called Relevant Cost.

(3) Extra Fixed Cost :- Such type of cost will have to be incurred only in case of ~~said~~ shut Down & Re-Continue but will not incur in case of Continuation. for example - Heavy Amount of Advertisement, Extra Maintainance Cost of Plant & Machinery

	A_1 Shut down & ReContinue	A_2. Continue.
Unavoidable F.C	✓	✓
Avoidable F.C	X	✓
Extra. F.C.	✓	X

Statement of Comparative Results.

A_1: Shut Down & Re Continue.		A_2: Continue.		
Contribution	Nill.	Contribution [Qty sold X Contribution/unit] 10000 X 4	XXX	40000
(-) Extra fixed Cost [only in A_1]	XXX 6000	(-) Avoidable fixed Cost	XXX	45000
Always.	Loss 6000.	Loss	XXX	5000

\# Select the option having least cost.

\# For shut down point i.e. the level of Demand where we have equal loss.

Losses in A_1 = Losses in A_2.

$= \quad 4x - 45000 = \text{Nill} - 6000$

$= \quad 4x = 45000 - 6000$

$\therefore \quad x = \frac{39000}{4} = 9750.$

$\therefore$ formula = Contribution/unit X x (units) − Avoidable fixed Cost = Nill − Extra fixed Cost.

$$\boxed{x = \frac{AFC - EFC}{\text{Contribution / Unit}}}$$

\# If Actual Demand falls below Shut down point, then better to Shut down the business.

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Working Qty = 200,000 p.a.

Qty / Quarter = $\frac{200000}{4}$ = 50,000 unit / Quarter.

But Now only 10,000 units / Quarter.

Fixed Cost = 200000 x 10 = 20,00,000 p.A.

∴ Fixed Cost / Quarter = $\frac{20,00,000}{4}$ = 5,00,000 / Quarter.

Unavoidable fixed Cost = 60,000 / Quarter.

∴ Avoidable fixed Cost = 4,40,000 / Quarter.

Extra fixed Cost = 12000 / Quarter.

S.P. = 20 / units.

VC = 5+2+3+2 = 12 units.

Contribution / Unit = 8 / units.

Statement of Comparative Results

A1 shut down		A2 Continue	
Contribution	Nill	Contribution (10000x8)	80000
(-) Extra fixed Cost	12000	(-) Avoidable fixed Cost	440,000
Loss.	12000	Loss.	3,60,000

∴ Better to shut down. = Let 'x' be the unit to have shut Down point.

∴ Shut Down point = $x = \frac{AFC - EFC}{Cont/unit} = \frac{\cancel{44}0000 - 12000}{8}$

$8x = \cancel{348000}$ 428000

$x = 53,500.$

∴ If Demand becomes less than 53,500 units, better to shut down.

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Working Note

SP = 8

VC = 75% of SP = 75% of 8 = 6

FC = 350,000

FC = 1,30000. (Unavoidable)

Avoidable FC: 220000 (350000 - 130000)

Statement of Comparative statement.

A1 = Shut		A2 - Continue	
Contribution	Nill	Contribution [95000 x 2]	1,90,000.
(-) Extra fixed Cost	(15000)	Less:- Avoidable fixed Cost	(2,20,000)
Loss.	15000	Loss ⇒	30,000

∴ Better to shut down.

Let 'x' be the unit to have shut Down Point

$x = \frac{AFC - EFC}{Cont/unit} = \frac{220000 - 15000}{2} = \frac{2,05000}{2}$

= ~~1005,2000~~ = 1,02,500 Units

Statement of Comparative Statement.

A1 = Shut Down		A2 = Continue.	
Contribution	Nill	Contribution (95000 x 4)	3,80,000
(-) Extra fixed Cost	15000	Less. Avoidable fixed Cost	(220,000)
Loss	15000	~~Profit~~ Benefit ⇒	1,60,000

∴ Better to Continue.

Let 'x' be the unit to be Shut Down Point

$x = \frac{220000 - 15000}{4}$: $4x = 205000$

= 51,250 Units. Ans.

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Working

Statement of Comparative Results.

A_1 Shut Down		A_2 Continue	
Contribution	Nill	Contribution $[5000 \times (14-x)]$	$70000-5000x$
(-) Extra fixed Cost	(2000)	(-) Avoidable fixed Cost	(20000)
Loss	2000	Loss.	$50000-5000x$

for shut Down Point.

$Loss_{A_1} = Loss_{A_2}$

$Nill - 2000 = 50000 - 5000x$

$5000x = \cancel{48000}\ 52000$

$x = ₹ 10.4$

∴ If Variable Cost becomes higher than ₹10.40/unit, then, better to shut Down.

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Working Note :- Is Production O/H is Variable or Not?

$$= \frac{11{,}400}{40\%} \times 60\% = 17{,}100.$$

as per Question, it is = 12,600

∴ It is not entire Variable Cost

& It is not entire Fixed Cost.

∴ We can say it is Mixed Cost. [Some part of Cost are Fixed & some are variable

	40%	60%
Production overhead	11400	12600
Administrative overhead	5800	6200
Selling & Distribution O/H.	6,200	6,800
	23,400	25600

$$\text{Variable overhead} = \frac{\text{Change in Cost}}{\text{change in \%}} = \frac{25600-23400}{60-40} \times 1\%$$

$$= 110 \text{ per } 1\%$$

	40%	60%
Variable O/H	4400	6600
	[110 X 40]	[110 X 60]
Fixed O/H.	19000	19000
	23,400	25600

Fixed Cost = 19000 for each Quarter.

8000 Avoidable

11000 Un Avoidable

Extra Cost = 7500 + 1000 + 4000 = 12,500

Recession ↓ 50% | 75%

Now | Next Quarter | X | ↳ 11000 + 8000 = 19000 → FC

~~Fixed Cost = 19000~~

11000 Unavoidable | 8000 ↳ Avoidable FC

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Statement Of Comparative Results.

A1 Shut Down			A2 Continue [50%]	
Contribution		Nill.	Sales	49,500
Less:- Extra Fixed Cost			Less:- Variable Cost.	
Closing Down	7500		Material. $\left[\frac{12000}{40} \times 50\right]$ =	15000
Maintainance	1000		Labour $\left[16000 \times \frac{50}{40}\right]$	20,000
Re-operating	4000	12,500	Variable Prod. O/H. [110 X 50]	5500
			Contribution ⟹	9000
Loss		12,500	Less Avoidable Fixed Cost	(8000)
			Benefits	1000

Its better to Continue the business in Next Quarter.

Statement of Profit. [At 75% Capacity]

Revenue			90000
Less:-	Material	$\left[\frac{12000}{40} \times 75\right]$	22,500
	Labour	$\left[\frac{16000}{40} \times 75\right]$	30000
	Variable	[110 X 75]	8250
	Fixed O/H	[Total]	19,000
Profit ⟹			10,250

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Working Note

Fixed overhead (Year) = ₹7 X 200000 units = ₹ 14,00,000.

Here Unavoidable F.O/H = ₹1,25000

Avoidable fixed O/H = ₹12,75,000

Extra Cost = 50,000 + 100 000 = ₹ 1,50,000

Labour Hours. = 1 Hrs/unit X 200000 Units = 2,00,000 Hrs.

200,000 Hrs

~~50%~~ 50%

i.e, 1,00,000 Hrs

₹ 40 X 100000 Hrs i.e 1,00,000 Hrs. [If No Production then 50% Idle]

₹ 40,00,000 (No use)

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Statement of Comparative Results. (let x be the level of output ~~to have equal loss~~

A1 SHUT DOWN	(₹)	A2 Continue	(₹)
Contribution	Nill	Contribution $(x \times [200-(65+Nill+33+16)]$	86x
Benefits from sunk Cost (40 X 100 000)	4000000	Less:- Avoidable fixed Cost (1400000 - 125000)	1275000
Less:- Extra Fixed Cost	1,50,000		
Benefits	38,50,000	Benefit	86x - 1275000

(1) Labour is Permanent, Hence would Continue to occur irrespective of our decision means called sunk Cost. (Hence ignored for decision i.e, unavoidable Cost)

At Shut Down Point

Loss in shut Down = Loss in Continuation.

$38,50,000 = 86x - 12,75000$

$86x = 3850000 + 12,75000$

$x = \frac{51,25000}{86} = 59,593 \cdot 0232558$ units.

∴ If Production Qty becomes equal to or more than 53,593 units then only we should Continue the business.

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#(15) Relevant Cost Of Material, Labour & Overhead & Machine.

Topic :- Acceptance of Offer.

Relevant Cost of Offer.

[Case No. 1] Obsolete Material (बेकार)

eg) (1) A Company has a material called M, Purchased for ₹500 (4 years ago) lying in godown as it is, it has no use (obsolete). Now, Company is deciding to resale this M material for ₹25 as scrap, but before selling Company receives an offer (in addition to the nature of related Product) which will require such material (M_1.)
Require = Available Current Purchase Price = 700 ₹
What would be the relevant Cost of M_1 for the offer?

Solution

M_1 (500) → Sale as scrap = ₹25
M_1 (500) → Offer (Current Purchase Price 700)
[₹500 ⇒ Sunk Cost ignore due to past cost]

(1) ₹500 → Sunk Cost (Ignore) due to Past Cost.
(2) Current Purchase Price has No Relevance. (No Question to Purchase)
(3) Opportunity Cost ⇒ M_1 → ₹25.

Statement of Relevant Cost

	(₹)
Cost to be incurred due to offer.	Nill.
Benefit to be lost due to offer [Opportunity Cost]	25
Relevant Cost ⇒	25

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(eg) 2 Mobile (old) purchased at 50,000 2 years ago.

Now, we are Considering to Sale

What should be Relevant Cost for 'Y'

Mr x as it is → ₹ 10,000 (Today's selling Price)

Mr. 'Y' →

Repair 2000 Cost

- battery - 500 (sale)

Statement of Relevant Cost.	₹
Cost to be incurred due to offer	2000
Benefit to be lost due to offer	10,000
(-) benefit to be achieved due to Offer.	500
Relevant Cost ⟹	11,500

[Case No-2] ⟹ TOXIC Material.

(eg) 3 x Company purchased material (M_1) ⟶ Toxic ₹ 1000 (4 years ago)

M_1

Cost of Removal will have to be incurred. → ₹ 90.

~~Offer~~ ⇒ M_1 will consumed. ⇒ Current Purchase Price ⇒ 1200 ₹.

Requirement = Available

Statement of Relevant Cost	
Cost to be incurred due to offer	Nill.
benefit to be lost due to offer	Nill
(-) benefit to be achieved due to offer	90
Relevant Cost ⟹	(90)

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[Case No-3] Substitute Material.

eg. (A) M_1 purchased for ₹500. 4 years ago. (wood Piece)
Lying in godown as it is.
Not in regular use ⇒ obsolete / slow moving / Non moving)

(A1) sale as it is as scrap ₹50.

OR

(A2) M_1 product can be utilized in a product in place of M_2 (Sunmica)
M_2 current Purchase price ⇒ ₹90

(A3) Offer - which require M_1 = Available.
current p.p. of M_1 = ₹500.

What is the Relevant Cost of M_1 for offer.?

Ans If we had not accepted the offer, benefit of M_1, would have been as under:

(a) Sale ⇒ ₹50.

(or)

(b) Saving in Cost = ₹90.

⇒ Which ever is having higher benefit have been selected.

(#) Higher benefit would have been selected but due to offer, such high benefits will have to be loosed. Hence it should be charged from offer as minimum amount.

Cost to be incurred due to offer	Nill.
+ benefit to be lost due to offer	90
Minimum Price ⇒	90

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[Case-No-4] Regular Use [Daily use in Production] होता रहता है

eg) Ansal & Co (construction)
(5) Regular business : Construction of flat

They have 1000 Cement bag in stock purchased @ ₹200 per bag (Just Last week)

Now Company receives an offer for the Construction of Guest House which will require 1000 cement bag, Cement Purchase price = ₹210/bag
What should be the Relevant Cost of 1000 bag for offer.

Statement of Relevant Cost	(₹)
Cost to be incurred due to offer. (₹210 X 1000 bag)	2,10,000
Relevant Cost ⟹	2,10,000

Self Note ⟹ In Normal Course we tried to purchase the resources from outside market instead of utilizing from regular stock. However, if such resource are in short supply (Could not be purchased from market), in that case we utilize such regular resource & reduce our regular production and Contribution to be lost. but such Contribution to be charged from offer.

(6) Same as above (5) example. (Except following changes)
Now Company receives an offer for the Construction of Guest House which will require 700 Cement bag.
C.P.P = ₹210 per bag.
(#) Supplier agree to supply in a lot of 1000 bag @ 210 ₹.

Ans

Relevant Cost	₹
Cost to be incurred due to offer [₹210 X 1000 bag]	210,000
(−) Transfer to Regular stock (₹210 X 300 bag)	(63000)
Minimum Price ⟹	₹1,47000

(*) Relevant Cost Of Machine

[Case - I] Obsolete

eg) Company has a machine purchased 4 years ago

Original Cost	= ₹	1,00,000.
(−) Depreciation	= ₹	1,00,000
W. D. V.		Nill

Company is considering to sale the machine as it is
Resale value now is ₹10000.
Now, Company receives an offer which will require such machine for next 3 month for ₹ 6000 (sale value)

Current Purchase Price (Replacement Cost)

Now	after 3 months
₹ 125000	₹ 110,000 → 3 महीने बाद मशीन इतने में बिकेगी।

Statement of Relevant Cost.

	₹.
Cost to be incurred due to offer.	Nill.
Benefits to be lost due to offer (10000 − 6000)	4000
Relevant Cost	4000

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[Case- II] **Regular Use**

Company has different machines which are of regular use (Daily) No surplus is held. Now Company receive an offer which will require a machine (M_1)

	Today	3 month late
M_1 Current Purchase Price = (Replacement Cost)	₹200000	₹1,90000
Re sale Value		20000

Statement of Relevant Cost

Cost to be incurred due to offer	200000.
(+) Benefit to be lost due to offer	—
(−) Transfer to Regular.	(1,90,000)
Relevant Cost ⟹	10,000

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Relevant Cost of Overhead.

Variable | Fixed

(1) Variable overhead always to be incurred only when labour Hours are being utilized and called Relevant.
~~eg~~:- Power | Petrol.

Fixed overhead :- Amount of Expenditure to be incurred in Totality. such type of Cost is divided into 2 types.

(a) Unavoidable fixed Cost :- Such type of Cost will Continue to occur irregular of decision, hence called Sunk Cost.
~~eg~~ Factory Rent, Manager Salary, Accountant Salary, Permanent Labour Cost, Depreciation of Machine.
Although Fixed overhead expressed per unit or per Hour but always incurred in Total.

~~eg~~ Factory overhead ₹ 100 000.
Qty (unit) 10,000
Fixed O/H per unit = $\frac{100\,000}{10000}$ = ₹ 10 per unit

After acceptance of offer fixed O/H = $\frac{₹100\,000}{12000}$ = ₹ 8·33/unit
But fixed overhead will remain same in total i.e, ₹ 100 000.

(b) Avoidable fixed Cost :- Such type of expenses will be incurred due to acceptance of offer, always Called Relevant Cost. eg:- Machine Rent, Temporary supervisory salary

In the absence of instruction always Fixed O/H means Unavoidable Fixed O/H unless untill expressed specially to be incurred due to acceptance of offer.

Change in Apportionment does not change in cash outflow.

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Relevant Cost of Labour.

LABOUR :— Direct Labour

(1) **Casual Labour :—** Such type of Labour can be appointed as and when required and can be terminated as and when not required. Payment will be made according to their work. No payment for Idle Hours.

(2) **Permanent Labour :—** Such type of Labour can never be retrenched / Terminated due to an agreement with Labour. Payment will be made irrespective of work.

[Sunk Cost in Context of Decision Making]

(3) **Short Supply & Busy :—** Short supply here means its not possible to appoint extra Labour from market to accept the offer.
'Busy' here means regular labour are providing same contribution from regular product.

[Case No-1] → Casual Labour + No short Supply

(eg) A Construction Company has at present 1000 Labour @ ₹50 per day for regular work.
Company receives an offer for the Construction of guest House which will require 50 Labour for next 10 days. Current Market Rate = ₹ 500 per day.
What should be Relevant Cost of Labour for offer?

Statement of Relevant Cost.	₹
Cost to be incurred due to offer	
Labour Cost [50 Labour X ₹500 X 10 days]	2,50,000
Labour Cost ⟹	2,50,000.

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[Case No-2] **Permanent Labour & No short Supply.**

(eg) A ~~Cost~~ Construction Company has at present 1000 labour @ 500 per day. For regular Work. At present management estimates that they have excess labour for next 5 days. But we cannot terminate such labour. Now Company receives an offer for the Construction of Guest House which will require 200 labour for next 5 days.

Current Market Rate = ₹ 500 per day. Calculate Relevant Cost of labour for the offer

Ans In order to accept the offer we require 200 labour for next 5 days. If we had not accepted the offer, existing 1000 labour would have been Continued to receive payment without any work, its better to utilise 200 labour, out of 1000 labour and No Extra cost will be incurred due to offer. Hence, Relevant Cost = Nill.

Statement of Labour Cost.

	₹
Cost to be incurred due to offer	Nill.

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[Case - No. 3] → Casual Labour, Busy, Short Supply

(eg) A Construction Company has 100 labour @ 500 per day. At present they are engaged in regular work and we estimates that they will provide the Contribution ~~of~~ to the Company as for next 10 days

Revenue = 12,00,000
less:- Material 300 000
labour 500 000 (100 × 10 × 500)
Contribution ⇒ 400 000

Now, Company receives an offer for the Construction of Guest House which will require 100 Labour for Next 10 days. Labour are in short supply.
What should be relevant Cost of Labour for the offer.

Solution

[Casual Labour + Busy with short supply]

Next 10 days:
Revenue = 1200 000
(-) Material = 300 000
(-) Labour Cost 500 000
Contribution. 400 000

Offer Next 10 days:

	₹
Cost to be incurred due to offer	500 000
+ Contribution to be lost due to offer	400 000
Minimum Labour Cost to be charged from offer.	900 000

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[Case- 4] **Permanent busy and short supply.**

(eg) A Company has 10 labour @ 500 per labour/day.
Nature :- Permanent [can't be retrenched]
Company estimates that they will generate the following Contribution in next 10 days.

Revenue	1,50,000
(–) Material Variable overhead.	60,000
Labour Cost $(\overset{\text{labour}}{10} \times \overset{\text{day}}{10} \times \overset{₹}{500})$	50,000.
Contribution ⟹	40,000

Now, Company receives an offer for the Construction of guest house which will require 10 labour for next 10 days & labour are in short supply. What should be relevant cost of labour for offer.

Solution Labour.

[Permanent + busy. with short supply] → next 10 days →

Revenue	1,50,000
(–) Material Cost	60 000
(–) Labour Cost	50 000
Contribution	40 000

[Permanent + busy. with short supply] → next 10 days offer

Cost to be incurred due to offer	Nill
+ Benefit to be lost including Fixed Cost (LC) (40000 + 50000)	90000
Relevant Cost of Labour. ⟹	90000

CRUX [Relevant Cost of Labour]

	Not Short Supply.	Short Supply.
Casual Labour.	Labour Cost ⟹ Cost to be incurred due to offer.	Labour Cost + Contribution to be lost.
Permanent Labour.	Surplus labour exist. Nill	Short supply + busy. Labour Cost :- Sunk Benefit to be lost ignoring sunk cost (LC)

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Statement of Cost Benefits

		Basis	Amt (₹)
Revenue (100000 X 30)		—	30,00,000
Less			
Relevant Cost			
Material	[W.N. 2].	[W.N. 2]	17,40,000
Labour	[W.N. 3]	[W.N. 3]	9,00,000
Foreman		[W.N #4]	9,000
	Net Benefits ⟶		3,51,000

[W.N. #1] Survey Cost ₹ 1 lakh is sunk cost due to Past Cost.

[W.N. #2] Relevant Cost of Materials.

	₹
A: Regular Use : [2 kg/kg X 100 000 units X ₹5/kg] Cost to be incurred ↑	10,00,000
B: Obsolete : 1,60,000 kg/unit X 2 ₹ ~~kg~~ [opportunity cost]	3,20,000
[Requirement = 3 kg X 100000] i.e. Remaining 1,40,000 kg X 3 ₹	4,20,000
	17,40,000

[W.N. #3] Relevant Cost of Labour.

Skilled labour. (Casual + Short supply busy.) — Per Hour. ₹.

Revenue	10
(−) Labour Cost	3
(−) Other Variable Cost	5.5
Contribution	1.50

Regular

Offer

Labour Cost	Per Hour	200 000 Hrs.
Cost to be incurred ~~due to~~ offer ⇒	3	600 000
+ Casual Labour.	1.5	300 000
	4.5	900 000

Unskilled Labour

Requirement 3 Hour X 100000 Unit

Available surplus 300000 Hrs.

Labour Cost Nill

Relevant Labour Cost → 900000

If we are not interested to accept the offer then also Company will have to incurr labour Cost with out any work. Hence Relevant Cost of labour Sunk.

[W.N. #4] Foreman

If we had not accepted the offer. Result would have been as under.

Today	Next Year	Year 2	......
⇓	⇓	⇓	and so on
Pension.	6000	6000 →	....

If we acept the offer.

Today	Next Year	Y2	....
⇓	⇓	⇓	and so on
Salary 15000	6000	6000 →	....

Pension ⇒ xx

∴ Cost to be incurred due to offer = 15000

(−) benefit to be achieved due to offer = 6000

9000

Comments → It is better to accept the offer due to incremental benefits of ₹ 351,000.

In the absence of instruction always we should Consider, Nature of Labour will be Casual.

We should Consider Permanent Labour in following situation:–

(a) Not to be Terminated/Retrenched.

(b) Employee

(c) IDLE wages.

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Statement of Average Variable Cost (Relevant Cost)

Particulars	Basis	Amt (₹)
Material	W.N. 1.	8,24,000
Direct Labour	W.N. 2.	5,00,000
Variable O/H. [₹10 X 100 000 Hrs]		1,00,000
Total Variable Cost		14,24,000
÷ Qty		10,000
Variable Cost / unit.		₹142.4/unit

[W.N. #1] Material. ₹

Ⓐ : Regular. 1 X 10,000 X 20 — 2,00,000

Ⓑ : Old Requirement — 10,000

obsolete :- 6000 X 8 : (opportunity Cost) — 48,000

out of stock : 4000 X 24 — 96 000

Ⓒ New stock : Out of stock

10 000 X 48 — 4,80,000

8,24,000

[W.N. #2] Labour 1 product require 0.25 Hours

∴ 10,000 product require 10,000 X 0.25 = 2500 Hrs.

Labour: skilled (casual + short supply)

Regular.

	2 Hours
Revenue	?
− Material & Variable overhead.	?
− Labour (80 X 2)	160
Contribution per 2 Hrs.	240

Offer (Labour Cost)	2 Hour	2500 Hrs.
Labour Cost	160	200 000
+ Contribution to be Cost	240	300 000
	400	500000

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~~Uns~~ Unskilled (Permanent : Surplus)

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Relevant Cost ⟹ Nill

[Availability = Requirement]

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W.N. (1) Q_1 Q_2

[Q] New product will be advertise in Q_1 with production & sale in Q_2

Expected Qty

[SP = 20]			[SP - 40]		
Qty	Prob		Qty	Prob	
6000	0.3	1800	4000	0.2	800
8000	0.7	5600	10000	0.8	8000
		7400			8800

Statement of Comparative Result

A_1 = [SP ⇒ 20] [Qty : 7400]		A_2 ⇒ [SP = 40] [Qty = 8800]	
Revenue	1,48000	Revenue	3,52000.
Less:- Relevant Cost		Less :-	
Material (W.N. #2)	(22200)	Material [W.N #2]	(15200)
Labour (W.N. #3) Gr-I	21600	Labour (W.N #4) G-I	~~27~~ 200
Gr-II	10200	G-II	14400
Variable O/H (W.N #5)	44400	Variable O/H (W.N # 5)	52800.
~~Fixed O/H~~		~~Fixed O/H~~	
Advertisement Cost	10000	Advertisement Cost	20000
Expected benefit	84000	Expected benefit.	2,52800

[∴ Better to accept Selling Price ₹40]

[W.N = 2] Material.

SP 20.	₹	[SP. 400]	
'x' Regular use		'x' Requirement	
[7400 unit × ₹3]	22200	1 Unit × 8800 unit × 3₹ =	26400
'Y' [7400 unit × 2 × ₹3]	(44,400)	'Y' 8,800 × 2 unit	
(benefit to be achieved)		= 17600.	
	(22200)	stock 16 000 in Godown	
		1600 out of stock	

∴ Cost to be incurred for 1600 units of Y.

₹4 - [1600 × 4] 6400

benefit to be achived due to offer.

[16000 × 3]

(48000)

(15200)

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Statement of Cost Benefits

Particulars	Amt (₹)
Revenue	40,000
(−) Relevant Cost	
Material (W.N.*1)	18,100
~~Loss~~:- ~~to~~ other	1,000
Net Benefits	20,900

Its better to accept the offer, due to incremental benefit of 20,900.

[W.N. *1] Material

₹

'A' Out of stock 8000
(4000 X 2)
(Cost to be incurred)

'B' Required ; 2000 unit.
Out of stock : 1400 X 3 4200
Regular use : 600 X 3 1800

'C' Required : 1000 unit.
Out of stock 300 unit x4 1200
Obsolete. 700 unit X 2 1400
(Opportunity Cost)

'D' Required : substitute use if we had not accepted the offer, benefits would have been as follow 1500

18,100

[W.N = 2] If we had not accepted the offer, Benefits would have been as follows.

(a) Resale : 3 X 200 = 600
or
Cost saving
'E' ~~300X3~~ = ₹1500

~~Higher benefit will have to be loosed due to offer.~~
Hence charged from the offer.

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Statement of Comparative Results.

[A_1] SP:20 Qty-7400	₹	[A_2] SP=40 Qty 8800.	₹
Revenue (7400×20)	1,48,000	Revenue (8800×40)	352,000
Less:- Relevant Cost		Less:- Relevant Cost	
Material (W_2)	(22,200)	Material (W.N_2)	(15,200)
Labour (W_3) Gr-I	(21,600)	Labour - G_1	27,200
Gr-II	(10,200)	G_2	14,400
Variable overhead (WN#4)	44,400	Variable overhead	52,800
Advertisement	10,000	Advertisement	20,000
Expected benefit	84000	Expected benefits	252800.

(#) Better to accept at SP.: ₹40.

W:N: 1 Q_1 Q_2.

Q_0 ⇒ New product will be advertised in Q_1 with production & sale in Q_2

Expected Qty [SP=20]

Qty	Probability	
6000	0.3	1800
8000	0.7	5,600
		7400

[SP=40]

Qty	Probability	
4000	0.2	800
10000	0.8	8000
		8,800

[W.N#2] Material

[SP. 20] ₹

'x' Regular use (7400×3 (₹)) 22,200

'y' (7400units × 2 Hrs/unit × ₹3) (44,400)

Benefits to be achieved due to offer. (22,200)

[S.P= 40]

'x' Requirement (1 Hrs × 8800 units × ₹3) 26,400

'y' (8800 unit × 2 Hrs/unit) = 17600 unit

~~out of stock~~ (in godown) 1600 unit

out of stock 1600 unit

Cost to be incurred for 1600 unit of 'y' @ 4 ₹ = 6400

Benefits to be achieved due to offer (16000×3) (48000)

15,200

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[W.N.=#3] Labour [Grade-I]

SP = 20 ; Qty = 7400

Grade I   7400 units X 2 hrs
= 14800 hrs.

4000 Hrs
Idle Time
(No extra cost, payment will have to be incurred otherwise)
No Relevent for our Decision.

10,800 Hrs.
(New appointment) X 2
= 21,600 Hrs.

∴ For 4000 Hrs = Nill
For 10800 Hrs. 21600
21,600

[Grade-II]

7400 ~~Hrs~~ units X 1 Hrs. = 7400 Hrs.
for 4000 Hrs (Idle Hrs) : Nill
balance 3,400 Hrs X ₹ 3   10,200
(New appointment)
10,200

[WN= #4]

[S.P= 400] [Qty = 8,800]

Grade I [8800 unit X 2 Hrs]   17600 Hrs
For 4000 Hrs (Idle with No Extra Cost)   Nill
Balance 13600 Hrs @ ₹ 2   27200
27200

Grade-II [8800 X 1] unit Hrs. : 8800 Hrs
4000 Hr from Idle = Nill
balance (4800 Hrs @ 3 ₹) 14400
14400

[W.N#5] Variable O/H

[SP 20] Qty = 7400.
Grade I = 7400 units X 2 Hrs = 14800 Hrs.
Var. O/H = 14800 Hrs X ₹2 = 29600 ₹ (#)
Grade-II   7400 units X 1 Hrs. = 7400 Hrs
Var. O/H   7400 ~~Hrs~~ X ₹ 2 = 14800 ₹ (#)
~~37000~~
44400

S.P. [40] Qty = 8800.
Grade-I [8800 Unit X 2 Hrs] = 17600 Hr
Var. O/H = 17600 Hrs X ₹2 = 35200 #
Grade II [8800 units X 1 Hrs] 8800 Hrs
Variable O/H: 8800 Hrs X ₹2 = 17600 #
52,800

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Statement of Minimum Price

		₹
Cost to be incurred due to offer.	60×2	120
Benefit to be lost due to offer.	(8000-7500)	500
Minimum Price charged ⇒		₹620

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~~Statement of Relevant Cost~~

Machine - M_1		
Regular: Cost to be incurred.	80000	
(−) Transfer to Regular.	(65000)	15000
Machine - M_2 Benefit to be Lost (11000 - 8000)		3000 -
Fixed overhead.		20000 (Sunk)
(Qty 10000 × ₹2) Relevant Cost ⇒		38000

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Statement of Cost Benefit.

		₹
Incremental Revenue [300000 - Nil]		300000
Less Relevent Cost		
Research Staff. (W.N #2)		80000
Equipment (W.N. #3)		9000
Material. [W.N#4]		(5000)
Labour. [W.N#5]		90000
Consultancy [W.N#6]		
Cost to be incurred due to offer	4000	
Benefit to be achieved " " "	(1500)	
Cancellation charge saved	2500	2500
Net Benefit ⇒		1,23,500

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[W.N. #1] ₹ 1,50,000 is our Sunk Cost due to Past Cost

[W.N. #2] Research staff

Cost to be incurred due to offer (Continuation of Work)	60,000
Redundancy Payment (35000 - 15000)	20000
(already paid)	80,000.

[W.N. #3] Equipment

3 years ago Past Cost 18000 (Sunk Cost)
Today. Residual value = 8000.
Withing two (2) year Residual 3000 & within 1 year: Residual = 6000.
Benefit to be lost due to offer = 2000 (8000 - 6000)

General building expenses like Rent Salary etc will have to incur with a same amount irrespective of acceptance of offer. Hence called Sunk Cost, should not be Charged.

Opportunity Cost (Rent forgone due to acceptance of offer) 7000.
9000

[Working Note - 4] Material

Material
Cost incurred before Decision taking, Called Sunk.
Benefit to be achived due to offer. (5000.)

[W.N. #5] Labour

Casual + Being Regular → Revenue 1,50,000
Short supply

Material Cov	60000
Labour	40000
Contribution	50000

Offer

Labour	40000
Contribution ~~lost~~	50000
lost	90000

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W.N. If Work is not Completed then only Otherwise not contract on Consultant would be cancelled at cost ₹ 1500.

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Statement of Minimum Price

Material 'A' (5000 kg × ₹15) opportunity cost	75000
Material 'B' (8000 kg × ₹25) cost to be incurred	2,00,000
Other Hardware item	10,000
Department 'X' [5 Labour × ₹ 7000]	35000
Department 'Y' [3000 Machine Hrs × ₹5/M·H]	15,000
Pattern and specification	15000
Minimum Value Required to accept the order.	3,50,000

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Statement of Minimum Price

	₹
Material 'A' (Opportunity Cost)	200
Labour (Permanent)	Sunk
out of Pocket expenses	400
Fixed overhead	sunk
Minimum Price to be charged ⟹	600

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Statement of Cost-benefit

Revenue (₹25 X 40 000 units)			10,00,000
Less:- Relevant Cost			
	Research & Design Cost	1,50,000	
	Manufacturing Cost (₹16 X 40000)	6,40,000	
	End of life Cost	70,000	
	Promotion & Capacity	20,000	(8,80,000)
	Net Benefits		1,20,000

∴ The product should be introduced. although Mark up is not achieved.
Markup :- Notional Profit for decision making.

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Statement of Cost Benefits

		₹ in lakh
Revenue (50000 unit @ 1000		500
Less:- Relevant Cost.		
	Material [W.N #1]	(409)
	Labour [W.N ~~#4~~]	(27)
	Foreman Labour Cost	(2.4)
	Machine [W.N #6]	(0.18)
	Variable Overhead [W.N #7]	(0.60)
	Opportunity Cost [W.N #8]	(2.06)
	Benefit ⟹	427.66 lakh

Decision Its better to accept the Contract offer. due to incremental benefit of ₹ 427.66 lakh.

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Working Note - [#1]

Survey cost (₹100000) is sunk Cost (Past Cost)

[Working Note - #2]

	₹
M_1 = [1 Kg × 1 unit × 50000 unit × ₹2] (out of stock) ∴ C.P.P. is relevant	100000

M_2 = [2 unit × 50000 unit] Require = 100000 unit M_2.

Alternative-1	Sale	2 × 100000	=	200000	
(or) Alternative-2	subuse	3 × 100000	=	300000	300000

Higher benefit is our opportunity cost

M_3 :- Require [1 unit × 50000 unit] = 50000 unit of M_3.

Stock: opportunity cost of M_3 (50000 Unit × 70 ₹)	3,50000

M_4 :- Require [50000 unit × 1 unit M_4] = 50,000 M_4.

Out of Stock: 30000 unit × 5 =	150000
Benefit to be achieved: 20000 unit × 2 =	(40000)
	40,90,000

[Working #3] M_3

If we had not utilized M_3 for offer, Utilization of M_3 would have been [already purchased]

S.P	450			450	
(-) Material	50	(5×10)	-	(Ignore sunk cost)	
(-) V.C	100			100	
Contribution	300			350	∴ 1 M_1 = 70.

M_3 Purchased Qty = 200000
Required 50000
offer

opportunity cost = 70.
of M_3/unit of M_3

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M_3 Could not be purchased/sold
Purchased Cost is sunk ∴ Ignored.

[Working Note #4] Labour

	₹
Skilled Labour (Grade-I) [2 hr X 50000 unit X ₹ 1/hr] [Casual ∴ Cost to be incurred]	1,00,000
Unskilled Labour : (Permanent) [3 hr X 50000 unit] = 1,50,000 Hr. [Future obligation already Decided]	Sunk Cost.

Semi-skilled labour : [Casual] + [Busy] + short supply]
Require ⇒ [4 hr X 50000 unit] = 2,00,000 Hr.

Casual + busy + short supply

→ 'L' Product

Contribution = 24.

S.P	₹
Lab.	8 (₹2X4 hr)
V.C	₹
Contribution	24

∴ Contribution/Hr = 6.

→ offer.

Labour Cost	₹ 2/hr
Contribution	6/hr
	8/hr.

∴ 2,00,000 hr X ₹ 8 =	16,00,000
Highly skilled Labour (Gr-II)	10,00,000.
	2700000

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Working Note #5 Highly skilled labour (Gr-II).

5 ₹ is our sunk cost because employee are of Permanent nature (Always)

Cost to be incurred due to offer. 10,00,000.

[4/hr X 50000 unit X ~~₹~~ 5hr]

[Working Note # 6] **Machine**

MT-4	Regular use.	₹
	Cost to be incurred.	80000
	Transfer to regular stock.	65000
	Difference on Replacement Cost	15000
MT-7	Benefit to be lost	11000
	Benefit to be achieved.	8000
	Difference of Resale	3000

Total = 18000.

[Working Note #7]

$$\text{Fixed overhead Recovery Rate} = \frac{\text{Budgeted O/H}}{\text{Budgeted Hr. of Regular work}} = ₹\,3.5/\text{hr.}$$

Fixed overhead continue to occurs with same amt Hence called Sunk Cost.

Variable ~~of~~ overhead = ₹ 1.2/~~Unit~~ X 50000. 60000.

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Working Note #8 Benefit from 5000 unit of 'Y'

		₹
Revenue	(5000 x 70)	3,50,000
Less:- ~~Relevant~~ Material	(₹12 x 5000)	(60 000)
Labour	(5000 unit x 4 hr x ₹1)	(20 000)
Variab overhead	(₹1·2 x 5000)	(6000)
Avoidable fixed overhead		(58000)
		~~3,22,000~~
Benefit from Product 'Y'		2,06,000

~~(27)~~
~~Page-25~~

Statement of Relevant Cost.

	(₹)
Relevant Cost	
Material [W.N #1]	32,200
Labour [W.N #2]	42,250
Fixed overhead [W.N #3]	~~42000~~
Minimum Price ⟹	74,450

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[Working Note #1] Material.

Material [A]	Out of Stock [1000 unit X ₹10]		10,000
	Resale value (opportunity cost)		
	Sale 1000 unit X ₹2 =	2000	
	(-) Expenses	300	1700
" [B]	Regular Use.		
	Cost to be incurred @15 X 1000 kg		15000.
" [C]	Alternative -1 Sale	6000	
	Alternative -2 Substitute use	8000	
	Higher of above to be charged		8000
" [D]	Benefit to be achieved (50X50)		(2500)
			32,200

[Working Note #2]

	₹
Skilled Labour [1000 hr X ₹25/hr]	25000
Semi-skilled Labour: Spare: Payment will have [1500 hr] to be ~~paid~~/made	
500 hr : Extra to be appointed [[15+7.5] X 500]	11,250
Unskilled Labour: [Casual + Busy] = (500X12)	6000
	42,250

Regular

Revenue — X
(-) Labour X
(-) Mates. X
Contribution 2/hr

Offer

Labour Cost 10
Contribution 2
12

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we have two option either to appoint New worker @ 20 ₹ per hour or shift from Regular work. then Relevent Cost = ₹12.

Better to shift from Regular.

[W.N.#3] fixed overhead = sunk ~~Cost~~
already incurred before taking the decision is called sunk Cost.

Travel Exp. already spent. is sunk Cost.

[W.N.#4] Minimum Profit required by management has no relevance for Decision making.

Notes.
1. 25 men day = Lab > 1, day = 1, 25 labour for 1 day
2. 25 man days = Lab = 1, day > 1, 25 days for 1 labour
3. 25 men days = Labour > 1, day > 1, 5 labour for 5 days (say)

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Statement of Minimum Price

	₹
Cost to be incurred to Complete the Job	50,000
Cost to be incurred to Modification in Job [W.N#1]	17,500.
Benefit to be lost [W.N#2]	36,600.
Benefit to be achieved [W.N#3]	~~1950~~ (19550)
Minimum Price ⟹	84,550

[W.N.#4] Benefit to be achieved.
- Cost saving 20000
- Labour cost 'A' first day / Labours x 1 days
  1 x 100 100

'B' Second Day = 1 Labours x 2nd days. 150
= 1 ~~00~~ x 150
V.O. = 100 / lab / Day x 2 Day
~~20,250~~
(1950)

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[W.N. #1] Modification Cost

Department 'B'

Casual + busy

Revenue	✓	
(-) Labour	100	
(-) O.C.	✓	
Contribution	500	[5×100]

Offer.

Labour Cost	100
Contribution lost	500
	600

Per man / Per Day.

∴ Relevant Cost of labour = 100×25 — 2500

Contribution Lost .. 500×25 — 12500

15000

[~~W.N. #2~~] Variable overhead.

100% of Direct wage. = [2500×100%] = 2500

Fixed overhead (sunk — sunk

17500

Working Note (2)

Benefit to be lost

Cost saving	12000.	
(-) Cost to be incurred.	₹ 200	
Labour Cost [2 labour × 1 day × 100 /day)		
Variable overhead. (100% × 200)	200	
	11,600	11600.
+ Sale of Material.	10000	10000.
Sale of Drawing		15000
		36,600

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[W.N. #4] Benefits to be achieved.

Cost saving — 20 000

(−) labour Cost 'A' [1st day / labour × 1 day] 1×100 — (100)

2nd day (1 labour × 2 days) ~~20×~~1×150 — (150)

Variable O/H 100 labour per day × 2 Day = — (200)

19,550

Note If Variable O/H express as % of labour Cost It does not mean if labour rate increase, ~~so~~ variable O/H also increase. % is just a relation, to be applied only on basic wages.

(20) ~~Page-20~~ (a) Relevant for the decision because

(i) Future Cost

&

(ii) To be incurred due to New product

Although Fixed but avoidable.

(b) ₹500 Running Cost of New Machines Hence Relevant Cost as future nature. Reduction in Absorption does not change Cash outflow i.e.

Note :- Absorption / Apportionment / Allocation = Always Sunk.

i.e. one apportionment decrease correspondingly other increase i.e. Total remains same, Hence Not Relevant.

(c) Only 1 month Cost i.e ₹125 is Committed / sunk Cost for next month.
Hence Not Relevant for decision only ₹125 (next month expenses. but next to next months will be Relevant Cost.

(d) Due to Past Cost :- Sunk / Non Relevant Cost

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S.No. Item

(26) (a) Statement of Relevant Cost

[Page-24]

Specialised Machine (Relevant Cost) [W.N. #1]	25000
Running Cost [₹720/week X 10 week]	7200
Depreciation	Sunk Cost
Skilled Labour [W.N.#2]	99000
Unskilled Labour [12000 hr X ₹8/hr]	96000
Supervisor Cost [W.N.#3]	500
Material [A] [W.N #4]	15000
Material [B] [W.N.#5].	35000
Minimum Price. ⟹	2,77,700

(b)

Relevant Cost	2,77,700
Profit	1,25000
	4,03200

[W.N#8]

Financial Profit Means

Revenue — xxx

(−) All Expenditure (xxx)
[Relevant, Sunk Cost, Non Financial Item]

xxx

[Working Note #1] Machine

Alternative 1 = Hire charges. 10weeks X 4000/week = ₹40000

or

[Alternative-2 Purchased] = Cost to be incurred 2,50,000

less:- Rental Income [30week × ~~2500~~] (75000)

Sale of Machine after 1year (1~~50000~~)

~~100~~ 25000

∴ Relevant Cost = ₹25000

[Working Note #2] Labour (skilled)

[Alternative 1] Either appointed New [9000 hr X ₹12] 1,08,000

or

[Alternative 2] ₹10/hr sunk Cost [∵ Permanent Employees]

New Workers Payment [₹11/hr X 9000 hr] 99000

Alternative 2 is better. i.e. ₹11/hr for 9000 hr ⟹ 99000

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[Working Note #3] Supervision Cost

Requirement : 500 hrs.
Overtime hr: 300 hrs No Extra Cost but bonus of ₹5500 to be paid.
Regular hr: 200 hrs No Extra Cost

₹ 50,000 / year Sunk Cost.
only ₹ 5500 = Relevant [Cost to be incurred due to offer].

[Working Note #4] [Material A]
Cost to be incurred due to offer ₹ 15000.

[Working Note #5] Material B

• Out of Stock = 5000 square meter
Cost to be incurred [5000/sq. mt X ₹5/sq. meter] 25000.

• Obsolete · 5000 Square Meter
Resale Value / opportunity Cost = [5000 sq. mt X ₹2/sq. meter] 10,000
35000

[Working Note #6]
Cost incurred before taking the decision to analyse the project 25000 is our Sunk Cost.

[Working Note #7]
40% of Prime Cost is the Policy, It does not involve any Cash outflow i.e. not to be incurred due to offer. Hence Called SUNK COST for Quotation of Minimum Price (Relevant Cost Concept). Mark up is only Company's Policy but not any benefit to be lost due to acceptance of offer. Hence ignore.

[Working Note #8]

(b) Financial Profit analysed at the end of year after Considering all relevant cost, Sunk Cost & Non Financial Expenses. eg Dividend Paid, Tax paid, Loss on sale of Assets, Discount on issue of shares etc. but in Relevant Cost Concept we consider only Relevant Cost, i.e. ~~Ignore~~ Sunk Cost & Non Financial Expenses.

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#(16) Concept of Profit Centre & Cost Centre :-

Profit Centre :- Profit Centre means a Unit of Company in which profit occurred on Regular basis, Profit here means Substantial Profit.

Substantial Profit Occurred only when we utilize our Major Capacity i.e. No Spare Capacity exists.

It means we can say in order to accept the offer we will have to loose some Contribution from regular Work in Profit Centre.

[Minimum Price for Acceptance of offer in Profit Centre] = [Cost to be incurred + Contribution to be lost due to offer (from regular work)]

Cost Centre :- [Loss Making Unit]

A unit of Company not having Substantial Project Constantly, that unit of the Company is known as Loss Making Unit i.e, Cost Centre.

When Regular Production becomes just closer to Break Even Point i.e, Sufficient Capacity always remains idle.

[Minimum Price for Acceptance of offer in Cost Centre] = [Only Cost to be incurred due to offer]

[#] In the absence of instruction about the nature of Centre, always we should Consider Cost Centre.

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Statement of Minimum Price.

Employee Cost
'A' (Permanent i.e idle) Sunk

Overhead.
Fabrication shop. [W.N. #1] 12500
Welding shop [W.N. #2] 4800

Minimum Cost ⟹ ₹17,300

[Working Note #1] ⇒ Fabricated shop. ie Profit Centre
No spare Capacity from Regular work

Minimum Price = Cost to be incurred due to offer + Contribution to be lost (25-7)

= [7 + 18] = 25.
= [500 hr X ₹25] ₹ 12500

[Working Note #2] ⇒ Welding shop. [Cost Centre (silent)]

Minimum Price = Cost to be Incurred.
= ₹ 16/hr X 300 hr.
= ₹ 4800

[Working Note #3] ⇒ Planning and Design engineers worked before taking the decision. Hence called Sunk Cost.

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(17) [#] Quotation of Minimum Price :- [Pricing Decision]

We have two (2) type of system.

(a) Marginal (Decision Making / Relevant Costing)

(b) Absorbtion (Traditional / Conventional)

(b) If management would like to know the price for regular product, we should follow the system known as Absorbtion Costing.

[PRICE = Total Cost + MARK UP]

Total Cost = [Variable Cost
+ Avoidable fixed Cost
+ Unavoidable fixed Cost.]

Here Total Cost exclude only Non financial Item eg. Discount on share / Debenture, Goodwill written off, Preliminary Expenses, Dividend, Tax paid. Absorbtion does not help to take any decision.

(a) If Management would like to know the minimum price for acceptance of offer, then Management Accountant should follow the system known as the "Marginal Costing / Relevant Costing".

Minimum Price = [Relevant Cost
+ Variable Cost
+ Avoidable fixed Cost.]

If we have long term decision i.e. Quotation for a product having life more than 3 year.

[Minimum Price = "Present Value of Future Relevant Cost to be Incurred in life of Product"]

or [Minimum Price − Present Value of Future Relevant Cost] = 0

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Note ⇒ Calculate Price ⇒ [Absorption : TC + Mark up]

Calculate Minimum Price ⇒ [Marginal = Relevant]

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Statement of Minimum Price. [Let Minimum Price = x]

1–5 Years (Per year)		6 to 10 Years (Per year)	
Revenue	17000x	Revenue	7000x
(–) Relevant/Cost			
Variable Cost [60×17000]	10,20,000	[₹60 × 7000 unit]	4,20,000
Avoidable Fixed Cost	1,12,500	⇐[75000+37500]⇒	1,12,500
Profit before Tax before Depreciation	17000x – 11,32,500		7000x – 5,32,500
Profit after Tax	(17000x – 1132500)×60%		(7000x – 532,500)×60%
+ Tax saving due to Depⁿ.	4000	+	4000
Net Revenue	(10,200x – 679500) + 4000 i.e. [10,200x – 675500]	Net Revenue =	[4200x – 3,15,500]

Present Value of Net Revenue for Next 10 year = $\left[\left[(10200x-675500) \times 3.79\right] + \left[(4200x-315500) \times 2.355\right] + (6000-0) \times 0.386 \times 60\% \right]$

$98842 = \left[\left[38658x - 25,60,145\right] + \left[9891x - 743,002.5\right] \right] + \cancel{2316}\ 2316 \times 60\%$

$98842 = \left[38658x - 25,60,145 + 9891x - 7,43,002.5 + \cancel{23160}\ 13896\right]$

$\therefore x = 69.79$

[Working Note # 1]

1–5 year:

Qty	Prob.	Demand
20000	0.1	2000
10000	0.6	6000
30000	0.3	9000
[Qty to be demand every year for upto 1st 5 years]		17000

6 – 10 year

Qty	Prob	Demand
12000	0.20	2400
8000	0.50	4000
2000	0.30	600
Qty every year for 6 to 10 year ie next 5 year.		7000

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[Working Note #2]

Survey Cost ₹ 40000 & Consultant Cost ₹ 7500 incurred before introducing the project is known as Sunk Cost.

[Working Note #3]

Fixed overhead = 20/unit ⇒ Sunk Cost.

[Working Note #4]

Material = 50000 X 120% = 70 000

Labour = 30 000

Relevant Cost of Machine 1,00,000

$$\text{Depreciation} = \frac{100000}{10} = 10{,}000 / \text{Years.}$$

Tax benefit due to Depⁿ = 40% of 10000 = 4000

Present Value of Cash outflow.

Capital Cost of Machine		100000
(-) Sale Value of Machine	5000	
Written Down Value	Nill	
Short Term Gain	5000	
(-) Tax @ 40%	2000	
	3000	
	~~x 0.386~~	
PV =	0.386	1158
PV of Cash outflow		98842 I

For Minimum Price

PV of Net Revenue = PV of Cash out flow. II

$$98842 = 3.79(10{,}200x - 675500) + (4200x - 315500) \times 2.355 + 60000 \times 60\% \times 0.386$$

$$= 38658x - 2560145 + 9891x - 743{,}002.5 + 13896 = 98842$$

$$= 48549x = 32{,}89{,}251.5 + 98842$$

classmate $x = \frac{3{,}3{,}88{,}093.5}{48549} = 69.79$

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All revenue receipt should be accepted along with revenue nature of expenditure. Hence scrap sale Adjusted in the Calculation of Net Revenue.

II All Capital Receipt should be adjusted with Capital Expenditure like sale of Machine should be adjusted with Capital Cost of Machine.

III If it is ~~stated~~ Written that full Cost of Machine will be Depreciated then Depreciation = $\frac{\text{Total Cost}}{\text{Life}}$ and sale value at the end is treated as Short Term Capital Gain entire

(6) [Page-11]
(i) Committed Cost ⇒ Event i.e. Advertisement Program as well as Amt i.e. ₹ 12,00,000 already decided.

(ii) Differential Cost ⇒ Change in Cost due to change in Alternative.
i.e. Relevant

(iii) Sunk Cost ⇒ Already incurred before taking the decision.

(iv) Opportunity Cost ⇒ benefit to be lost

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(32) [Page-31] Company Adopted Absorbtion
but we should follow Marginal (Decision Making)

# Absorbtion Costing		# Marginal Costing	
Variable Cost	xx	Variable Cost	xxx
Fixed Cost (AVFC) + (UNAFC)	xx	Avoidable Fixed Cost	xxx
Total cost	xxx		
+ Markup	xx	Market Price	xxx
Price	xxx		

Statement of Cost-Profit
(as per Company's Policy)

"Regular Work"		₹ in Lakh
Material		3.60
Labour		6.40
Prime Cost		10.00
+ Factory overhead		
Variable	2.20	
Fixed	2.60	~~4.80~~
Administration	1.80	
Fixed selling O/H	0.40	7.00
Commission	~~1.00~~	1.00
Total Cost.		18.00.
+ Profit [1/9 of 18]		2.00
Sale value. ⟹		20.00

Statement of Price (order) [As per Company]

	₹
Material	36000
Labour	64000.
Variable overhead $\left[\frac{2.20}{6.40} \times 64000\right]$	22000
All fixed overhead $\left[\frac{4.80}{6.40} \times 64000\right]$	48000
Commission (5% of sale)	10,000
Total Cost	1,80,000
Profit (1/9)	20000
Price of order.	2,00,000

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Statement of Minimum Price.
(as Per Relevant Cost / Marginal Costing)
Management Accountant)

Cost to be incurred.

Material	36000
Labour	64,000
Variable overhead.	22,000
Relevant Cost	1,22,000.

As per Relevant Costing, We should Accept the offer because Relevant Cost, is 1,22,000, less than offer Price - ₹150000

1) Unavoidable Fixed Cost should not be Considered due to sunk Cost

2) Commission would not become payable because Customer Comes directly or directly approached.

3) Cost Centre, Spare Capacity, i.e. no profit will have to be loosed.

(3A) [Page-3A]

Capacity	Cost/unit	Total Cost
70 000	97	67,90,000
80 000	92	73,60,000
90000	87	78,30000
100,000	82	82,00,000.

Such Type of Cost is either Mixed or Differential.
This is Differential due to Export Incentive.

Let take entire variable.
Differential Cost is Relevant Cost
Differential Cost = 73,60,000 - 67,90000 = 5,70,000

Cost to be incurred due to offer. = 10,000 X 92 = 9,20,000
Benefit to be achieved = 70,000 X 5 = 3,50,000
5,70,000

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Relevant Cost ⟹ PAGE 071

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If it had Mixed Cost, when Variable Cost/unit would have been same and Fixed Cost in total also same.

$$VC/unit = \frac{\text{Change in Cost}}{\text{Change in Qty}} = \frac{73{,}60{,}000 - 67{,}90{,}000}{80{,}000 - 70{,}000} = 57/unit$$

∴ Fixed Cost of 70000 = [6790000 − (57 × 70000)] = 28 00 000

Fixed Cost of 80000 = [73,60 000 − (57 × 80000)] = 28 00 000

Fixed Cost of 90000 = [7830 000 − (57 × 90000)] = 27,00,000.

Fixed Cost of 100 000 = [82,00,000 − (57 × 100 000)] = 25,00,000.

It indicates that it is not Mixed Cost.

Statement of Cost.

Qty	P/Unit	Total Cost.	Differential Cost → [Meaning in page 003 copy.]
70000	97	67,90000	
80000	92	73,60,000	5,70,000
90000	87	78,30,000	4,70,000
1,00,000	82	82,00,000	3,70,000

Individual order either A or, B or C should not be accepted

Statement of Cost Benefit.

Order	AB	BC	AC	ABC.
Revenue	10,70000	10,30,000	10,60000	1580000
Less:- Relevant Cost	10,40 000	10,40,000	10,40000	14,10,000
Benefit →	30,000	(10 000)	20,000	1,70,000

AB: 10000 × 55 = 550000 + 10000 × 52 = 520000 → 10,70000

BC: 10000 × 55 = 550000 + 10000 × 51 = 510000 → 1030000

AC: 10000 × 55 = 550000 + 10000 × 51 = 510000 → 1060000

ABC: 10000 × 55 = 550000; 10000 × 52 = 520000; 10000 × 51 = 510000 → 1580000

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Ans Better to Accept all export order simultaneously.

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(a) Statement of Minimum Price ₹

Differencial Cost for next 10000 units 60000.

Minimum Price. 60000

(b)

Qty	Cost	VC.	FC.
50000	40000	5	1,50000
60000	4,30,000.	45	1,60000

Differential Cost = 30,000.

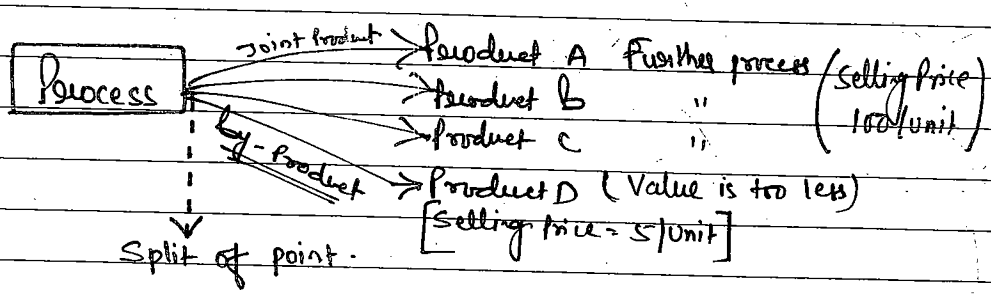
[Cost to be incurred due to change in output]

Statement of Minimum Price.

Cost to be incurred due to offer.

VC = ~~5~~0000 x 4.5	45000
F.C [160000 - 150000]	10000
+ benefit to be loss	—
- benefit to be achieved [5000 x 0.5]	25000
Minimum Price / Relevant Cost	30000

18 # Joint Product & by Product.



Joint Product :- If two or More product produces from a Common process at a same time having almost same significant value, Such type of Product known as Joint Product.

eg :- Petrol, Diesel, oil etc.

Split off Point :- Point where these product emerge called Split off Point.

[Process's Cost known as Joint Cost.]

Joint Cost includes Material, Labour, Variable overhead.

Joint Cost does not include any part of Fixed overhead, for the purpose of Decision making because it's called Sunk Cost.

Fixed Cost should not be apportioned between Product

How to apposition Joint Cost between Products.

(a) On the basis of output.

(b) On the basis of Net Realisable Value at split off Point.
i.e, [Sale Price X Qty Produce at split off Point]

(c) on the basis of Estimated Price at split off Point.
[Estimated Price = (Final Selling Price - Further Processing Cost)]

When Question is silent always apportion Joint ~~Cost~~ on the basis of NRV.

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(#) **By-Product** :- When sale value of one product is substantially very less than other product, then product having lower selling value called By Product. and product having higher selling value called Main Product.

(#) Sale value of "by product" should be subtracted (less) from cost of "Main Product"

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(a) Statement of Profit.

	A	B	Total
Sales	(200000X6)	(400000X4.5)	
	1200000	1800000	30,00000
Less:- Joint Cost	7,20000 $\left[\frac{1200000 \times 1800000}{3000000}\right]$	10,80,000 $\left[\frac{1800000 \times 1800000}{3000000}\right]$	18,00,000
Contribution			12,00,000
Less:- Fixed Cost			200000
		Profit ⟹	10,00,000

(b) [Working Note (#1)]

Joint Process

(A) (B)

200000 kg @ 6₹ = 12,00,000

further process → 16,00,000

28,00,000

'P' 200000 X 13 = 26,00,000

Statement of Cost Benefit

	₹
Incremental Revenue [(200000X13) − 1200000]	1400000
(−) Incremental Cost	1600000
Loss →	200000

∴ We should not process 'A' into 'P'.

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(c) In order to produce Additional 40000 unit of 'B',
(i) We should Introduce 60000 kg of Raw Material
(ii) 20,000 kg of 'A' also produce simultaneously.

Working Note [#2]

Input	Joint Cost
600000 kg	18 00 000
60,000 kg	1,80,000
6,60,000 kg	19,80,000

Statement of Cost Benefit

Let S.P. 'x' ₹

	A	B	Total
Sales	220,000 x	40000 x 4.5	2,20,000x + 180000
		40000 x 3.5	1,40,000
Less:- Joint Cost			19,80,000
			220,000x − 40000
Less:- fixed Cost			200000
	Profit		10,00,000

According to equation.

$220000x - 40000 - 200000 = 10,00000$

$x = \frac{12,40000}{2,20,000} = ₹\ 5.63\dot{6}\dot{3}$ /kg for 'A'

(d) Maximum Price to pay = Normal Price + Extra Benefit due to Supplies

~~Annual~~ 1200000 + 60000 = 12,60,000

Ans ∴ $\frac{12,60000}{600000} = 2.1$ /kg

[W.N#3] Extra Benefit due to supplier = Revised Revenue

A [600000 x 2/5] ⟶ A : 240000 x 6 = 1440000

B. [600000 x 3/5] ⟶ B : 360000 x 4.5 = 1620000

30,60000

(−) Present Revenue 3000000

Increased Revenue 60000

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(1) Conversion Cost ⇒ Cost which convert raw material to Product

(2) Committed Cost or sunk Cost ⇒ Cost could not be changed and arise due to prior decision i.e event, amt fixed Priorly.

(3) Differential Cost ⟶ change in cost due to change in output or change in alternative.

(4) Unavoidable fixed Cost or sunk Cost ⇒ Rent paid already or for closed factory.

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Statement of Comparative Cost benefit. (Per unit)

	₹
If 'A' sold (as it is)	
Revenue	7 /unit
Commission on sale (10% on sale)	0.70
Net Realisable value	6.30 /unit.
Cost of 'A'	3.60 /unit
Benefit ⇒	2.70
If 'A' converted in 'F'.	
Incremental Revenue (10-7)	3 /unit
(-) Commission @ 10%	0.30
Net Incremental Revenue	2.70
(-) Incremental Cost	1.90
Incremental benefit.	0.80.

	₹
Incremental Benefit for conversion of A into 'F' (0.8 X 12500)	10000
Less:- Avoidable Fixed Cost	4000
Net Incremental benefit. ⟹	6000

∴ Co can acheive a benefit of ₹ 6000 if 'A' convert into 'F'.

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Working Note

Process-I

$\boxed{\text{200000 kg Input}}$

Normal 10% loss of Input = 10% of 200000 = 20000 kg

Output = 1,80,000 kg

3:2

A

[180000 × 3/5] = 108000

Process-II

$\boxed{\text{1,08000 kg A Input}}$

Normal loss 12.5% of out

= [12.5/112.5 × 108000]

= 96000 output.

B

= 72000 [180000 × 2/5]

Sale at split off point

C 5:3 D

$\frac{96000 \times 5}{8}$ = 60000

S.P 55

Process-III

$\boxed{\text{60000 kg Input}}$

395600

Normal Loss = 5% of Input = 3000

output = 57000 kg

S.P. = 66 per kg

$\frac{96000 \times 3}{8}$ = 36000

S.P. 40

Process IV

$\boxed{\text{36000 kg Input}}$

332500

Normal Loss = 12.5% of output

$\frac{12.5}{112.5} \times 36000 = 4000$

output = 32000

S.P./kg = 55/kg

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Statement of Cost Benefit.

		C	D.
'C' Incremental Revenue	C [(66×57000) − (55×60000)]	462000	
	D. [(55×32000) − (40×36000)]		3,20000.
(−) Incremental Cost		395600	382500
Incremental benefit.		66400	(62500)

We should apply further processing approach only on Product 'C' while 'D' should be sold immidietely.

(41) ~~(Page-37)~~

~~Statement of Present Profit~~

1200000 unit

Additional. Extra.

$\frac{1200000 \times 40000}{400000} = 1,20000$ unit

H — T

Addition 20000kg + H: ~~20000kg~~ × S.P 25 = 500000. + T: 40000kg. ~~+ 40000kg~~ × 20 = 800000. Additional

Additional Cost $\frac{1,0200000}{1200000} \times 120000 =$ 10,20,000

Statement of Present Profit.

Sale [(200000×20) + (400000×20)]	1,30,00,000
(−) Joint Cost (6000000 + 4200000)	(1,0200000)
(−) Fixed Cost	(1800000)
Present Profit →	10,00,000

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Let S.P be 'x' ₹

Sale − Processing Cost − Fixed Cost = Profit.

$$\left[\left[(2{,}20{,}000x) + (400000 \times 20) + (40000 \times 15)\right] - (102{,}00{,}000 + 10{,}20{,}000) - 180000\right] = 10{,}00{,}000.$$

$$2{,}20{,}000x = 10{,}00{,}000 - 80{,}00{,}000 - 600000 + 1{,}12{,}20{,}000 + 180000$$

$$x = \frac{5400000}{2{,}20{,}000} =$$

$$x = 24.6\dot{3}$$

∴ Minimum Average Unit Price of H = ₹24.63

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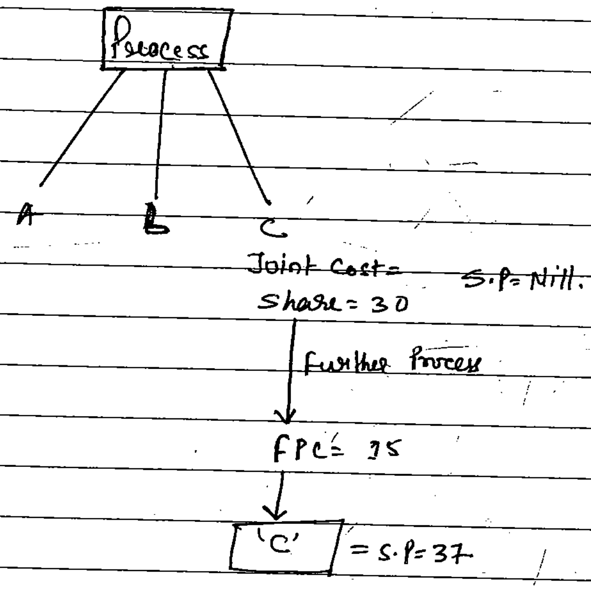

Statement of Cost Benefit.

Incremental Revenue	[37 − Nill]	37
(−) Further Processing Cost		(15)
Incremental Benefit		22

(#) Product 'C' should be Further Processed.

(#) Fixed Cost are always Unavoidable unless expressed specially to be Incurred for decision. Although Fixed Cost always incurred in Totality, may express in Per unit / Per Labour Hours.

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(ii) If 'C' becomes an independent Product (Not Joint Product)

Sale value of 'C'	37
(-) Cost = (30+15)	(45)
Loss ⇒	(8) / unit

∴ C should not be produced (when C is independent).

18 Discontinue Of Business

(A) Abandoned of Product. (B) Divestment (of Product) Policy.

(a) **Abandoned of Product**:- If we have different products say x, Y, Z & management would like to Discontinue any one of them forever, OR we have different Factory say Factory A, Factory B, Factory C. Management would like to Discontinue any one of them forever. This type of Decision called Product Abandoned.

Share of Fixed Cost applicable to discontinued Product will Continue to occur, hence called Sunk ie Unavoidable.

Only Avoidable Fixed Cost applicable to discontinued Product is Relevant.

If Decision is to close a Particular Factory, All Fixed Cost related to that Factory becomes Relevant.

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Statement of Comparative Result. (₹ in lakh)

[Proposal I] Profit from 'x' 60

Profit from 'z' 50

Total 110 lakh.

[Proposal - II]

Profit from x [W.N.1] 80.5

Profit from z 50.

130.5 lakh

W.N 'x'

S.P. 400/unit

Sale Value 500 lakh

Qty = 1,25000 unit $\left[\frac{500 \text{ lakh}}{400}\right]$

Revalued Qty = 1,25000 × 1.2 = 1,50,000 units.

∴ Sale = 1,50000 × ₹400 = 600 lakhs.

(−) Variable cost $\left[\frac{300}{125000} \times 150000\right]$ (360) Lakh.

(−) Fixed Cost [150 × 1.15] (115) lakh

(−) Selling O/H [40 × 1.05] (42) lakh

(−) Variable Distribution cost (2.5) Lakh $\left[\frac{25000 \times 10}{1000000}\right]$

Profit ⇒ 80.5 lakh + 50 = 130.5 lakh

Proposal III

S.P. 400/unit

Sale Value. 300 lakh

Qty $\left[\frac{30000000}{400}\right]$ 75000 unit

Revalued Qty [75000 × 1.25] 93750 units.

Sale Value [93750 × 400] 375 lakh

(−) Variable Cost $\left[\frac{93750 \times 180}{75000}\right]$ (225) lakh

(−) Fixed Cost (50 × 1.2) (60) lakh

(−) Selling & Distribution (20 × 1.1) (22) lakh

(−) Variable Distribution $\left[\frac{18750 \times 12}{10000}\right]$ (2.25) lakh

Profit → 65.75 lakh

+ 50 lakh

115.75 lakh

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Proposal 4

S.P	400
Sales Value	200 lakh
Qty	50 000 unit

Royalty $50000 \times 80\% \times 15 = 600000$.

Proposal II should be better to select

(6) Divestment Policy :- Diversification of Investment

If a particular product line is outsourced in consideration of fixed Amt and all ~~of~~ activities of that product line will be continued by Contractee, Contractee will incurr all running expenditure of our business in very Effective manner. This system is known as Diversification of Investment.

eg ① Govt ⇒ Gas Generation $\xrightarrow{\text{Righ}}$ Reliance
Gas Distribution own Distribute.

② x f Co. → Publishing
book → Printing
→ Distributing ⟶ Y f Co.

(#) Released Investment could be utilized in any beneficial Project

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Statement of Comparative Result.

	Alternative-1. Close on = 30th June ₹	Alternative-2 Close on 30th November.
Payment to XYZ	500000	—
Business Expenditure [W.N#1]	—	2,70,500.
Sale Value of Vehicle	(48000)	(44000)
Sale of Plant & Machinery	(27000)	(25000)
Rent Receivable	(12500)	—
Occupancy Cost [W.N=3]	—	193875
Material	18000	—
Sale of Material	(10000)	—
Loss on Contract	220.	
	420,720	2,20,887.5

Better to choose Alternative 2.

[Working-1] Business expenditure

Salary & wages [18000+4000] x5	1,10,000
Material & supplies [31000+1100]	160 500
	270,500

[Working-2] Net book value of Distribution Vehicles 80000 is our sunk cost.

[Working-3] Occupancy Cost.

Printing Co. ₹8500 x 5 month = 42500

Directly Attributable 30% = 12,750

Apportioned 70% = 29750 ↓15% Avoidable 4462.5 (15%)

Distribution ₹1200x5 = 6000

25% Directly Attributable = 1500

75% Apportioned = ₹4500 ↓15% Avoidable 675 (15%)

classmate Total [12750 + 4462.5 + 1500 + 675]
= 19387.5

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<u>Working Note #4</u> 2,70500 Business exp Includes ₹ 18000 which is our sunk cost (already Paid).

<u>Working Note #5</u> <u>If we close on 30th Nov.</u>

Contract need not be be Cancelled, payment to be incurred, which we already include in 2,70,570.

<u>If we Close on 30th June</u>

We have to be paid ₹ 500 X 2 month			1000.
option I = Only pay ₹ 300 as Cancellation			300.
option II = Take delivery of July & Augst			
Sale to XYZ			
∴ Cost	1000		
Sele	760		240.
option III Take Delivery of 1 month	500		
pay cancellation of 1 month	100		
Sale the Delivery taken	(380)		220 loss better

better to select option III.

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Statement of Contribution. (Project)

Product	S	T	U	Total
Sales	210000	210000	180000	600000
PV Ratio [$\frac{Profit}{Sale} \times 100$]	$\frac{15}{30} \times 100$ = 50%	$\frac{20}{40} \times 100$ = 50%	$\frac{8}{20} \times 100$ = 40%	
Contribution [Sales x PV Ratio]	1,05000	105000	72000	2,82000
(-) Fixed Cost				(1,80,000)
Profit				1,02000

Statement of Contribution (Revised)

Sales	S	T	M	Total
Sales.	320000	160000	160000	640000
PV Ratio	$\frac{15}{30} \times 100$ = 50%	$\frac{20}{40} \times 100$ = 50%	$\frac{15}{30} \times 100$ = 50%	
Contribution	1,60,000	80000	80000	3,20,000
(-) Fixed Cost				(180000)
Profit ⟹				1,40,000

Better to Replace Product 'M' due to Incremental Profit of ₹ 38000.

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Statement of Comparative Result:

Proposal - I

Profit from 'x'	2250
Unavoidable fixed Cost of (Y)	(1250)
Overall Profit ⟶	1000

Proposal II

Profit from 'x'	2250
Profit from 'Y' (W.N. #1)	(970)
Overall Profit ⟹	1280

Proposal - III

Profit from 'x' [W.N. #2]	4150
Profit from 'Y'	(250)
Overall Profit ⟹	3900

Better to follow Proposal III due to higher Amt of Profit.

[Working Note # 1] Profit from Y.

Sale [4000 X 1.4 X 0.8]		4480.
(-) Cost of sales.		
~~Labour [1000 X 4480 / 4000]~~	~~1120~~	~~1120~~
~~Material [2000 / 4000 X 4480]~~	~~1120~~	~~2240~~
Material & Labour. [2000 X 1.4]		(2800)
Variable Expenses [1000 X 1.4]		(1400)
Fixed Expenses.		(1250)
Loss		(970)

[Working Note # 2]

Sales [10000 X 2 X 40%]	8000
Less:- Material & Labour [~~4000~~ 4500 X 40%]	(1800)
Variable Expenses [2000 X 40%]	(800)
Fixed Cost	(1250)
Profit	4150

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Statement of Net Cost Saving. ₹

	₹
Saving in Loss / saving in Product 'c' due to discontinue	1,72,500.
Extra Variable Cost due to ~~decrease~~ decrease in operation $\left[\frac{20,70,000}{90} \times 10\right]$	(2,30,000)
Loss →	57,500

We should not discontinue Product 'c' because Saving in discontinuation of 'c' is not sufficient to cover extra burden of ~~tool~~ variable Cost.

[Note :- 1] Specific Avoidable Fixed Cost is avoidable. These should not be considered.

CO → KXA, KXB

KXA ↓ Produce "HN_2"

KXB ↓

Working Note [II] 10% of Material be used only
∴ 90% of Material saved.

[#] P_6. $\frac{750000}{3750}$ = 200 tonne (Purchased)
40 tonne (Used in last year)
160 tonne Remaining.

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Option - I Outsource (wye) = Mnf the Bottle & Store them.

Statement of Net Cash flow. ₹

Cash out flow due to option. [937500 + 187500]		11,2500.
Cash saving due to outsource.		
Material excluding P_6. (525000 - 150000) =	3,75000	
Labour.	3,75000	
Warehouse Rent (33750 + 33750)	67500	
Maintainance of Machine	27,000	
Miscellaneous overhead	1,18,125.	
		9,62,625
	9,62,625	
~~Net~~ Cash outflow		1,62,375
∴ Total Cash outflow over 4 years ⟹		649,500
(a) Sale of Machine 160		(187500.)
(b) Sale of P-6 $\left[\frac{(750000-150000)}{3750}\right] \times 3000$		(480000)
Net Cash Inflow ⟹		18000

Option - II Statement of Net Cash flow.

Outsource wye Manufacture of bottle

Ence Storage the Product.

Cash out flow to wye		937500.
Cash saving due to outsource		
Other Material 375000 × 90% [525000 - 150000] P_6	3,37,500	
Labour	18,750	
Warehouse Rent	sunk	
Maintainance of Machine	27000	
Miscellaneous overhead [1,18,125 × 80%]	94,500	
Depⁿ, Supervision, Administrative	sunk	
	4,77,750	477750
Cash out flow		459,750
Cash outflow in 4 year		18,39,000
(-) Sale of Machine 160		(1,87500)
Sale of P_6. $\left[\left(\frac{750000-150000}{3750}\right) \times 3000 \times 90\%\right]$		(432000)
~~Net~~ Cash outflow ⟹		12,19,500

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Option - iii

Outsource = Storage

Ence = Manufacture

Statement of Net Cash Flow.	E. P.A.
Cash out flow to wye	1,87500
Cash saving due to outsource.	
Other Material [5,25,000 - ~~7500~~ 150000] x10%.	37500
Labour.	~~375000~~
Miscellaneous Overhead. [118125 x 20%]	23625
saving →	61125
~~Cash out flow = (187500 - 61125) x4~~	~~505500~~ ~~126375~~
~~P.S. Sale Value. (160 x 10% x 3000)~~	~~(48000)~~
~~Net Cash outflow.~~	~~457500~~

Better: Option I

Cash out flow (187500 - 61125) p.a.	126375
Cash out flow for 4 year. (126375x4)	505500
(-) Sale of Material P.S. (160 tonne x10% x3000)	(48000)
Net Cash outflow →	457500

Option I should be better.

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We have Different Approach.

1) Differential Approach
2) Opportunity Cost Approach

→ Relevent Cost Approach.

3) full Cost Approach. ⟹ [Relevant + Sunk Cost + Irrelevant Cost]

Building

Rent 100000 . P.M.

Security 200000 (Non Refundable)

Self business (A₁)		Sublet (A₂)	
Revenue	10,00000	Rent	400000
Cost	300000	Cost	50000
Rent to be paid	100000	Rent	100000.
Security	200000	Security	200000
Profit	400000		50000.

(1) [Differential Approach] Statement of Cost benefit (A_1) ₹

Differential Revenue (10-4)	600000
Differential Cost (3-0.5)	2,50000.
Excess benefit in A_1 over A_2	3,50,000

(2) [Opportunity Cost Approach]

Statement of Cost benefit (A_1)

Revenue		1000000.
(-) Cost to be incurred.	300000.	
opportunity cost of A_1. (benefit of A_2 to be lost due to A_1)	350000.	650000
Net benefit in A_1 over A_2.		350000

(3) [Full cost Approach] Statement of Comparative Cost

	A_1	A_2
Revenue	1000000	400000.
(-) Relevent cost	300000	50000
(-) Irrelevant cost - Rent	100000	100000
(-) sunk cost - Security	200000	200000
Profit	400000	50000.

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		A	B	C
[Apportioned] ⇒	Rent (Area)	XX	XX	XX
	Depⁿ (Machine)	XX	X	XX
	Allocation of Cost: Salary of Supervisory	XX	—	—
	Total	XXX	XX	XX
		100000	50000	20000
	Qty	10000	25000	10000
	Absorbed Cost	10/unit	2/unit	10/unit

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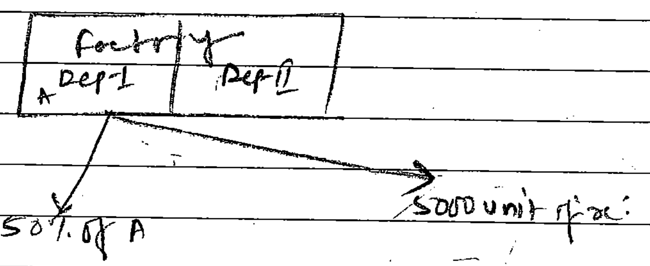

We have two (2) option
option-1 ⇒ Produce 50% of A
Option-2 ⇒ accept to produce 5000 unit of x.

In this Decision Rest 50% of A & Dept. II will Continue to operate.

Statement of Comparative Cost [Full Cost Approach]

A_1 (50% of A)		A_2 = 5000 units of 'x'	
Revenue (125000 x 50%)	62500	Revenue (5000 unit x ₹60)	300000.
Less:- Relevant Cost		Less:- Relevant Cost	
Material (40000 x 50%)	20000	Material (5000 unit x ₹20)	100000
Labour (45000 x 50%)	22500	Labour (5000 x ₹30)	150000
		~~Additional overhead~~	10000
IRRelevant Cost ⇒ Power	1000	Irrelevant Cost: Power	1000 ~~10,000~~
Sunk Cost = Depⁿ	9000	Sunk = Depⁿ	9000
Rent	2500	Rent	2500
Heat & light	250	Heat & light	250.
Profit ⇒	7250	Profit ⇒	27,250

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[Differential Approach]

Statement of Cost Benefit A2.

Differential Revenue	(300000 - 62500)	2,37500
(-) Differential Cost	(260000 - 42500)	217500
Excess benefit of A2 over A1. ⇒		20,000

Opportunity Cost Approach.

Statement of Cost benefit (A2).

Revenue	300000
(-) Cost to be incurred	(2,60000)
(-) opportunity cost - [benefit of A1] (62500 - 42500)	(20000)
Excess benefit in A2 over A1	20000

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Working Note Direct Exp.

A : $\frac{10\ P/unit}{10\ P/Hr} = 1\ Hr$

B : $\frac{20/unit}{10/hr} = 2\ Hr$

C : $\frac{10/unit}{10/hr} = 1\ Hr.$

D : $\frac{60/unit}{10/Hr} = 6\ Hr.$

Statement of Ranking.

Component	A	B	C	D.
Variable Cost	57	55	57	144.

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Chapter-2

Input Manufacture or Purchase Decision. 12th class

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(#) Decision Making :- (Make/Buy Decision).

This decision is related with ~~a~~ component but not product

Component here means part of production eg [Fan → Motor, blade] : [Shirt → button] : [Soft Drink → bottle empty] [bicycle → chain].

Decision is either to produce / Purchase.

(#) Non Costing factor

(i) Quality of the product/component should be standard (Sub standard component should not be purchased.

(ii) Supply of the Component should be at scheduled time

(iii) Price of the component must be constant

(#) Costing factor

(i) Management Accountant would like to take the decision : Either to purchase / manufacture the Component

If purchase Cost of Component < Relevant Cost of Manufacture the Component

(#) Relevant Cost :- Cost to be incurred due to Manufacture the Component in house + Benefits to be lost due to Manufacture the Component.

Cost to be incurred = Variable Cost + Avoidable Fixed Cost.

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(#) Unavoidable fixed Cost will Continue to occur, hence called Sunk Cost. eg ⊙ Factory Rent ⊙ Manager's salary ⊙ Depreciation ⊙ Electric Rent.

[eg] (i) Component : Chain.

	₹/unit
[Manufacture]	
Material	20
Labour	30
Variable O/H	10
Fixed O/H	25
	85

Purchase = 80.

For this purpose we should prepare

Statement of Comparative Cost

Material Manufacture			Purchase Material	
Cost to be incurred.			Purchase Cost	80
Material	20			
Labour	30			
Variable O/H	10	60		
Avoidable Fixed Cost		xx		
		60		80

Select the Cost (option) having least Cost.

[eg-ii] Manufacture :-

Material	10
Labour	20
Variable O/H	30
Fixed O/H	20

Purchase.

Purchase Cost 75

75

$\boxed{\text{Room : Chain}}$ Qty = 1000 P.M.

VC = 60   PC = 75.

If we purchase the component, released resource could be hired out for ₹ 2500 per month.

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Statement of Comparative Cost.

	Manufacture		Purchase	
Cost to be incurred.				
~~Material~~			Purchase Cost	75000
Variable Cost [60x1000]	60000.			
Benefit to be lost.				
Rental Income	25000			
Relevant Cost	85000			75000.

Purchase Cost always Compare with Relevant Cost.

loss	15000	(75000 - 60000)
Benefit	25000	
	10,000	

(#) 1 [Page-83]

Statement of Comparative Cost. [Qty: 200000].

(a) Manufacture			Purchase	
Cost to be incurred.			Purchase Cost	400.
Material	200			
Labour	75			
Var Exp. (b/l)	25	300		
		300		400

Better to Manufacture because the Manufacturing Cost less than the purchase Cost.

Working Note

	New product	Component manufacture	Purchase cost
S.P.	500		
(-) Mat	100	300	400
(-) Lab	75	100 X 200000	
(-) Var	25	= 200 lakh.	
	300		

+ 300x90000 unit
= ₹270 lakh

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Statement of Comparative Cost.

Manufacture	₹ in lakh	Purchase	₹ in lakh
Cost to be incurred		Purchase Cost [400 x 200000]	800
Variable Cost [300 x 200000]	600		
+ Avoidable F.C.	–		
+ Benefit to be lost [W.N.1]	270		
	870		800

<u>Benefit from product.</u>

S.P 500
V.C 200
= 300 x 90,000
= 270 lakh

<u>Alternative - 2</u>

Statement of Comparative Cost.

Manufacture		Purchase	
Variable Cost	300	Purchase Cost	400
	300		400

Statement of Cost Benefits.

	₹ in lakh
Loss on purchase [100/unit x 200000 Unit]	200
Benefit from released Capacity [(500-200) x 90000 unit]	270
Net Benefit	70

Better to Purchase because benefit from released Capacity is sufficient to cover the loss on purchase.

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(3) [Page-87] (i) Statement of Comparative Cost. [₹/Unit]

Manufacture		Purchase	
Cost to be incurred			
Material	14	Purchase Cost	50
Labour & V/OH	20		
	34		50

∴ Its better to manufacture

(ii) Working Note

Alternative - 1		Alternative - 2	
Manufacture		Purchase.	
Variable Cost	34	Purchase Cost	50
Avoidable fixed Cost	56000	AFC	xx

let 'x' be the unit where we have equal Cost in A_1, A_2

$TC_{A_1} = TC_{A_2}$.

$34x + 56000 = 50x + \text{Nill}$

$16x = 56000$

$x = \frac{56000}{16} = 3500$ units.

At higher level (i.e. greater than 3500 unit) fixed Cost per unit reduces. (A_1) Variable Cost already less. Hence A_1 is better at higher level of production.

Statement of Range.

Level	Range. Prefer
0 - 3499 units	A_2
3500 units	A_1 / A_2
> 3500 Units	A_1.

Cost Indifference Point = $\frac{\text{Change in fixed cost}}{\text{Change in variable cost}} = \frac{56000}{16} = 3500$ units.

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(6) Page-83

(i) Statement of Cost Benefit.

			₹.
Incremental Revenue			82000
(-) Incremental Cost			
Material	$\left[\frac{4900000 \times 1000}{100000}\right]$ =	4900	
Labour.	$\left[\frac{700000 \times 1000}{100000}\right]$ =	7000	
Variable factory O/H	$\left[\frac{300000}{100000} \times 1000\right]$ =	3000	
Other Var. Cos	$\left[\frac{100000}{100000} \times 1000\right]$ =	1000	
Sales Commission	[82000 x 10%]	8200	68200
Net Benefit.			13,800

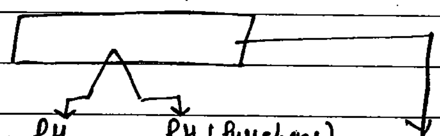
If Engineering Company accepts the offer, Operating Income would be 300000 + 13800. = ₹3,13,800

(ii) Statement of Comparative Cost [100000 - PH Unit]

Manufacture		Purchase	
Cost to be incurred		Purchase	
Material	500000	Purchase Cost	13,50,000
Labour.	300000		
Var. factory O/H.	200000		
Avoidable fixed cost	3,50,000.		
	13,50,000		13,50,000

Income of Company remain Same if they decide to Purchase.

(iii) Working Note



PH ₹1000000 PH (Purchase) ₹1350000

Loss = 350000.

Vacated (Drill 2000 Qty)

Produce Deluxe.

S.P. 130

V.C. 90

PH 13.50

Commission 13

Benefit ₹ 13.50 / unit

(-) 13.50 x 20000 : 270000.

Loss ⇒ 80000

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Statement of Comparative Cost. [Qty: 10000]

Manufacture		Purchase	
Variable Cost	10,00000	Purchase Cost	13,50000

Loss on Purchase [1350000 - 1000000] 350000

Benefits from Released Capacity. [13.50x20000] (270000)

S.P - 130
- V.C 90
- P.H 13.50
- Comm^n 13.00

13.50

loss 80000.

Operating Income of Company becomes 2,20,000 [350000-80000 (loss)] if Company decides to Purchase 'PH' & released Capacity be utilized for Deluxe Drill.

(5) [Page-86]

Component = 20,000 per Annum.

61- Labour

Machine Rent = 200 per Month.

↓

Manufacture

20,000 Units.

↓

Raw Material :- 2000 @ 2F

EOQ.

Holding Cost = 0.25 per unit.

Purchase Cost = 9.

Concept of EOQ

Storage Cost ↑ ⇒ Order Cost ↓

Storage Cost ↓ ⇒ Order Cost ↑

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(5) Page-86 We should decide to place order. so that.

Storage cost = ordering Cost

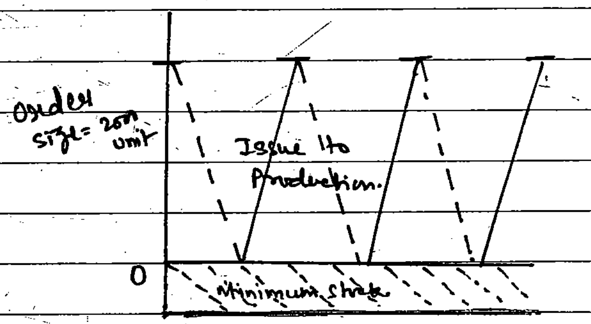
CS P.U.P.A. $\times \frac{1}{2}$ EOQ = No. of order $\times$ Rate Per order.

$(\cancel{EOQ})^2 = \cancel{2x}$ CS $\times \frac{1}{2}$ EOQ = $\frac{\text{Annual Requirement}}{\text{EOQ}}$

$(EOQ)^2 = \frac{2 \times A \times O}{CS}$ [Where A = Annual Requirement
O = Ordering Cost
CS. Carrying & Storage Cost p.u.p.a.

$EOQ = \sqrt{\frac{2 \times A \times O}{CS}}$

Average Stock



We would like to know the Qty retain at every moment of Time

Average Stock = $\frac{\text{Opening} + \text{Closing}}{2}$

$= \frac{0 + 2000}{2} = \frac{1}{2}(2000)$

$= \frac{1}{2}(EOQ)$

$\therefore$ Average Stock = Minimum Stock + $\frac{1}{2}$ EOQ. (if any).

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Statement of Comparative Cost.

Manufacture		Purchase.	
Cost to be incurred.			
Material		Purchase Cost	1,80,000
Purchase 2×20000: 40000	40000	[9×20000]	
Ordering: $\frac{20000}{2000} \times 25$	250		
Storage $[400 + \frac{1}{2} 2000] 0.25$;	350		
Labour [6×20000]	1,20,000		
Monthly Rent [200×12]	2400		
	1,63000		1,80,000

Working Note

$EOQ = 2000$

$= \sqrt{\frac{2AO}{CS}} = 2000$

$= \sqrt{\frac{2 \times 20000 \times 'O'}{0.25}} = 2000.$

$= \frac{2 \times 20000 \times 'O'}{0.25} = (2000)^2$

$= O = \frac{40,00,000 \times 0.25}{40000}$ or $O = \frac{2000 \times 2000 \times 0.25}{2 \times 20000}$

$= O = 25.$

∴ It's better to produce the Component in House

13th class

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(II) [Page-90]

Working Note Batch wise.

Inspection = ₹ 24000

chains = 24000

lot size = 2000 unit

No. of lot = $\frac{\text{Chain}}{\text{lot size}} = \frac{24000}{2000} = 12$ lot.

Cost / lot = ₹ 2000. ($\frac{₹ 24000}{12 \text{ lot}}$)

Lot	No. of lot	₹
0 - 2000	1	2000
2001 - 4000	2	4000
4001 - 6000	3	6000
6001 - 8000	4	8000
⋮	⋮	⋮
22001 — 24000.	12.	24000

i) Statement of Comparative Cost. [24000 units of chain]

Manufacture		Purchase	
Manufacture	1,20,000	Purchase Cost [12×24000] :	2,88000
Labour (sunk)	—		
Variable mfg O/H	48000		
Inspection setup	24000		
Machine Rent (Avoidable F.C)	24000		
Relevant Cost	2,16,000		2,88,000

∴ Blue bird ltd should not accept the offer.
Its better to produce the chain in house.

ii) Statement of Comparative Cost.

Manufacture		Purchase	
Relevant Cost	2,16,000	Purchase Cost	2,88,000
	2,16,000		2,88,000

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Statement of Cost benefit.

Loss on purchase (288000-216000)	72000
benefit from released Capacity [W.N.#1]	80,000
Net benefits	8000

Working [#1] benefit from released Capacity.

Revenue [24000 x 22]	5,28,000
Less:- Incremental Cost [24000X18]	(4,32,000)
Tooling Cost	(16000)
benefits	80000

(ii) We should purchase chain from outside & released Capacity should be utilized for upgrading bicycle.

Note- Variable Cost = 18 does not include Labour Cost because

1) Facilities only will be utilized for upgrading.
2) If it is written "Facilities Including workers" then VC = 18 Includes Labour Cost.

(iii) [Working Note #2] Batch size = 4000. units.

Chains = 24000.

$$\text{No. of lot} = \frac{24000}{4000} = 6 \text{ lot.}$$

Cost Per lot = 2000 (W.N# in last Page)

Total Cost = ₹2000 x 6 lot = ₹ 12000.

0 - 4000 unit	lot 1	₹ 2000
4000 to 8000 unit	lot 2	₹ 4000
8001 to 12000 unit	lot 3	₹ 6000
:	:	:
20001 to 24000 unit	lot 6.	₹ 12000

Cost Per lot always Remain same.

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(#) As lot size increase, No. of lot decrease
∴ Total Cost also decrease

Statement of Comparative Cost.

Manufacture		Purchase	
Material	1,20000	Purchase Cost	2,88,000
Labour	—	[12 X 24000]	
Variable O/H.	48000		
Inspection [W.N. #2]	12,000		
Machine Rent (Avoidable)	24000		
	204000		288,000

Statement of Cost Benefits.

Loss on Purchase [2,88000 - 2,04,000]	84000
Benefit from Released Capacity [W.N #1].	80000
Loss. ⇒	4000

⇒ Its Better to Manufacture the chain.

or

⇒ Its not better to Purchase bycycle chain from outsider because Loss on Purchase Could not be recovered from benefits.

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Key Factor + Make or Buy

Key Factor : Principal Factor (Main)

The Factor of Production which is in Short Supply. Factor of Production here means – Material, Labour, Man Hour.

Short supply means present availability are not sufficient to meet our requirement. [Requirement > Availability]

And Its not possible to manage from market

"We should utilize such factor ie such key factor in optimum manner"

(eg) Product 'x' — 10000 units

Components ⇒ A, B, C

Requirement/Unit ⇒ 1 kg, 5 kg, 1 kg

[Material is required for produce Component (A, B, C) and thereafter Component are used in product — Product 'x']

∴ Total Requirement:

A = 1 × 10000 = 10000 kg

B = 5 × 10000 = 50 000 kg

C = 1 × 10000 = 10000 kg

Total = 70,000 kg

Available ⟹ 50,000 kg only.

∴ Here Material are key Factor. [Not Component].

Optimum Utilization

Component	A	B	C.
Variable Cost (For mfg)	10	20	30
Purchase Cost	8	30	35.
Saving in purchase	2	–	–
Saving in Manufacturing	–	10	5
Decision	Purchase	Manufacture	Manufacture.

(#) Now we should utilize our resource (Material) in Component which has Maximum saving per kg (or overall saving).

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Component ⇒	b	c.
Saving in Material/unit	10	5
Material Require (kg)	5 kg	1 kg.
Saving in manufacture per kg.	2	5
	II	I

Let we assume, we have Total 5 kg Material available.

If we introduce in 'b'

	b		
Saving	1 Unit	Saving 10	Saving/kg 2

5 kg

Or If we introduce in 'c'

	c		
Saving	5 unit	Saving 25 (5×5)	Saving/kg 5

Qty		Component		Requirement (kg)	Unit	Available.
10000	A	10,000	Purchase	—	—	—
10000	b	5000	Manufacture	5kg	8000	40000
10000.	c.	10,000	Manufacture	1kg	10000.	10,000
						50,000

A : 10000 units. Purchase
b : 2000 units Purchase
b : 8000 unit Manufacture
c 10000 unit Manufacture.

(#) For make/buy key factor we should prepare the following 2 Statement.

(i) Statement of Ranking ⇒ Which one should be Mfg/Purchase
(ii) Statement of Optimum Component Mix. ⇒ How much Qty. should be Mfg./Purchase.

(#) We should purchase the component having PC < VC.

(#) We should manufacture having Maximum saving in manufacture over purchase / Requirement of key factor

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Product 'X' form [10000 unit].

Component	A	B	C
Labour Hr/Unit	2 Hrs.	5 Hrs	1 Hrs.
Labour Required	80000 Labour Hrs.		
Labour Available	60000 Labour Hrs.		
Variable Cost	10	20	30
Purchase Cost	18	30	25.

Solution

Statement of Ranking.

	Component	A	B	C.
	Variable Cost	10	20	30
	Purchase Cost	18	30	25.
(a)	Saving in Mfg over Purchase	8	10	(5)
	Decision.	Mfg	Mfg.	Purchase.
(b)	Hour/Unit.	2 Hr	5 Hr	—
	Saving in Mfg over Purchase per Hour [a/b] ₹	4	2	—
	Ranking	I	II.	—

Statement of Optimum Component Mix.

	Qty	Hr/unit	Hrs.
A_I	10000	2	20000
B_{II}	8000.	5	40000 (b/f)
			60,000

Status

A 10000 to Manufacture

B 8000 to Manufacture

2000 Purchase

C 10000 Purchase

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(8) [Page-82]

[Working Note = #1] Direct Expenses.

A = $\frac{10/unit}{10/Hr}$ = 1 Hour

B = $\frac{20/unit}{₹10/Hr}$ = 2 Hr

C = $\frac{10/unit}{₹10/Hr}$ = 1 Hr

D. = $\frac{60/unit}{₹10/Hr}$ = 6 Hr.

Statement of Ranking.

Component	A	B	C	D.
Variable Cost (₹/unit)	57	55	57	144
Purchase Cost (₹/Unit)	60	59	52	168
Saving in Mfg. over purchase	3	4	(5)	24
Decision	Mfg	Mfg	Purchase	Mfg.
Hr/Unit	1	2	—	6.
Saving/Hour	3	2	—	4.
Ranking	II	III.	—	I

Statement of Optimum Component Mix.

	Qty	Hr/unit	Hours.
A	2000	1	2000
B	600.	2	1200 (b/f)
D.	2800.	6	16800
			20000

Manufacture
A 2000 unit
B 600 unit
D 2800 unit

(ii) Balance "2900" unit of B may be purchased or produced in Second shift.

P-T-O

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DATE

Statement of Comparative Cost
2900 unit of B.

Manufacture (Second shift)		Purchase	
Variable Cost	55	Purchase Cost	59.
+ Extra ~~Labour~~ Cost in second shift (8x25%)	2		
Extra fixed Cost $\left[\frac{3000}{2900}\right]$	1.034		
	58.034		59

∴ better to Produce in second shift.

Working Note [#2]

Hr required to produce 2900 unit of B = 5800 Hrs. i.e 6000 Hr.

∴ Fixed Cost = 500 x 6 = ₹3000.

Hr.	Qty	Fixed cost	Per unit/cost
0 – 1000	500	500	₹1
1001 – 2000	1000	1000	₹1
2001 – 3000	1500	1500	₹1
3001 – 4000	2000	2000	₹1
4001 – 5000	2500	2500	₹1
5001 – 6000.	2900	3000.	₹1.25.

⇒ upto 5000 Hrs (2500 units), we have burden of fixed Cost = ₹1/unit.

⇒ If we had any qty in last range i.e, closer to lower limit then we should identify that extra unit (Hrs) seperately.

⇒ OR we can calculate Indifference Point.

Extra burden of fixed Cost = 500 due to last Range

Allowable burden = ₹2/unit for fixed cost

59 - 55 = 4 - 2 [labour] i.e Qty x 2 = 500

∴ Qty = 250 units.

If we require more than 250 unit i.e 500 Hrs. for last range then produce

Extra

If we had 5100 Hrs, 5000 Hrs exhaust in II last Range. for 100 Hrs (50 unit) – Produced, Cost Incurred = 500. i.e, ₹10/unit

∴ better to purchase

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Working Note [#1] Direct Expenses.

$A = \frac{₹ 80/unit}{₹ 40/Hr} = 2$ Hrs.

$B = \frac{₹ 60/unit}{₹ 40/Hrs} = 1.5$ Hrs.

$C = \frac{₹ 80/unit}{₹ 40/Hrs} = 2$ Hrs.

$D = \frac{₹ 80/unit}{₹ 40/Hr} = 2$ Hrs.

Statement of Ranking

Component	A	B	C	D.
Variable Cost [₹ (Per unit)]	260	280	350	280
Purchase Cost [₹ (Per unit)]	300	320	400	270
Saving in Mfg over Purchase	40	40	50	(10)
Decision	Mfg	Mfg	Mfg.	Purchase
Hrs/Unit	2	1.5	2	~~2~~.
Saving in Mfg/Unit	20	26.67	25	—
Ranking	III	I	II	

~~Statement of Optimum Component Mix.~~

	Qty	Hr/Unit	Hrs.
A	~~3000~~ 1000	2	2000
B	3500	2	7000
C	2000	1.5	3000 (b/f)
			12000

Statement of Optimum Component Mix

	Qty	Hr/unit	Hrs.
A III	~~1000~~ 1375.	2	2750.
B I	3500	1.5	5250
C. II	2000	2	4000
			12,000

A 3000 − 1375 = 1625 Unit could be Purchased or Produced in Second shift & better option will be having least Extra Cost.

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Statement of Comparative Cost [For 1500 units].

Manufacture (second shift)		Purchase.	
Variable cost	260	Purchase Cost	300
Extra Wages [60 x 20%]	12		
Extra fixed Cost [$\frac{18000}{1500}$]	12		
	284		300

Explanation = 125 unit should be purchased because Company will have to incur extra F.C of ₹ 6000 just due to 125 units. (250 hrs) which is very high as compare to Purchase Cost.

Working Note = [#2] Extra fixed Cost.

1625 unit X 2 Hrs = 3250 Hr

Hrs	Qty	Cost
0 - 1000	500	6000
1001 - 2000	1000	12000
2001 - 3000	1500.	18000.
3001 - 4000.		

[Indifference Point = $\frac{₹ 6000}{₹ \cancel{28}\ 24}$ = ~~150~~ unit 214]

Statement of Comparative Cost. [For 125 unit]

Manufacture (Second shift)		Purchase	
Variable Cost	260	Purchase Cost	300
Extra wage	12		
Extra fixed Cost [$\frac{₹ 6000}{125 \text{ unit}}$]	48		
	320		300

Conclusion	Qty	Nature
A.	1375	Single shift.
	1500	Second shift
	125	Purchase
b	3500	Manufacture
c	2000	Manufacture
D	3000	Purchase.

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Statement of key factor

Department	P	Q
Component	Hr	Hr
A	900 x 2Hr = 1800	900 x 3Hr = 2700
B	900 x 2Hr = 1800 (16/8)	900 x 3 Hr = 2700
C	1350 x 1.5Hr = 2025 (12/8)	1350 x 1Hr = 1350
	Require 5625	Required 6750
	Available 6000	Available 6000

All Component Could be Processed from 'P' Process. 'Q' is our key factor.

Entire Qty of 'B' must be produced

Between A & C : we should produce the component having Maximum saving in term's of 'Q' Hours

Statement of Ranking

Component	A	C
Variable Cost/unit	99	50
Purchase Price	129	70
Saving in Mfg over purchase	30	20
Machine Hour/unit (In Dept Q)	3 Hr	1 Hr
Saving/Hr	10	20.
Ranking for Manufacturing	II.	I

Statement of Component Mix [Dept Q]

Component	Qty	Hr/unit	Hrs.
A	650.	3	1950 (b/f)
C I	1350	1	1350
B	900	3	2700
			6000

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Final Status.

Component	P	Q.
A	900 Mfg	650 Mfg & 250 purchase
B	900 Mfg	900 Mfg
C	1350 Mfg	1350 Mfg.

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Working

Gurgaon

Product

(90000 Hours) A1 → Material
(95000 Hours) B2 → Material
(80000 Hours) C3 → Material
(75000 Hours) D4 → Material

M1 → Require availability.
M2 →

Faridabad

Product

F1 — Material - Z.

Mfg → Gurgaon
Purchase

?

Statement of Comparative Cost
Material Z.

Mfg			Purchase	
Material - M1	[2.5 ltrs x ₹30]	75	Purchase Cost	₹ 200
Labour -	[2 hr x ₹45]	90		
Variable o/H → [Machine]	[3 hr x ₹3] [9/3 or 12/4]	9		
-[Labour]	[2 Hr x ₹5]	10		
		184		₹200

Working Note Variable o/H / Material

$A_1 = \frac{9}{3 Hr} = ₹ 3/Hr$

$B_2 = \frac{12}{4 Hr} = ₹ 3/Hr.$

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Variable O/H Per Labour Hour

A_1 = ₹12.50 $\left[\frac{₹112.50}{₹45/Hr} = 2.5\ Hr\right]$ = $\frac{₹12.50}{2.5\ Hr}$ = ₹5/Hr

B_2 : ₹7.50 $\left[\frac{67.5}{₹45/Hr} = 1.5\ Hr.\right]$ = $\frac{₹7.50}{1.5\ Hr}$ = ₹5/Hr

C_3 = ₹15 $\left[\frac{135}{₹45/Hr} = 3\ Hr\right]$ = $\frac{₹15}{3\ Hr}$ = ₹5/Hr

D_4 = ₹7.50 $\left[\frac{67.50}{₹45/Hr} = 1.5\ Hr\right]$. = $\frac{₹7.5}{1.5\ Hr}$ = ₹5/Hr.

We should produce Material Z (Component) in Gurgaon unit because the Cost of Manufacturing is less than Purchase Cost.

(ii)

Statement of key factor.

Product ↓ Qty	M_1 Req./unit	M_1 Total	M_2 Req/unit	M_2 Total
A_1 [90000 H/000] = 100000	1 kg (₹50/50/kg)	100000	3 litre	300000
L_1 [9500 H/000] : 105000	2 kg (₹100/50kg)	210000	1.5 litre	157500
C_1 [8000 H/000] = 90000	—	—	2 litre	180000.
D_1 [7500 H/000] = 85000.	1.5 kg (₹75/₹50/kg)	127500	—	—
	Required	437500	Required	637500
	Available	650000	Available	600000
	Remarks	Not a key Factor.	Remark	key factor

M_2 is our key Factor, hence we should utilize M_2 in a optimum manner i.e, produce the product having Maximum Contribution in terms of limiting factor i.e, M_2

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Statement of Ranking. [Gurgaon].

Product	A_1	B_2	C_3.
Selling Price/unit	360	285	290.
Variable Cost	274	232	219
Contribution	86	53	71
M_2 (limiting factor) [Hr Req/unit]	3 Hr	1.5 Hr	2 Hr
Contribution/Hr	28.67	35.33	35.5
Rank	III.	II	I

Statement of Product Mix

Product		Qty.	Hr/unit	~~Total Hr~~	Total Hr
A_1	iii	Demand 77500.	3		[232500] (b/f)
		Contract 10000	3		[30000]
Demand B_2	II	95000	1.5.	~~142500~~	[142500]
Contract		10000	1.5	~~15000~~	[15000]
Demand C_3.	I	80000	2	~~160000 Hr~~	[160000]
Contract		10000	2	~~20000~~	[20000]
				Total.	600000

Decision Accordingly :- As M_2 our key factor. Hence we should utilize in optimum manner, but, now we have another option i.e. to utilize M_2 in Component (Z) means we should divert the M_2 from the product A_1 (having least Contribution/Hr)

Statement of Comparative Cost. [Z]

Manufacture		Purchase	
Cost to be incurred for 'Z'	₹184.	Purchase Cost	200
Contribution to be lost by not producing A_1. [₹26.66 x 2.5 Hr]	~~₹86~~ ₹71.66		
Total Cost ⇒	255.66.		200.

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(iii) If Purchase Price of Z becomes more that 255.66/unit, then its better to ~~purchase~~ produce/Mfg Component Z.

(2) [Page 84]

Working

Labour Cost = sunk Cost

Concept of SUNK COST : Ignore Sunk Cost always but if any benefit to be derived from sunk which will have to be Lost due to acceptence of offer, should be charged from offer

Marginal Cost (VC) = Material + Labour + Direct exp + Variable O/H

Statement of Comparative Cost.

Manufacture	₹ in lakh	Purchase	₹ in lakh
Cost to be incurred.		Purchase Cost [25000 X 2000]	500
Material [8000 X 2000]	160.		
Labour	sunk		
Variable overhead [3000 X 2000]	60.		
+ Contribution to be lost due to Mfg [W.N.].	360		
Relevant Cost	580		500

Better to Purchase from outside Market.

Working Note Benefit from Permanent labour. (If not utilize in Component)

Labour Hrs = 40 Hr/unit X 2000 unit = 8000 Hrs. Released from Component.

Qty of 'K' = 1600 unit [Hr = (1600 unit X 50 Hr/unit) = 80000].

Sale Price		45000/unit
(−) Variable Cost.	30000	
(−) labour Cost [Hr 50 X 150/Hr]	7500	22500
Benefit excluding labour		22500

Total Benefit = [22500/unit X 1600 unit] = 360 lakh.

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(10) Page-88

Product-'x'   Machine-Hrs 42000.

Component	A	B	C
Hr/unit	0.15	0.25	0.30.
	60000	60000	60000

Hour to be required for 1 unit of Product 'x'
= 0.70 Hr.

Hours Available = 42000 Hrs.

Qty of Product 'x' Producing in C.Y. = $\frac{42000 \text{ Hr}}{0.7/\text{unit}}$ = 60000 unit of 'x'

Demand in Next Year = 60000 + 75% of 60000
= 1,05000 unit of 'x'.

i.e, Component A, B & C are to be produced in 42000 Hrs which is not possible due to limiting factor of Machine Hrs

Statement of Ranking. (Next Year).

Component	A	B	C.
Variable Cost	3.75	4.50	4.50
Purchase Cost	5.55	7.00	8.40.
Saving in produce over Purchase	1.80	2.50	3.90.
Hr/unit	0.15	0.25	0.3
Saving/Hr.	12	10	13.
Ranking	II	III	I

Statement of Optimum Component Mix.

Component	Qty	Hr/unit	Hrs (total)
A II	70000	0.15	10,500 (Bl)
	35000 purchase		
B III	105000 purchase		
C.I	105000.	0.3	315000.
			42000.

(ii) Statement of Ranking [for Purchase]

Component	A	B	C.
Variable Cost	3.75	4.5	4.5
Purchase Cost	5.55	7.00	8.40.
	1.80	2.50	3.90
Hr/PU	0.15	0.25	0.3.
loss Per Hour.	12	10	13.
	II OR	I OR.	III.

If only one (1) component is to be purchased, then it means balance other two (2) component should be/must be produced.
We should start from least loss in purchase.

Combination I 'B' Purchase & A & C Manufacture.

Statement of Mix.

A	105000	0.15	15750
C	105000.	0.30	31500
		Required	47250
		Available	42000

Combination II = 'A' Purchase & Manufacture B & C.

Statement of Mix

B	105000	0.25	26250
C	105000	0.30	31500
		Required	57750
		Available	42000

Combination - III , 'C' Purchase and Manufacture A & B.

Statement of Mix.

A	105000	0.15	15750
B.	105000	0.25	26250
		Required	42000
		Available	42000

∴ Better to Purchase Component 'C' & ~~Produce Component~~ 'A' & 'B'.

Chapter-3

KEY FACTOR

15th class

DATE 27 | 12 | 2016

Key factor :- Key factor decision should be applied for Product (T.V/Computer/Bicycle/Toy/Fan etc)

Key Factor here means :- Limiting Factors (Principal factor) i.e Factor of production which is in short supply.

Factors of Production : Material, Labour (Hrs), Machine Hrs, sales (Qty) (₹), (Kg/Ltr).

Short Supply Present availability of Resources would not be sufficient to meet entire demand of all products (Requirement > Availability)

& It's not possible to produce such resources from outside market.

In key Factor Decision.

(1) We should utilize the resource in optimum manner, which are in short supply.

(2) Our decision is : Which product (s) should be produced & How much Qty of that products should be produced.

(3) Key Factor Decision does not Indicate the "Which product(s) should be purchased" because decision to purchase & sale of a product is known as "Sub Contracting"

Optimum Manner Utilize the resource so that overall Contribution (benefit) to be maximized.

Overall Contribution = [Contribution/unit X Possible Unit]

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We have two(2) situation.

(I) When Resource could be exchanged.
⇓
RANKING METHOD

(II) When Resource could not be exchanged
⇓
COMBINATION METHOD

① Ranking Method ⇒ Resource could be exchanged.

(a) always apply Ranking Concept
(b) When Resource (Mat / Kg) could be utilized for every products.

eg. Material A ₹2/kg → x, → y, → z
2000kg.

eg Labour = semiskilled
Labour Hrs = 10000 Hrs. → x, → y, → z

(II) Combination Concept ⇒ Resource could not be exchanged.

(a) apply Combination Method.
(b) eg:- Dept-I (Cutting) Hr 100000
Dep- II (Stitching) 200000
~~300000~~

Material (Domestic) 100000 kg ⇒ A
Imported (20000)hr ⇒ B.

Key Factor :- Exchangable (Ranking Concept)
Overall Contribution = Contribution/unit × Possible unit.

eg
Next page

DATE

(eg)

Product	Contribution/unit	kg/unit	Demand	Require	Available
A	50	2kg	1000 unit	2000kg	
B	100	10kg	1000 unit	10000kg	
				12000kg	11,000 kg

Key Factor

Base	Product	Qty	Cont/unit	Total Contribution	Cont/kg	Rank
10 kg	A	5 unit	50	250	25	I
10 kg	B	1 unit	100	100	10	II

	Qty	kg/unit	kg	Contribution
First A Produce	1000	2kg	2000	
Next B Produce	900	10kg	9000 (bal)	
			11000	

In Ranking Concept we should prepare the following 2 Statements

(1) Statement of Ranking

(2) Statement of optimum product Mix.

Points to be Remembered

(I) In the absence of any instruction always we should Consider the demand for the product is unlimited.

(II) If we have minimum Requirement for any Product(s) then first of all we should utilize our resource for meeting that product requirement & balance resource should be utilized as per Ranking.

(III) Material (kg), Labour (Hr) OR Machine (Hr) → Any one is key factor + sales Qty is restricted then sales Qty's restriction is only a Condition but not itself a key Factor. However if only it is given sales Qty is Restricted, then sales Qty is our key Factor.

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(III)

Factor	Basis of Ranking.
(a) Material (kg, ltr)	Contribution/kg, ltr
(b) Labour (Hrs)	Contribution/Hr.
(c) Machine (Hrs)	Contribution/Machine Hr
(d) sales (Qty)	Contribution/unit
(e) Sales (₹)	Contribution/₹ of S.P.

(1) Working
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x = 50 X 80% = ₹40/10 = 4kg.

y = 80 X 80% = ₹64/10 = 6.4 kg

z = 60 X 80% = ₹48/10 = 4.8 kg.

(I) Statement of Ranking

Product	x	Y	Z.
Contribution/unit	60	40	28
kg/unit	4kg	6.4kg	4.8 kg.
Contribution/kg	15	6.25	5.83
Ranking	I	II.	III

(II) Statement of Ranking.

Product	x	Y	Z.
Contribution/unit	60	40	28.
Labour Hour/unit	10 Hr	20 Hr	18 Hrs.
Cont/Hr.	6	2	1.55
Ranking	I	II	III.

(III) Statement of Ranking.

Product	x	Y	Z
Contribution/unit	60	40	28.
kg/Unit	4kg	6.4kg	4.8kg.
Cont/kg (₹)	15	6.25	5.83
Ranking	I	II	III.

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Statement of Optimum Product Mix.

Product	Qty	kg/Unit	kg	Contribution(£)
x	1000	4	4000	60,000
y	562.5	6.4	3600	~~23,750~~ 22500
z	500	4.8	2400	14000.
			10000 kg	96500 → Total Contribution.

(3) Page-105

Working Note

(#1) Raw material (kg) : key factor

	Qty	kg/unit	kg (Total)
A	30000	40×40% = £16/2 = 8kg	240000
b	20000	80×35% = £28/2/unit = 14kg	280000
C	40000	20×45% = £9/£2unit = 4.5kg	1,80,000
			700000 kg

(#2) Budgeted Turnover		S.P.	Sale	PV Ratio	Contribution
A	30000	40	1200000	20%	240000
b	20000	80	1600000	40%	640000
C	40000	20	800000	10%	80000
		Budgeted Turnover	3600000		9,60,000

⇒ Budgeted Contribution 960000

Profit before Int & Depⁿ [3600000×10%] 360000.

(-) Interest & Depⁿ 400000

Profit (40,000)

Budgeted Contribution 960000

Fixed Cost :- Interest & Depⁿ 400000

Other Fixed Cost 600000(b/f) (10,00,000) (b/d)

Profit (40000)

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Statement of Ranking

Product	A	B	C
Contribution/unit (₹) [S.P × PV Ratio].	8	32	2.
Material (kg/unit)	8	14	4.5
Contribution/kg (₹)	1	2.2857	0.44
Rank	II	I	III.

Statement of Optimum Product Mix.

Product	Qty	kg/unit	kg (Total)	Contribution (₹)
A	~~40000~~ 35000.	8	2,80,000 (b/f)	2,80,000
B	30,000	14	4,20,000.	9,60,000.
C	—	—	—	—
			700 000 kg.	₹ 12,40,000

(–) Fixed Cost [W.N. #2]. (10,00,000)

Profit ⟹ 2,40,000

(ii) "What the Maximum benefit we could derived due to new supplier, such Maximum benefit could be shifted to him."

Additional Qty (A) could be produced & sold due to New supplier = 2,250 unit $\left[\frac{20000 \text{ kg}}{8 \text{ kg/unit}}\right]$

Contribution/unit of A product ₹8

Add" Contribution (₹) [(2250 unit (A) × ₹8] (if we consider Normal Rate of Material ₹2/kg) ₹ 20,000

Less:- Transportation Cost ₹ 10,000

Net Contribution. ₹ 10,000

Qty (kg) 20,000 kg

∴ Additional Contribution/kg ₹ 0.5/kg

Maximum Price/kg = Normal Rate/kg + Addition Contribution/kg.

= ₹ 2/kg + ₹0.5/kg

= ₹ 2.5/kg Ans

classmate

(9) [page-108]

(i) Statement of Profit [Current Year].

Crops	x_1	x_2	y_1	y_2
Sales / Acre.	10000	10,000	13500	16200.
	[200X50]	[250X40]	[300X45]	[270X60]
(–) Variable Cost / Acre.	4700.	4975	5950	6600.
Contribution / Acre	5,300	5025	7,550	9600
Area Occupied ~~Total Contribution~~	250	200	300	250
Total Contribution	~~5300x25~~ 1325000	10,05,000	22,65000	2400000

Total Contribution = 69,95000
Less:- Fixed Cost 53,76,000
Profit ⟹ 16,19,000

(ii) Statement of Ranking.
Key factor: [Acre Area]

Crops	x_1	x_2	y_1	y_2
Sales / Acre	10,000	10,000	13500	16,200
VC / Acre	4700	4975	7550	6600
Contribution / Acre	5300	5025	7550	9600.
Rank	I	II &	II	I

Statement of Production Mix.

Crops	Land	Ton / Acre.	Cont / Acre	Contribution
x_1	40+360	50	5300	21,20,000
x_2	50.	40	5025	2,51,250
	450 Acre			
y_1	40	45	7550	3,02,000
y_2	30+480	60.	9600	48,96,000
	550 Acre		Total Contribution	75,69,250
			Less:- Fixed Cost	53,76,000
			Profit ⟹	21,93,250

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(iii) The Land could be cultivated to all Product (Crops) then Ranking should be applied for All Products (crops).

	x_1	x_2	y_1	y_2
Contribution/Acre	5300	5025	7550	9600
	III	IV	II	I

∴ Entire Land (Acre) should be utilized for Producing Crops Y_2. Y_2 Crops Demand is unlimited.

Total Land (450+550)	1000 Acre
Revenue [270 x 60 x	16200
(–) Variable Cost	(6600)
Contribution/Acre	9600
Total Contribution	96,00,000
(–) Fixed Cost	53,76,000
Profit ⟹	42,24,000

Break Even Point (in Acre) = $\frac{\text{Fixed Cost}}{\text{Cont/Acre}} = \frac{5376000}{9600}$ = 560 Acre. Answer

Break Even Point (in Revenue or ₹): 560 ~~Acre~~ X ₹16200/Acre = ₹ 90,72,000 Answer

16th class
DATE 29 | 12 | 2016

Topic : Coverage

(1) Resource Exchangeable :- Ranking Concept
(2) One key factor with different product :-
(3) Two key factor with one product
Two Product
Three Product.
(4) Not Exchangable
(5) Avoidable fixed Cost with key Factor.

(12) [Page-110]

Hour Available Per day: 8 Hour i.e 480 mint
less Set up timing (40) mint
Productive Time. 440 mint

Statement of Consumption of Time.

Product	Mint	Qty	Minutes/Unit
A	440	110	4
B	440	60	7.33
C	440	50.	8.8

\# Due to Different. S.P of Same Product, we should Prepare Two Ranking. For (1) Initial Qty (2) Additional Qty.

Statement of Ranking.

For Initial product	A I	B III.	C II
upto	50unit	15unit	20unit
S.P	30	38	50
V.C.	25	30	40
Contribution/unit	5	8	10
Mint/Unit	4	7.33	8.8.
~~Cont/mint~~	~~1.25~~	~~1.09~~	~~1.136~~
Ranking	I	III	II
For additional Product exceed	50unit	15unit	20unit
S.P	29	37	49.
V.C	25	30	40.
Cont/Unit	4	7	9
Mint	4	7.33	8.8.
Cont/Mint	1	0.9545.	1.022
Ranking	II	III.	I

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Point No. [#1] : First selection should be made between Initial Product A, B & C.

[#2] : Second selection should be made between Further unit of A, Initial Qty of B & C.

[#3] Third selection should be made between Further unit of A & C and Initial of B

Statement of Optimum Product Mix & Contribution.

Product	Qty	Mint/unit	Total (Mint)	Contribution.
A	50	4	200	250 (50×5)
C	20	8.8	176	200. (20×10)
B	8.72	7.33	64 (b/f)	69.84 (8.7272×8)

Maximum Contribution ⇒ 519.84

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Two Key Factor with One Product.

① We should produce the product having maximum overall contribution

Overall Contribution = [Contribution/unit X Possible Unit]

Possible Unit means the unit which could be manufactured (Processed) from both resources.

		(A)	Qty
eg	Material = 100000 kg	2kg	50000
	Labour = 200000 Hrs.	5 Hr.	40000. ⇒ Possible Unit.

(6) [Page-106]

Possible Unit

	Part A	(OR)	Part B
Material	13000 kg		13000
Material/Unit	~~8~~1.6 kg		1.6 kg
Unit	8125 Unit		8125 Unit
Labour. Machine A	4000 Hr.		4000 Hr
Machine A Hr/Unit	0.6 Hr		0.25 Hr.
Unit	6,666.66 unit.		16000 unit
Machine B.	4500 Hr		4500 Hr
Machine B Hr/unit	0.5 Hr		0.55 Hr
Unit =	9000 unit		8181.81 unit
Possible unit	6666.66 unit		8125 unit

Statement of Comparative Contribution.

~~Selling Price~~ Part A	Rs	~~Selling Price~~ Part B.	Rs
~~(Material)~~ Overall Contribution [6666.66 X 27]	1,80,000	Overall Contribution [8125X20]	162500.

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Statement of Contribution/unit

		A	B
S.P.		145	115
Less:- Variable Cost			
Material		(20)	(20)
		[12.5×1.6]	[12.5×1.6]
Machine	A	(48)	(20)
		[0.6×80]	[0.25×80]
	B.	(50.)	(55)
		[0.5×100]	[0.55×100]
Contribution/unit		27	20

We should produce Product 'A' due to higher Amt of Contribution in overall.

(ii)

Present Contribution	1,80,000.
(−) Loss due to Reduction (14.5×6666.66)	(96,666.66)
+ Benefit due to utilization of spare capacity of Machine B ([{4500 − (6666.66×0.5)}×60] =	70,000
Revised Contribution ⟹	1,53,333.33

We should not accept the offer. due to reduction in overall Contribution in Revised manner.

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Two key factor with Two Products.

(eg)

	A	B	Total Available
Material (kg)	2kg	4kg	16000 kg
Labour (Hrs)	3 Hr	2 Hr	15000 Hr.
Cont/unit	1000	1000	
Demand Unlimited.	Unlimited	Unlimited.	

Statement of Ranking.

	A	B
Contribution/unit	1000	1000
kg/unit	2kg	4kg
Contribution/unit	₹ 500	₹ 250.
Ranking	I	II.
Hr/unit	3 Hr	2 Hr.
Contribution/Hr.	₹ 333.33	₹ 500
Ranking	II.	I

opposite Ranking

Opposite Ranking

Statement of Product Mix

Material

	kg/unit	kg	Qty	Check Labour Qty	Hr/unit	Hr
A_I	2kg	16000 kg	8000.	~~5000 unit~~	3 Hr	~~15000 Hr~~
		16000 kg				15000 Hr

Qty of 'A' = 5000.

Labour (Priority) — Check for Material

Product	Hr/unit	Hour	Qty	Qty	kg/unit	kg
B_I	2 Hr	15000 Hr	7500	4000	4kg	16000 kg.
		15000 Hr				16000 kg

4000 Qty of Product 'B'.

Contribution from A : 5000 unit × ₹1000/unit = ₹ 50,00,000

B : 4000 unit × ₹1000/unit = ₹ 40,00,000.

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Equation Method.

	A	B	
Material.	2 kg	4 kg	16000 kg.
	3 Hr	2 Hr	15000 Hr

Let x be the Qty of A product
y be the Qty of B Product.

$2x + 4y \le 16000$ kg —(i)
$3x + 2y \le 15000$ kg —(ii) — X2

$2x + \cancel{4y} \le 16000$
$6x + \cancel{4y} \le 30000$
$\cancel{4x} = 14000$
$x = 3500$
$y = 2250$.

$x = 3500$ unit
$y = 2250$ unit.

~~Proof~~
$[3500 \times 2kg + 2250 \times 4kg] = 16000$ kg
$[3500 \times 3Hr + 2250 \times 2Hr] = 15000$ Hr.

Contribution A $[3500 \text{ Unit} \times ₹1000/\text{unit}] = ₹ 3500,000$
B $[2250 \text{ unit} \times ₹1000/\text{unit}] = ₹ 22,50,000$
$₹ \underline{\underline{57,50,000}}$

CRUX Result :-

If we have two(2) key factors and 2 product, then

(a) if we have opposite Ranking (as in above example) always apply Equation Method.

	A	B
Material	I	II
Labour	II	I.

(b) if we have same Ranking then always apply Ranking Concept.

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(#) Two key Factor with three (3) Product.

(4) [Page.105]

Statement of key factor.

	Material (kg)	labour. (Hr)
A	60000 kg	90000
	[6000 unit X 10 kg]	[6000 unit x 15 Hr]
b	24000.	100000
	[4000 unit x 6 kg]	[4000 unit X 25]
c	45000	60000
	[3000 unit x 15 kg]	[3000 unit X 20 Hr]
Required	1,29000 kg	2,50,000
Available	100000 kg.	1,84000 Hr.
Remarks	Limiting factor	Limiting factor

Now, we have two key factor like Material & labour with three products to be produced.
We should produced the Qty of each product so that.
(i) Qty will satisfy both Ranking.
(ii) will provide maximum overall Contribution.

Statement of Ranking.

Product	A	b	C.
selling Price	125	100	200
(-) Variable Cost			
Material	(100)	(60)	(150)
Labour	(15)	(25)	(20)
(₹) Contribution/unit ⇒	10	15	30.
kg/unit	10 kg	6 kg	15 kg
(₹) Contribution/kg	1	2.5	2
Ranking	III.	I	II
Hour/unit	15 Hr	25 Hr	20 Hr.
(₹) Contribution/Hr.	0.66	0.6	1.5
Ranking	II	III.	I

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Statement of Product Mix

	As per Material				As per Labour		
	Qty	kg/unit	kg		Qty	Hr/Unit	Hour
A_{III}	3100	10 kg/unit	31000 (b/f)	A_{II}	6000 (Max)	15Hr/unit	90000
B_I	4000 (Max)	6 kg/unit	24000	B_{II}	1360	25Hr/unit	34000
C_{II}	3000 (Max)	15 kg/unit	45000	C_I	3000 (Max)	20Hr/unit	60,000
			1,00000 kg				184000 Hrs.

Possible Unit

A 3100 units ; B = 1360 units; C = 3000 units.

Balance Resource

A = (6000 − 3100) X 15 Hr = 43500 Hr.

B = (4000 − 1360) X 6 kg = 15840 kg.

These Resources can be used for A & B.

(Now we have 2 ~~key~~ product with 2 key factor

	A	B
Contribution/kg =	1 (II)	2.5 (I)
Contribution/Hr	0.66 (I)	0.6 (II)

Apply Equation Method

	A	B	Total
Material	10 kg	6 kg	= 15840.
Labour.	15 Hr	25 Hr	= 43,500 Hr.

let X be the quantity of A.

Y be the quantity of B.

$y = 1233.75$

$x = 843.75$.

$10x + 6y \leq 15840$ —— (I) —— $\times 1.5$

$15x + 25y \leq 43500$. —— (II)

$15x + 9y \leq 23760$

$15x + 25y \leq 43500$

$-16y = 19740$

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Statement of Contribution ~~[illegible]~~

	Qty.	Cont/unit	Total Contribution
A	3100 + 843.75 = 3943.75	10	39437.5
B	1360 + 1233.75 = 2593.75	15	38906.25
C	3000	30	90000

Maximum Contribution ⇒ 1,68,343.75

(5) [Page-106] Opportunity Cost of Resources i.e, Material & labour means
"If we utilize 1 Labour Hr in any where (other than A, B, C & D), we can acheive Contribution of ₹2.5/Hr. However if such labour Hour is diverted from somewhere else to product (A, B, C & D), then such Contribution ₹2.5/Hr will have to be lost, means that becomes an opportunity Cost for Labour Hr.

Statement of Total Availability of Resources

	Qty	Material	Labour
A	1000	2000 kg	3000 Hr
B	1200	3600 kg	4800 Hr
C.	1600	6400 kg	3200 Hr
D.	800	4000 kg	4000 Hr
		16000 kg	15000 Hr

17th class

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Statement of Diversion

	Contribution	Opportunity Cost	Remarks
A	100-60 = 40.	[(2kg × 16.25) + (3 × 2.5)] = 40	Can be diverted.
B	130-80 = 50	[(3kg × 16.25) + (4 × 2.5)] = 58.75	Can't be diverted.
C.	120-50 = 70	[(4kg × 16.25) + (2 Hr × 2.5)] = 70	Can be diverted.
D.	150-70 = 80	[(5kg × 16.25) + (5Hr × 2.5)] = 93.75	Can't be diverted.

Resource 16000 kg & 15000 Hrs Can be diverted for A & C (Now 2 product with 2 key factor).

Statement of Ranking

	A	B.
Contribution / kg.	40/2 = ₹20/kg	70/4 = ~~₹35/kg~~ 17.5/kg
Ranking	I	II
Contribution / Hr	40/3 = ₹13.3/Hr	70/2 = ₹35/Hr
Ranking.	II	I

Let 'x' be the quantity of A & 'y' be the Qty of B.

	A	B	
Material	2kg	4kg	16000 kg
Labour	3Hr	2 Hr.	15000 Hr

Demand Unlimited

$2x + 4y \le 16000$ — (i)

$3x + 2y \le 15000$ — (ii) × 2

$2x + 4y \le 16000$

$6x + 4y \le 30000$

$-4x \le 14000$

$x = 3500$

$y = 2250.$

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Statement of Contribution

As per Tentative budget

Product	Qty	Cont/unit	Total Contribution
A	1000	40	40000
B	1200	50	60000
C	1600	70	1,12,000
D	800	80	64000
		Total Contribution	2,76000

As per Optimum Product Mix.

Product	Qty	Contribution	Total Contribution
A	3500	40	1,40,000
B	2,250	70	1,57,500
			297,500

Differences 2,97,500 - 276000

= ₹21,500 Ans

(7) [Page-107]

We have two (2) option

Option I (P:Q) = 2:3

Option II (P:Q) = 1:2

Let Total Qty be 3000 unit.

[Option-I] Statement of Profit

Product	Qty	SP.	VC.	Contribution/unit	Total Contribution.
P	1200 (2)	1800	900	900	10,80000
Q	1800 (3)	2160	1800	360	6,48000
				Total Contribution	17,28,000
				Less:- Fixed Cost	88000
				Profit	16,40,000

[Option-II]

	Qty	SP	VC	Cont/unit	Contribution
P	1000 (1)	1800	900	900	900000
Q	2000 (2)	2160	1860	360	7,20,000
				Total Contribution	16,20,000
				(-) Fixed Cost	88 000
				Profit	15,32,000

∴ Option I is better.

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(#) If we have Avoidable fixed Cost, then final Decision should be applied only on ~~overall~~ ~~Contex~~ the basis of overall benefits.
Point to be Remembered

Overall benefit = [Total Contribution as per Ranking − Avoidable Fixed Cost]

(10) [Page-108]

Peak Season	Off Season
Labour ⇒ Short supply (Key Factor)	Labour : Not in short supply
Demand ⇒ Unlimited.	Demand: limited. (Key Factor)
Base :- Contribution/Hr.	Base = Contribution/unit.
Final Decision ⇒ Total Benefit (Basis)	

Statement of Ranking [Peak Season] [Base = Contribution/Hr]

	Product	A	B	C
	Selling Price/unit	550	630	690.
(−)	Material Cost/unit	230	260	290
(−)	Labour Cost/Unit	110	120	150
(−)	Variable overhead/unit	100	120	130.
(−)	Variable selling O/H/unit	10	20	15
	Contribution/unit	100	110	105
	Labour Hr/unit	8	11	7
	Contribution/Hr	12.5	10	15
	Ranking	II	III.	I

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Statement of Comparative Benefits.

Product	Qty.	Cont/Hr	Contribution	AFC	Benefits
C	$\frac{1617\text{ Hr}}{7\text{ Hr/unit}}$ = 231 unit	~~₹10~~ 15	24,255 [1617 Hr × ₹15/Hr]	4780	19,475
A	$\frac{1617\text{ Hr}}{8\text{ Hr/unit}}$ = 202.125 unit	12.50	20,215.5 [1617 × 12.5]	—	20,215.5
B.	$\frac{1617\text{ Hr}}{11\text{ Hr/unit}}$ = 147 unit	10	16,170 [1617 × 10]	2000	14,170

So, In Peak season we should produce Product 'A'

profit = 20212.50 − 20,000 = ₹ 212.5 Ans.

Statement of Ranking [Off Season].

[base = Contribution/unit]

Product	A	B	C
Selling Price/unit	550	604	890
(−) Material/unit	230	260	290
(−) Labour/unit	100	99	149
(−) Variable O/H/unit	100	120	130
Contribution/unit	120	125	121.
Ranking	III	I	II

Statement of Benefits.

[Option-I]	Cont/PU	Total Contrib^n	AFC	Benefits
B 115	125	14375	2000	12,375
C 100	121	12,100	4780	7,320.
215		26475	6780	19,695
Option II				
B 115	125	14375	2000	12375
A 100	120	12000	—	12000
215		26,375	2000	24,375
Option III				
C 135	121	16335	4780	11555
(HL) A 80	120	9600	—	9600
215		25935	4780	21155

∴ Option-II is better. We should produce B-115 & A-100 unit.

Profit = 24375 − 20,000 (F.C) = 4375 Ans

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(13) [Page-11]

Material = Key Factor

Production = 100000 units. [A + B + C]

Demand = A: 20000

B: Unlimited.

C: 20000

We should Produce According to Demand.

(i) Statement of Ranking.

Product	A	B	C.
Contribution / Unit	10	10	15.
Material / Unit of finished goods)	4	5	6
Contribution / Unit of Material	2.5	2	2.5.
	I	II	I.

Statement of Optimum Product Mix. & Profit.

Product	Qty	Mat/Unit	Material	Contribution
A_I	20000	4	80000	200000 [20000 X 10]
(b/f) B_{II}	20000	5	100000 (b/f)	200000 [20000 X 10]
C_I	20000	6	1,20000.	300000 [20000 X 15]
	100000		300000	700000
			L. Factor	
			Less: Fixed Cost	(750000)
			Loss	50000

Due to lack of Material, It's not possible to produce additional Qty of 'B' : 40000 units although we have sufficient Production Capacity, as well as demand.

(ii) Statement of Profit. [Using subtitute Material]

Existing Profit	(50000)
Incremental Contribution {[40 − (3.75 X 5 unit) − 6 − 9] X 40000}	2,50,000.
Incremental Fixed Cost	(50000)
Profit	1,50,000

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(iii) Statement of Profit

	Qty	Cont/unit	Contribution
A	20000	10	200 000
B	20000	10	100 000
C	20000	15	300 000
		Total Contribution	600 000
		Lease Rental	275 000
			8,75 000
		Less:- Fixed Cost	750 000
		Profit ⇒	1,25 000

Company cannot enhance the profit by leasing to 3rd Party as compared to option II i.e Producing 40000 unit of B by substitute Material.

∴ Better to utilize entire capacity by using substitute material for producing 40000 units of B.

(15) [Page-113] Working Note:- ~~Additional Fixed Cost~~

Machine Hours = Limited (key factor)

1 lot = 100 unit.

	P	Q
Demand =	220,000	1,75000
Demand of lot =	$\frac{220,000}{100}$	$\frac{175000}{100}$
	= 2200 (lot)	= 1750 lot

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Statement of Ranking

	P	Q
Contribution / lot.	1000	1200.
	[₹10 X 100 unit]	[12 X 100]
Machine Hr / lot.	15	25
Contribution / MHr.	66.66	48.
Ranking	I	II

Statement of Optimum Product Mix.

	Qty in lot	MH / ~~unit~~ lot	MHr	Contribution / lot	Contribution
P_I	220,00 lot.	15	33000	1000	₹22,00,000
Q_{II}	1680 lot	25	42000 (bl.)	1200	20,16,000
			75000		42,16,000
	Less:- Fixed Cost (18,70,000 + 12,20,000)				(30,90,000)
			Profit ⟹		11,26,000

	P :	Q
For 1st 1000 lot i.e 100000 unit	600000	5,50,000
For ~~2nd~~ Next 1000 lot i.e Next 100000 unit	750000	6,70,000
For Next 1000 lot i.e Next 100000 unit	5,20,000	3,30,000.

In order to achieve Max profit if reduce Production of 'P' by 200 lot then fixed Cost could be saved by ₹5,20,000 but Contribution to be lost by ₹2,00,000 [200 lot x ₹1000/lot]

On the other Hand released hrs from 'P' 200 lot i.e [200 lot x 15 Hr]
= 3000 hr. can be utilized for 'Q'

$\therefore$ Q's Qty = ~~1680~~ $\frac{3000 \text{ Hr}}{25 \text{ Hr/lot}}$ = 120 lot.

But Maximum Demand of 'Q' is 1,75000 unit (i.e, 1750 lot)
Hence 1750 − 1680 = 70 lot extra of 'Q' only can be produced without Incurring any extra fixed Cost.

~~Savings in fixed cost~~ P-7-0.

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∴ Saving in fixed Cost = 5,20,000
Contribution lost (200 x 1000) 200 000

Net benefit by not producing of 200 lot of P 3,20,000

\+ Additional Contribution from producing 'Q' [70 lot x 1200] 84000

Net Additional benefits ⇒ 4,04,000

Statement of benefit (Revised).

	lot	Cont/lot	Total Contribution
P	2000	1000	20,00,000
Q	1750	1200	21,00,000
			41,00,000.

Less fixed Cost
for P 1350000
for Q. 12,20,000 (25,70,000)

Net benefit ⇒ 15,30,000

(ii) If we ~~don't~~ donot fulfill entire demand of 'P' then we can acheive additional benefits of ₹ 404,000 i.e, However if we fulfill the entire demand of 'P', then such benefits of ₹ 404,000 will have to be lost i.e become our Opportunity Cost.

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18th Class

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(11) ~~Page: 108~~

Statement of Ranking.
[Before Land Developement]

	Mango	Oranges	Apples	Grapes
Revenue / hectare	10768	3174	2576	8019.
	[30.76 X 350]	[31.74 X 100]	[36.8 X 70]	[44.55 X 180]
Cost / hectare				
Material & Labour	2744	1648	1128	1680
Harvesting & Packing	6160	1696	1176	5328
	[17.60 X 350]	[16.96 X 100]	[16.8 X 70]	[29.6 X 180]
Transport	—	—	560	
			[8 X 70]	
Contribution / Hectare	1862	(170)	(288)	1011
Ranking 340 Hectare	I	—	—	II.

Minimum Land for 5000 box.

Mango = $\frac{1}{350} \times 5000$ boxes = 14.28 ≅ 15 Hectare

Oranges = $\frac{1}{100} \times 5000$ boxes = 50 Hectare

Apples = $\frac{1}{70} \times 5000$ boxes = 71.42 = 72 Hectare

Grapes = $\frac{1}{180} \times 5000$ boxes = 27.77 ≅ 28 Hectare.

Statement of Optimum Product Mix

Total Contribution	1st Hectare	2nd Hectare	Total Cont.
Mango	—	15 / 297	580944 If we had utilize 340 hectare to [312 x 1862] meet minimum requirement for all
Oranges	50	—	(8500) then very low part of 340 hectare [(170) x 50] would have been utilized for
Apples	72	—	(20736) Mango and entire 140 Hectare [(288) x 72] becomes idle.
Grapes.	—	28	28308 (28 x 1011).
	140 − 18 = 122	340	5,80,016

Less:- F.C. 424000

~~Profit~~ 1,56,016

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[#2] Cost of land Developement ~~becomes an Assets~~ but not Cost because at the time of sale of land then at that time entire value of land along with developement cost would be recovered.

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(ii) If Land Developement Work is undertaken

Revised Contribution / Hectare

Existing Contribution / Hectare of Grape	1011.
+ Reduction in Cost [2.60X180]	468
Revised Contribution / Hectare	1479

Ranking would be same

Only 18 Hectare should be developed because 122 Hectare would continue to be utilized for orange & Apple due to Minimum restriction.

Cost of land Developement [18 Hect x ₹6000 / Hr] = 108000.

Statement of Optimum Revised Contribution.

	Hectare	Hecture	Contribution	Total Contribution
Mango	—	15+315=330	1862	614,460
Orange	50		(170)	(8500)
Apples	72		(288)	(20,736)
Grapes	—	28	1479	41,412
	122 Hect	358 Hect		6,26,636
			Less: FC	(424000)
			Inton 108000	(16200)
			Profit ⇒	1,86,436

Decision Land developement work should be Considered due to Increase in Profit

[#7] 1,08000 ₹ for Developement of land is of Capital Expenditure Nature, therefore should be Capitalised not taken in Revenue expenditure in Profit determination.

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(8) (108)

Statement of Profit [1981]

	Sales (₹ in lakh)	Contribution (₹ in lakh)
x	32	6,40,000
Y	8	48000
Z	24	2,88,000
A	16.	1,60,000
	80 lakh	11,36,000
	Less:- F.C	10,00,000
	Profit	1,36,000

Working Note

Calculation of Maximum sale in 1982

	Last year sale	1982 (Max. sale)	
x	32	33.6	[80 X 40% X 105%]
Y	8	33.6	[80L X 40% X 105%]
Z	24	33.6	[80L X 40% X 105%]
A	16	33.6	[80L X 40% X 105%].
	80L	134.4 lakh	

Working Note 2 Raw Material.

	x	Y	Z	A
S.P (left)	100	100	100	100
Contribution	20	6	12	10
Variable Cost	80	94	88	90
Material (50% of V.C)	40	47	44	45.

Raw Material Required to Meet Max Sale ₹ in lakh

x	(3360000 X 40% X 110%) =	1478400	1408000	[32L X 40% X 110%]
Y	(3360000 X 47% X 110%) =	1737120	16,54,400	[32 X 47% X 110%]
Z	(3360,000 X 44% X 110%) =	1626,240	1548,800	[32 X 44% X 110%]
A	(3360000 X 45% X 110%) =	16,63,200	158400	[32 X 45% X 110%]
	Req.	65,04,960	~~4998~~ 61,95200	
	Available	3500000	∴ Material key factor.	

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Statement of Cost (1981)

	S.P	Qty	Contribution	Variable Cost	Raw Material	Other Var. Cost
x	100	1	20	80	40	40
Y	100	1	6	94	47	47
Z	100	1	12	88	44	44
A	100	1	10	90.	45	45

Statement of Ranking. (1982)

	SP	O.V.C	Raw Material.	Contribution	Contribution / ₹ of Raw Material	Ranking.
x	105	40	44	21	21/44 = 0.4773	I
Y	105	47	~~47~~ 51.7	6.3	6.3/51.7 = 0.1218	IV
Z	105	44	48.4	12.6	12.6/48.4 = 0.2603	II
A	105	45	49.5.	10.5	10.5/49.5 = 0.2121.	III

Statement of Optimum ProductMix

	Max Sales	Basis	Raw Material	Contribution
x_1	33,60,000	$\frac{44 \times 336000}{105}$	14,08,000	672000 $\left[\frac{21}{44} \times 1408000\right]$
Y	—	—	—	—
Z_{II}	33,60,000	$\frac{48.4 \times 33,60000}{105}$	15,48,800	403200 $\left[\frac{12.6}{48.4} \times 1548800\right]$
A.	~~33,60,000~~ 11,52,242 (bld)	$\frac{543200 \times 105}{49.5}$	5,43,200 (bld)	1,15,224 $\left[\frac{10.5}{49.5} \times 543200\right]$
			3500,000	11,90,424
			Less:- F.C =	10,00,000
			Profit ₹	1,90,424

Profit (1982) = 1,90,424 (₹).

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(2) Page-184

Working

Department

1 = 45 worker X 8 hr/day X 300 days = 1,08,000 hrs. → P, Q
2 = 24 worker X 8 hr/day X 300 days = 57,600 hrs → P, Q
3 = 27 worker X 8 hr/day X 300 days = 64800 hrs → P
4 = 36 worker X 8 hr/day X 300 days = 86,400 hrs. → Q

3,16,800 Not transferable

If we had transferable Labour Hour, then situation would have been

	P	Q
Selling Price	144	216.
(−) Material Cost	20	40
(−) Labour Cost	72	108
(−) Variable overhead.	16	14
Contribution/unit	36	54
Contribution/Hr	2	2

Time in	P (Hr)	Q. (Hr)
Dep- I	6	9
II	3	6
III	9	—
IV	—	12
	18 Hrs	27 Hrs

∴ Contribution/Hr. ₹2.~~176~~ (36÷18 Hrs) ₹ 2 (54÷27 Hrs)

Demand = Unlimited

Qty P = $\frac{316800 \text{ Hr}}{18 \text{ Hr/unit}}$ = 17600 unit.

P	LHr	Req	Available	Spare
Dept I	17600 X 6 Hr =	105600	108000	2400
II	17600 X 3 Hr	52800	57600	4800
III	17600 X 9 Hr	158400	64800	(93600)
IV	——	——	86400	86400
		316800	316800.	

As Resource could not be transferred, Hence above situation should not applied.

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Fair Part

Ranking Could not be applied, Combination should be applied because Resource are not transferable.

First Combination

Statement of Possible Unit.

First 'P' & balance for 'Q'

Dept	P LHR	Hr/Unit	Unit	Balance Resource	Q Hr/unit	Unit
I	108000	6	18000	[108000-(7200×6)] = 64800	9	7200
II	57600	3	19200	[57600-(7200×3)] = 36000	6	6000
III	64800	9	7200	[64800-(7200×9)] = —	—	—
IV	86,400	—	—	[86400 - 0] = 86400.		7200
		Possible unit	7200		Possible unit	6000 unit.

∴ First 7200 unit of P & 6000 unit of Q.

2nd Combination

Statement of Possible unit.

Dept	LHR	First 'Q' HR/Unit	Unit	Balance LHR	P Hr/Unit	Unit
I	108000	9	12000	[108000-(7200×9)] = 43200	6	7200
II	57600	6	9600	[57600-(7200×6)] = 14400	3	4800
III	64800	-	—	[64800 - 0] = 64800	9	7200
IV	86,400	12	7200	[86400-(7200×12)] = —	—	—
	Possible Unit=		7200		Possible Unit ⇒	4800

Statement of Comparative overall Contribution.

Option-I			Option-II	
P=	7200 unit × ₹36/unit	259200	P = 4800 unit × 36/unit =	172800
Q=	6000 Unit × ₹54/unit =	324000	Q = 7200 unit × 54/unit =	388,800
		583,200		561,600

Option-I is better. (i.e P = 7200 unit & Q-6000 unit)

Profit = 583200 - 50000 = ₹ 5,33,200 Ans

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(ii) (a) If only one product is to be manufacture, we should produce Product 'Q' with profit of 388800 − 50000 = ₹3,38,800 Ans

as ~~P 372000~~

P = 7200 unit × ₹36/unit = 259200

Q = 7200 unit × ₹54/unit = 388800.

(ii)(b) If we have Two key factor (lab & Material) & only one product. We should produce the product having overall Contribution (Max)

Overall Contribution = Possible unit × Contribution per unit.

Possible unit	P	Q
Material.	$\frac{180000}{20}$ = 9000 unit	$\frac{180000}{40}$ = 4500 unit
Labour	7200 unit	= 7200 unit
Possible Unit	7200 unit	4500 unit
Contribution/unit	₹36	₹54 unit
Total Contribution	259,200	₹243,000

Better to Produce Product 'P'.

Profit = 259200 − 50000 = ₹209,200 Ans

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(14) [Page-112] ⇒ We have two option to produce Input (x) in Finished Product 'XA'

Option- I [Case 260 lakh-Tonne].

Maintain own Vehicle. ₹/P.A.

F.	Fixed Cost	10,40,000
	Variable Cost [₹ 0.08 / Tonne km X 260 T.km]	20,80,000
		31,20,000

Option-II Chamba Travells.

Payment [260 Lakh Tonne km X ₹0.18 / T.km] **46 80 000**

Better to have own Vehicles. for ₹ 260 Tonne-km..

⇒ **Selection of Supplies**

Statement of Comparative Cost

Town	A	L	C
Cost Per Tonne.	90	97	78
Variable Cost / Tonne km. [Transportation Cost].	24 (300km X 0.08)	20 (250 X 0.08)	40 (500km X 0.08)
Net Cost / Tonne	114	117	118
Ranking	I	II	III
	Upto 9000 tonne.	Upto 8000 tonne	Balance.

	Mode	Tonne	km	Tonne km
A	Own vehicle	9000	300	27,00,000
L	Own vehicle	8000	250	20,00,000
C	Own vehicle	42600	500	2,13,00,000 (bld)
		59600		260 00,000 Tonne-km.
Chamba	Balance from Chamba travels	400 Tonne.		
	Capacity.	60000 Tonne		

∴ Transportation Cost = 400 Tonne X 500 KM X 0.18 = ₹ 36000

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Statement showing selection of Customes.

Customer	S.P	Demand	Revenue	KM	T.KM
Q	220	9000	1980000	14.	126000.
R	200	10000	20,00,000	25	250,000.
L	200	6000	1200000	9	54000
P	192	10000	1920000	22	220,000.
M	188	6000	1128000	—	—
N	~~17000~~	15000	25,50,000	—	—
O	150	4000	600000	—	—
		60000 Tonne	1,13,78,000		650,000

Transport Plan

(1) Agency 650,000 Tonne km X 0.15 = 97500 subject to Minimum 1,25000

(2) chamba travels = 650000 Tonne km X 0.18 = 117,000

Better to select chamba Travels = 1,17000.

Statement of Profit

Revenue		1,13,78,000
Less:- Material 'x'		
Transportation Cost	31,20,000	
Chamba Travels Transportation Cost	36000	
Purchase Cost		
A : 9000 X 90	810,000	
B : 8000 X 97	776,000	
C : 43000 X 78.	33,54,000	
Processing Cost [60000 tonne X £5/tonne)	300000	
Transportation for Customes	1,17000	85,13,000
Fixed Cost		750,000
Profit		21,15,000

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(16)
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Statement of Profit
[As per Draft Budget]

Product	P	Q	Total
Qty	40000	80,000	
SP	25	50	
Total Cost	20	40.	
Profit/Unit	5	10	
Total Profit	200000	800000	1000000

Calculation of Machine Hours & Contribution Per unit.

P 40000 Unit × 2 Hr/unit = 80000 Hr

Q 80000 Unit × 1 Hr/unit = 80000 Hr
1,60,000 Hr

Fixed overhead / Machines Hours = $\frac{₹960000}{1,60,000 \text{ Hr}}$ = ₹6/Hr.

	$\boxed{P}$	$\boxed{Q}$
Fixed Cost/unit	12 [6×2Hr]	6. [6×1 Hr]
Total Cost	20	40.
Variable Cost	8	34
Selling Price	25	50
Contribution/unit	17	16
Contribution/Hour	8.5	16
	II	I

Statement of Optimum Product Mix & Profit

Product	Hr/unit	Qty	Hr	Contribution/unit	Contribution
P_{II}	2	30000.	60000	17	510000
Q_I	1	100000	100000	16	16,00,000
			1,60,000		21,10,000
				Less: Fixed Cost	960000
				Profit ⟹	11,50,000

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We should discontinue Product 'P' as it has low (less) Contribution/Hr.

Machine Hours Released = 60000 Machine Hours.

Qty of 'l' Produced = $\frac{60000 \text{ Hr}}{1.5 \text{ Hr/unit}}$ = 40000 unit.

$\therefore$ Cost + Profit = Sales.

VC + FC + 15% Return on Capital + Desired Profit = sales.

= [(₹21 × 40000 unit) + (60000) + (15% of 200000 × 1/12) + 510000 = sales

= 840,000 + 60000 + 2500 + 510000 = Sales

$\therefore$ Sales = ₹1412500

Selling Price/unit = $\frac{₹1412500}{40000 \text{ unit}}$ = ₹35.3125

$\therefore$ S.P/unit = ₹35.3125

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~~Chapter-4~~

Sub ContractinG

it is subcontracting's sumx.

Manufacturing Cost & Purchase Cost both are given, then, DATE

\# Sub Contracting means purchase and sale of complete goods i.e. Trading, Outsourcing [Purchase – Stamped – sales]

\# This is a Short Term Decision.

\# If a Company has 100% Resources to fullfill their entire Demand i.e. No key factor exists, then Sub-Contracting Decision is not applied

\# Sub Contracting Decision will apply only when key factor exists.

\# Key factor Decision analyse only which Product should be Manufactured or which should not be ~~purchase~~ manufacture.

\# Key factor decision does not analyse that "which product should be purchased" because in key Factor decision Purchase cost : Not Considered.

Now we can say which Product should be Purchased i.e. to be analysed in Subcontracting Decision.

(eg) Statement of Ranking

	A	B	C	
Selling Price	10	20	30	
Variable Cost	4	5	6	
Contribution/unit (a)	6	15	24	
Machine Hour/unit	10 Hrs	2 Hrs	3 Hrs.	
Contribution/Hour	0.6	7.5	8	
Ranking	III	II	I	
Purchase Cost/unit	7	8	5	
Contribution in Purchase & sale (b)	3	14	25	
Excess Contribution in Mfg over purchase (a-b)	3	1	(1)	⇒ Excess Contribution in purchase over Mfg.
Decision	Mfg	Mfg	Purchase	

Now if we do not have sufficient resources to meet entire Demand of A & B then we should produce that product having maximum Excess Contribution in Mfg over purchase in term of key Factor.

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	A	B
Excess Contribution in Mfg over Purchase/unit	3	1.
Machine Hours /unit	10 Hrs	2 Hrs
Contribution /Hr	0.3	0.5
Ranking	II.	I

Difference of Variable cost and Purchase cost is the "Excess Contribution in manufacturing over purchase"
Now we can say that in "Sub Contracting" We should Prepare the following 2 Statement

(1) Statement of Ranking
(2) Statement of Optimum Product Mix. & Profit & loss statement.

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Statement of Ranking

Product	A	B	C
(a) Variable Cost (₹/unit)	XX	XX	XX
(b) Purchase Cost (₹/unit)	XX	XX	XX
Excess Contribution or saving in Mfg over Purchase (a-b) = (c)	XXX	XXX	(XXX) Suppose Comes Negative.
Decision	Mfg	Mfg	Purchase.
Key factor/unit (d)	XX	XX	—
Excess Contribution in Mfg over Purchase/Hour [c/d]	XX	XX	—
Ranking for Mfg	✓	✓	

(2) [Page-123]

Statement of Ranking

Product	A	B	C	D
Variable Cost/Unit (a)	56	74	76	76
Purchase Cost/Unit (b)	63	80	72	82
Excess Contribution in Mfg & sale over Purchase & sales (b-a)	7	6	(4)	6
Decision	Mfg	Mfg	Purchase	Mfg
Machine Hour/Unit	2 Hr	4 Hr	3 Hr	6 Hr
Saving or Excess Contribution/Hr.	3.5	1.5	—	1
Ranking for Mfg	I	II	—	III

Statement of Optimum Product Mix.

Product	Qty.	Hr/unit	Hrs.
A_{I}	18000	2	36000
B_{II}	30000	4	1,20,000
D_{III}	9000	6	54000 (b/f)
	57000 unit		210000

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If we restrict our production upto 50000 unit i.e reduced by 7000 units then Saving in fixed Cost = ₹ 100 000

Excess Cost for 7000 unit of D = (7000×6) 42000

Net benefits. 58 000

final status

A	18000	Mfg
B	30000	Mfg
C	27000	~~M~~ Purchase
D	2000	Mfg
	[7000 / 6000]	Purchase

Statement of Profit

Revenue
A 18000 × 68 = 12,24000
B 30000 × 90 = 2700 000
C 27000 × 91 = 2457000
D 15000 × 94 = 1410, 000 — 7791000

(−) Cost
Variable Cost ~~AB~~ (18000 × 56) = 10,08 000
B = (30000 × 74) = 22,20,000
C = (27000 × 72) = 1944 000
D = (2000 × 76) = 1,52000
= (13000 × 82) = 10,66,000 — 63, 90, 000

(−) Fixed Cost — 400 000

Profit ⟹ 10, 01, 000

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(5) [Page-123]

Statement of Surplus Hours from existing.

Product	Qty Demand	Hr/Unit	Hours
x	200000	2	400000
Y	300000	2	600000
Z	400000	3	1200000
K	500000	3	1500000
	Required		3700000 Hr.
	Available		39,50,000 Hr.
	Surplus/Additional Hrs		2,50,000 Hr.

Statement of Hrs Required.

Product	Additional	Hr/Unit	Hrs
x	10000	2	20000
Y	20000	2	40000
Z	30000	3	90000
K	40000	3	120000
		Required →	2,70 000 Hr
		Surplus Hr	2,50 000 Hr
		Shortage →	20 000 Hr

Statement of Ranking

	x	Y
Variable Cost	9	12
Purchase Cost	10	15
Excess Contribution in Mfg over Purchase	1	3
Hours/Unit	2	2
Excess Contribution/Unit	0.5	1.5
Ranking	II	I

Statement of Optimum Product Mix.

Product	Qty	Hr/unit	Hr.
x	10000 (Purchase)	—	—
Y	20000 (Mfg)	2	40000 (b/f)
Z	30000 (Mfg)	3	90000
K	40000 (Mfg)	3	120000
			250000

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Statement of Cost Benefit

Incremental Contribution

x [10,000 × (12−10)]	20 000	
Y [20000 × (30−12)]	3,60,000	
Z [30000 × (30−24)]	1,80,000	
K [40000 × (20−17)]	1,20,000	680,000
Less:- Increment Cost of Advertising		500000
Incremental Benefits ⟹		1,80,000

Advice = Better to introduce Advertisement of Product.

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Calculation of Possible Unit

	x	Y
Department I	$\frac{100000 \text{ Hr}}{5 \text{ Hr}}$	$\frac{160000 \text{ Hr}}{7.5}$
	20000 Unit	= 13,333 Unit
Department II	$\frac{160000 \text{ Hr}}{7.5 \text{ Hr}}$	$\frac{160000 \text{ Hr}}{10 \text{ Hr}}$
	= 21333.33 unit	= 160000 Unit
Possible Unit	$\boxed{20000 \text{ unit}}$	$\boxed{13333.33 \text{ Unit}}$

S~~tatement~~ ~~of~~ Contribution/unit

	x	Y
~~S. Price~~	~~300~~	~~430~~
~~(−) Labour~~	~~40~~	~~60~~
~~Material~~	~~45~~	~~75~~

20th class
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Statement of Contribution/unit

		x		Y
Selling Price		300		430
Less:- Cost Dept I				
Material	45		75	
Labour	40		60	
V.O (5Hr × ₹2)	10	95	~~7~~ 15 (5Hr × ₹2)	(150)
Dept II				
Material	15		20	
Labour	75		100	
V.O (7.5Hr × ₹2.4)	~~1~~18	108	24 (10Hr × ₹2.4)	(144)
		97		136.

Statement of Comparative Cost

'x'

Contribution 20,000 unit × 97 = 19,40,000

Y

Contribution 13,333.33 unit × ₹136/unit = 18,13,333.3

Better to Consentrate on 'x'

Profit = 19,40,000 − 1500000 = 440,000 ₹

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Statement of Comparative Contribution.

x		y	
Revenue (22000 X 300)	66,00,000	Revenue [18000 unit X ₹430]	77,40,000
Less:- Dept-I		Less:- Dept-I	
20,000 (mfg) X 95]	1900000	[13,333.33 Unit X 150]	20,00,000
[2000 (Sub Contract) X 110]	2,20,000	[4667.67 Unit X ₹180]	8,40,000
Dept-II		Dept-II	
[21333.33 (Mfg) X] 108]	23,04,000	[16000 unit (Mfg) X ₹144]	23,04,000
[667 X 120]	80,000	[2000 unit (Sub) X ₹ 150]	300,000
	20,96,000		22,96,000
Less:- Fixed Cost	15,00,000	Fixed Cost	15,00,000
Profit ⇒	5,96,000	Profit	7,96,000

Better to Produce 'Y'

(4)
~~Page-125~~

Working Note

Labour Hours Require to produce Complete Component

Section - I [18 mint X 5 part] 90 mint i.e 1.5 Hr

Section- II [15 mint X 4 part] 60 mint i.e 1 Hr

Section - III [30 mint X 1 Part] 30 mint i.e 0.5 Hr

180 mint i.e 3 Hr

Total Labour Hours available = 7500 Hrs.

∴ No. of units be produced = $\frac{7500 \text{ Hrs}}{3 \text{ Hrs/unit}}$ = 2500 units.

Statement of Cost.

Section		I.	II	III	Total
Material	(60X5)	300	(40X4) 160	(20X1) 20.	480
Labour.	(1.5 Hr X ₹120)	180	(1Hr X 120) 120	(0.5 Hr X 120) 60.	360
V.O	(0.5X180)	90	(0.5X120) 60	(0.5X60) 30	180
		570	340	110	1020
Purchase Cost (₹)		700	500	200.	

[700 against 500]
Note #

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Strategy (I) ~~2500~~ ~~units~~ Statement of Profit.

Revenue	[3000 unit X 1500 ₹]	45,00,000
Less:- Manufacturing Cost for	[2500 units X 1020]	(25 50 000)
Purchase Cost for	[500 unit X ₹ 1400]	(700 000)
Testing Charges	[₹ 20 X 3000 unit]	(60,000)
Fixed Cost		(500,000)
Profit ⟹		8,90,000

Self ~~Para~~ Note Since Testing charges not included in the Cost of Manufacturing in section I, II & III. And the some purchase cost are also relating to the said section I, II, III. So Testing charges will charges on all unit. of 3000 unit

(#) Note :- Sub Contract Price of ₹ 1400 made up of Individual Subcontract Price & Individual Subcontracting Cost/Price is paid against our Mfg Cost & our mfg cost does not include any TESTING Cost.

Statement of Ranking.

	I.	II	III
Variable Cost	570	340	110
Purchase Cost	700	500	200.
Saving in Mfg. over-Purchase	130	160	90
Labour/Hr.	1.5 Hr	1 Hr	0.5 Hr.
~~Ranking~~ Saving/Hr	86.6	160	[illegible] 180
Ranking	III	II	I

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Statement of Section Mix

Section	Qty	Hr/unit	Hrs
I	2000 (Mfg)	1.5	3000 (blt)
II	3000 (Mfg)	1	3000
III	3000 (Mfg)	0.5	1500
			7500

On 2000 unit Section I work will be done Inhouse on on 1000 unit section I will be outsourced. & on 3000 unit section I & II's work will be manufacture in house.

Strategy-II

Statement of Profit.

Revenue	[₹1500 x 3000 unit]	4500,000
Less:- Cost		
Mfg Cost for 3000 unit in section II & III	[₹(340+110) x 3000 unit]	(13,50,000)
Mfg Cost for 2000 unit in section I.	[₹570 x 2000 unit]	(1140,000)
Purchase Cost for 1,000 Unit in section I.	[₹700 x 1000 unit]	(700000)
Testing Charge	(₹20 x 3000 unit	(60,000)
Fixed Cost		(500,000)
	Profit ⟹	7,50,000

Better to follow IInd Strategy having ₹750000 Profit more than Ist strategy having ₹690000 which is greater by ₹60,000.

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(7) (Page-127) Working Note

Total Machine Hr available = 10000 Hr.

Bottle Requirment Hr 7500 Hr

(100000 × 7500] = [750000 bottles Demand]

Spare 2500 Hr

	Bottle	Toy
S.P.	0.5	3.00
V.C	0.2	2.40

AFC = 20000.

UAFC = 200000.

Order = 100000 Units of Toy

Hr/Unit of Toy 1 40

∴ Total Hr Required = $\frac{100000}{40}$ = 2500 Hrs.

Toy can be produced if there profit in spare Hours.

Statement of Cost Benefits.

Increment Revenue (100000 × £3)		300000
Less:- Increment Cost		
(100000 × £ 2.4)	240,000	
Avoidable Fixed Cost	20000	260000
Benefits ⇒		40000

Better to accept offer of Toy order due to Incremental benefits of £40000 in spare Capacity of 2500 Hrs.

(ii) If Demand for bottles increases which results no spare Capacity, in order to meet Toy's Production, the Company will have to reduce demand of bottles i.e Contribution to be Lost which should be covered from Toy.

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Statement of Net Benefits.

Revenue	[100000 x ₹3]	300000
Less:- Relevant Cost to be incurred		
	(100000 x ₹2.4)	240000
Avoidable fixed Cost		20000
Contribution to be lost	[2500 Hrs x 0.3 x 100]	75000
	Loss	(35000)

(C) Working Note

Total Machine Hours	10,000
(-) bottle Hours.	?
Spare	?

Toy (Mfg)		Sub Contract	
V.C. =	2.4	P.C	2.8
S.P =	3.00		
F.C =	20000.		

Let x be the no. of units where Total Cost for Mfg = Total Cost for Sub Contract

$x \times 2.4 + 20000 = 2.8x + \text{Zero}.$

$x = 50000 \text{ unit}$

i.e. $\frac{50000 \text{ unit}}{40/\text{Hr}} = 1250 \text{ Hrs}.$

Statement of Range.

Hrs [Excess Spare]	Preferences..
0 - 1249 Hrs	Subcontract
1250 Hrs	Mfg / subcontract
> 1250 Hrs	Mfg.

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(d) Working - Predicted

Total Machine Hour	10,000 Hr.
− Bottle	8,400 (b)(i)
Excess	1600 Hr

as 1600 > 1250 Hr

Hence, should be utilized mfg 1600 $\frac{Hr}{Unit}$ × 40 = 64000 toy

Sub Contract 36000

100000

Actual

Machine Hour	10,000 Hr
Bottle Demand	9000 Hr
Excess	1000

as 1000 < 1250 Hrs

Hence would not have been utilized & entire 100000 toy would have been subcontracted.

Statement of Comparative Results.

As per Incorrect Demand			As per Correct Demand		
Revenue	[840000 × 0.5]	420000	Revenue	[900000 × 0.5]	450000
	[100000 × 3]	300000		[100000 × 3]	300000
Less Cost			(−) Cost		
Bottle	[840000 × 0.2]	(168000)	Bottle	[900000 × 0.2]	(180000)
Mfg Toy	[64000 × 2.4]	(153,600)	Toy	[100000 × 2.8]	(280000)
S.C Toy	[36000 × 2.8]	(100800)			
Fixed	Cost	(20000)			
Profit ⇒		277600	Profit ⇒		2,90,000

If we had demand accurately, Profit would have been 290,000 instead of 2,77,600 i.e Cost of Prediction Error = 12400.

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(4) Nov 16
(a)

Machine Hour Requirement

P	120000 X 1.2 Hr/unit	1,44000
Q	186000 X 1.2 Hr/unit	2,23,200
R	171000 X 2 Hr/unit	
S	99000 X $\frac{2.16}{1.2}$ Hr/unit	1,78,200
		887,400 Hrs
	Available Hrs.	8,15,000 Hrs.

∴ Machine Hours is our key factor.

Statement of Ranking.

	P	Q	R
Variable Cost/unit	15.60	18.72	39.6
Purchase Cost/unit	21.36	24.00	48.00
Saving in Mfg over Purchase	5.76	5.28	8.4
Hr/unit	1.2	1.2	1.2.
Saving/Hrs.	4.8	4.4	4.2.
Ranking	I	II	III

Statement of optimum Product Mix & Profit.

Product	Qty	HR/Unit	Hrs	Cont/unit	Contribution
P_I	120000	1.2	144000	[23.88-15.6] = 8.28	9,93,600
Q_{II}	186000	1.2	2,23,200	[28.68-18.72] = 9.96 =	18,52,560
R_{III}	134800	2	269,600 (b/f)	[55.08-39.6] = 15.48 =	20,86,704
	36200 (b/f)	2	—	[55.08-48] = 7.08	256,296
S.	99000	1.8	178200	[47.98-33.48]	14,35,500
	[No choice]		815000	Total Contribution	66,24,660
				(-) Fixed Cost	46,84000
				Profit	19,30,760

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Statement of Ranking

	A	B	C	D.
Variable Cost/unit	144	140	153	110
Purchase Cost/Unit	146	126	155	108
Saving in mfg vs Purchase	2	(14)	2	8
Hr/Per unit	6	—	8	3.
Saving/Hr	0.33	—	0.25	2.6
Ranking	II	—	III	I

Statement of Optimum Product Mix.

Product	Qty	Hr/Unit	Hrs
A	52000	6	312000
B	—	—	—
C.	12000	8	96000 (b/f)
D_I	30000	3	90,000
			498000

Option-I

If we restrict our Machine Hours to 450000 then

Saving in Fixed Cost = 50,000.

(-) Loss in Contribution (48000 x 0.25) 12000

Benefits. 38000

Option-II

If we restrict our Machine Hrs to 300000 then

Saving in fixed Cost 50000.

Loss in Contribution

[(48000 x 0.25) + (102000 x 0.33)] 46000

Profit | ~~Loss~~ Benefits → 4000

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option - iii

If restrict our Machine Hrs to 150,000 Hrs.

Saving in fixed Cost	50000
(-) Cost of Contribution [150000 x 0.33]	50000
	Nill

Better to Restrict upto 300,000 Machine Hrs.

300000 Hr

Product	Hours	Qty	
A	210000	$\frac{210000}{6}$ =	35000
D	90000	$\frac{90000}{3}$ =	30000.
	300000		

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Chapter-5

TRANSFER PRICING

21st Class

DATE 08 01 2017

(#) Transfer Pricing — If a Company has two (2) Department, One Department supply its goods & services to other. Supply Department supply goods to Manufacturing Department & charge some price for its goods & services, such amount is known as Transfer Pricing.

In Case of Transfer Price goods remains within the Business.

(eg)

	Department₁	Department₂	Product
1)	Chain	Rim/Fram	Bicycle.
2)	Condensor	Motor/Other part	Fan.
3)	Empty bottles	soft drink liquid	Soft Drink.
4)	Table	Polish	Table Complete

∴ Amount charge by Department₁ from Department₂ for chain is our Transfer Price [in eg. 1]

(#) Transfer price is different from selling Price.

Transfer Price	Selling Price
1) In Transfer price, goods remain within the Company.	(1) Goods reaches in hands of Customer.
2) No profit could be realised due to Transfer Price.	(2) Profit realised on transaction of sales.
3) Title of Goods not Transferred.	(3) Title of Goods transferred to the Customers.

(#) Transfer Price becomes Revenue for the supply Department and becomes Cost for the Receiving Department.

(#) In order to evaluate/analyse the effectiveness of efficiency of each Department, we should have some profit amt earned by such Department. Profit could be analysed only when

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Some price could be recognized. For this purpose management deligates the right to charge some price for their goods & services. Although the price (Transfer Price) would be <u>Notional</u> from overall company point of view.

(#) Higher Profit of Department will generate Higher Remuneration/ Commission to the Department manager.

(#) <u>Notional</u>

<u>Statement of Profit</u>

(eg)

(a)

	A		B		Company
Transfer Price	200	Sale	1000	S.P	1000
Cost	120	− Transfer Cost	200	A	(120)
Profit	80	− own Cost	600	B	(600)
		Profit	200	Profit	280

(b)

	A > if B ready to pay higher Amt		B		Company
Transfer Price	250	Sale	1000	S.P	1000
Cost	120	− Transfer Cost	250	Cost - A	(120)
		− own Cost	600	B	(600)
Profit	130	Profit	150	Profit	280

Thats why Transfer price is Notional because overall Profit to the Company remains same although Department profit are fluctuate.

(#) Supply Department$_1$ would like to charge higher Price from from Department$_2$ on the other hand Department$_2$ would like to pay low price to Department$_1$. Such conflict would be resolved by "<u>Management Accountant</u>". Management Account fix the price i.e [Transfer Price]

(1) Acceptable by Supply Department
(2) Acceptable by Receiving Department
(3) Overall Profit of the company remains uneffected.

(#) Transfer Price should be always "<u>Relevant Cost</u>"

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Relevant Cost

Cost to be incurred due to Transfer	XXX
+ Benefits to be lost due to Transfer	XXX
− Benefits to be achieved due to Transfer	(XXX)
Minimum Transfer Price ⇒	XXXX

Coverage of Topics

1) Calculation of Transfer Price (Either fixed by Management or by Management Accountant with/without key factors)

(2) Transfer Price with best strategy

(3) Preparation of "statement of Profit" with given Transfer Price / given Method.

(4) Transfer Price with application of "Calculus"

(5) Transfer Price with application of "International Taxation" [Multi National Transfer Price / Arm length Price]

(6) Transfer Price with "Decision Making"

(1) Calculation of Transfer Price

Fixed by Management

1) Transfer Price = Market Price.
2) Transfer Price = Cost + Mark up. (Return)

Cost = VC + UAVF + AFC

Return = % on Investment

Investment = FA + WC.

FA = Fixed Assets

WC = Working Capital.

Fixed by Management Accountant.

Transfer Price = Relevant Cost. acceptable by Receiving/Supply Department as well as by Company.

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eg **Fixed by Management Accountant.**

Company

Dept-A ⇓ Chain | Dept B ⇓ Other Parts

Capacity = 10,000 units of chain.
Utilized = 7000 units of chain.
Spare = 3000 units of chain.
S.P = 100
V.C = 70.
F.C = 20000

Required = 3000 units of chain.
Purchase Price = 90.
(In market).

Now Management Account Resolve the situation by overall Company point of view. (Make / buy Decision).

VC = 70 ⇄ PC = 90. (In Market)

$\therefore$ Better to Manufacture

Result :- Fix the Transfer Price. So that 'B' Deptment would not like to purchase from market.

Minimum Transfer price = Relevant Cost but not arbitrary

Statement of Transfer Price.

	₹/unit
Cost to be incurred due to Transfer i.e.	
V.C	70.
Minimum Transfer Price =	70

Transfer Price = 70.

$\therefore$ Transfer Price = between 70 to 90.

70 ↓ Not less than VC.

90 ↓ A can Maximum Charge.

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(eg) 2

Company → A (Chain), B (Other Parts)

A	B
Chain	Other Parts.
Capacity = 4000 unit.	Required 4000 units of chain
No Market ~~ou~~ Sale.	Purchase Cost in Market
Variable Cost / Unit. = 40/unit	= 50/unit.

Released Capacity can be leased (Rented) for ₹ 50,000 P.M.
What should be Transfer Price.

<u>Management Accountant</u> (Thought Process).

VC = 40/unit   PC = 50/unit

Loss on Purchase = 4000 unit x ₹10/unit =	40000.
Benefits from Rented	50000
Net Benefit.	10,000

∴ Better to Purchase.

Fix Transfer Price so that 'B' would like to Purchase from market but based on Relevant Cost.

Statement of Relevant Cost (T.P) ₹/unit.

Cost to be incurred due to Transfer.	40
+ Benefit to be lost due to Transfer $\left[\frac{50000}{4000}\right]$	12.50
Transfer Price. ⇒	52.50

Transfer Price = Relevant Cost because, It automatically Control the decision.

	A		B
VC	40	P.C	50.
Rental	50000		
Units	4000 unit		

T.P = 52.50   P.C = 50. Better

TP 52.50 → 52.50 | P.C 50 → 60

Now After few Days

Now A will Transfer the chain to B.
Transfer Price 52.50/unit will Insist to 'B' to receive from 'A'

Loss on ~~Purchunit~~ Purchase	20 X 4000 =	80,000
Benefits		50,000
Loss ⇒		30,000

∴ Better to Transfer.

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Working Note

	A		B
V.C	180	Required	3000
Fixed Cost	10000	P.C	220
Qty	3000 units.	own cost	180
Transfer Price = 250		S.P. =	500.

Statement of Comparative Cost.

Manufacture		Purchase.	
VC	180	Purchase Cost	220
	180		220

Company will not be in benefit position if Dept 'B' Purchase from outside because V.C/unit is lower than Purchase Cost' (i.e Purchase Cost is higher than Variable Cost)

Statment of Transfer Price.

	₹/unit
Cost to be incurred due to transfer	180
+ Benefit to be lost due to transfer	Nill
Minimum Transfer Price ⇒	180

Transfer Price = between ₹ 180/unit to ₹220 /unit.

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(iii) Statement of Comparative Cost.

Manufacture		Purchase	
Variable Cost	180	Purchase Cost	220

Loss on Purchase	= [(220 - 180) X 3000]	(1,20,000)
Benefits from Released Capacity (Rent)		200 000
Net Benefit. ⟹		80,000

Company would be in better position if 'b' Purchase from outside

Statement of Transfer Price. ₹/P.Unit

Cost to be incurred due to Transfer		180.
+ Benefit to be lost due to Transfer	$\left[\frac{200000}{3000}\right]$	66.67
Minimum Transfer Price =		₹246.66

(iv) Statement of Comparative Cost.

Manufacture		Purchase	
Variable Cost	180	Purchase Cost	170

Company would be in better position if b Purchases from Market because PC < VC.

Statement of Transfer Price.

Cost to be incurred 180

Minimum Transfer Price ⟹ 180

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(9) Page-139 (i) Available Hours = 13000 Hrs. (Dept-A)

Statement of Hrs Availability (Dept-A)

	Unit	Hr/unit	Hrs
x	800	6	4800
y	500	8	4000
z	300	4	1200
		Required	10,000 Hrs
		Available	13000 Hrs
		Spare	3000 Hrs

Hours required to Produce 300 unit of 'Y' = [300 x 8] 2400 Hr.
Available 3000 Hr.

Statement of Transfer Price. ₹/unit.

Cost to be incurred due to transfer	24
Benefit to be lost (spare)	—
Minimum Transfer Price.	24

∴ Range of Transfer Price = ₹ 24 to ₹ 45 /unit.

(iii) Available Hours 8000
Required Hours 10,000 to meet external Demand.
It means we have already Labour Hours as key Factor i.e we are utilizing key factor in optimum manner as follows.

Statement of Ranking (Dept-A)

	x	y	z
Contribution / Unit	(96-33) = 63	(92-24) = 68	(80-28) = 52
Hrs / unit	6	8	4
Contribution / Hrs	10.5	8.5	13.
	II	III.	I

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Statement of Optimum Product Mix.

Product	Qty	Hr/unit	Hrs
x_{II}	800	6	4800
Y_{III}	250	8	2000 (bal)
Z_{I}	300	4	1200
			8000

Now in order to produce 300 units of y for the Purpose of Transfer we need 300 unit X 8 Hr/unit = i.e 2400 Hrs which could be managed by not producing existing y and x.

'Y' = 2000 Hr to be Release
'x' = 400 Hr to be Release

'300 'Y' unit
250 unit ['Y' sacrifice] — 50 unit ['x' sacrifice]

Statement of Transfer Price.

For the first 250 unit of y

Cost to be incurred due to transfer [24X250]	6000
+ Benefit to be lost due to transfer [250 unit X 8 Hr X ₹8.5] or [2000 Hr q Y X ₹8.5]	17000
Transfer Value	23000
Transfer Price / unit $\left[\frac{23000}{250}\right]$	₹92

For Next 50 unit of 'Y'.

Cost to be incurred due to transfer [₹24 X 50]	1200
Contribution to be lost [50 unit X 8 Hr X ₹10.5] or [400 Hr of x X10.5]	4200
Transfer Price ⇒	5400
Transfer Price / unit $\left[\frac{5400}{50}\right]$	₹108

∴ Transfer Price for First 250 units ₹92/unit
Next 50 unit = ₹108/unit.

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(iii) Available Hours = 12000 Hrs.
External Demand = 10000 Hrs
Spare 2000 Hrs

Hrs needed to Produce 300 unit of Y = for transfer = [300×8] 2400.
[in addition to external Demand]
∴ spare Hrs available 2000
from Regular production of 'Y' ⟹ 400 Hrs.

Statement of Transfer Price.

For first 250 units of Y or from spare 2000 Hrs.

Cost to be incurred due to transfer [24 × 250]	6000.
+ benefit to be lost (spare)	—
Transfer Value	6000
Transfer Price / unit $\left[\frac{6000}{250}\right]$	24/unit.

For Next 50 unit of Y or from 400 Hrs from Production of Y

Cost to be incurred due to transfer [24×50]	1200.
+ benefit to be lost [50 unit × 8 Hr/unit × ₹8.5]	3400
Transfer value	4600
Transfer Price / unit = $\frac{4600}{50}$ =	92/unit

Decision = better to Purchase 50 unit from Market @ ₹45 unit & Provide 250 unit from Dept A @ a Range between ₹24 to ₹45.

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(12) [Page-140] Department 'Y' would like to pay any amount to 'x' Department for product Delta to replace Imported Component. Such that after incurring extra cost of ₹ 64 per Component. It would become Cost of Imported Component (640)

$x + 64 \leq 640$

$\therefore x \leq 640 - 64$

$\therefore x \leq 576$ (₹).

(ii) Department 'x'

Hours Available 96000

Statement of Ranking.

	Delta	Gama.
Selling Price	640	158
(–) Material Cost	(240)	(64)
Other Variable Cost	(256)	(64)
Contribution/unit	144	30
Hours/Unit	4	1
Contriubution/Hour	36	30.
Ranking	I	II.

Statement of Optimum Product Mix.

Product	Qty	Hrs/unit	Hours
Delta	20000	4	80000
Gama	16000	1	16000 (b/f)
			96000

Now we can say in order to produce 5000 unit of Delta for Transfer to Department 'Y'. (In addition to regular Production) Department x need 5000 unit X 4Hr/unit = 20000 Hrs. Which can be released, 16000 Hrs from Regular Gama and 4000 Hours from Regular Delta.

∴ From 16000 Hours of Gama = $\frac{16000}{4}$ = 4000 (Unit of Delta for Y Dept)
From 4000 Hours of Delta = $\frac{4000}{4}$ = 1000 (Unit of Delta for Y Dept)

Minimum Transfer Price

For First 4000 unit of Gama

Variable Cost	[4000 unit X ₹ 496]	1984000
Contribution to be lost	[16000 Hrs X ₹ 30/Hr]	480000
	Transfer Value	2464000
	No. of unit	4000
	Transfer Price /unit	₹ 616

For Next 1000 Delta

Variable Cost	[₹ 496 X 1000 unit]	4,96,000
Contribution to be lost	[₹ 36 X 4000 ~~unit~~ Hrs]	1,44,000
	Transfer value	6,40,000
	No. of unit	1000
	Transfer Price /unit	640.

Statement of Optimum Product Mix.

Product	Qty	Hrs/unit	Hrs
Delta	15000	4	60000
Gama	10000	1	10000
		Required	70000
		Spare	26000 (b/f)
		Available	96000

Now in this Situation we can produce additional 5000 units of Delta (for transfer to Dept 'Y' to replace Imported Component) by utilizing Spare Capacity at the existing Variable Cost.

Minimum Transfer Price = ₹ 496/unit.

(iii) Statement of optimum Product Mix.

Delta	18000	4	72000
Gama.	24000	1	24000
			96000 Hrs.

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Now in these situation 2000 Hours should be released from Gama.

Statement of Transfer Price.

Cost to be incurred	(₹496 X 5000 unit)	24,80,000
+ Contribution to be lost	(₹30/Hr X 20000 Hr)	600000
	Transfer value	30,80,000
	No. of unit	5000
	Transfer Price/unit	₹616.

(ii) In 2nd situation (where Demand for Delta = 15000 & Gama = 10,000) management would like to insist to transfer 5000 Unit to Y.

(II) [Page-140] (i) Statement of Ranking.

	AlFA	~~GAM~~ Beta.
Contribution/Unit	300	40
Hrs/Unit	2	0.5
Cont/Hr	150	80
Ranking	I	II

Statement of Optimum Product Mix.

Product	Qty	Hr/unit	Hrs
AlFA (x)	15000	2	30000
Beta (x)	40000	0.5	20000
			50000 Hrs.

Since Demand of AlFA from 'Y' Department is 6000 Unit and Contribution from AlFA is greater than Beta/unit. So 6000 unit of ALFA is transferred from the Beta's Production.

∴ Transfer Price for ALFA –

Variable Cost	6000 unit X 300/unit =	1800000
+ Contribution to be lost for Beta =	[6000 unit X 2 Hr X ₹80]	960000
	Transfer value	2760000
	∴ Transfer price/unit	₹ 460 Ans

(ii) 'X' Dept has no spare Capacity, hence in order to produce additional 6000 AlFA (for the Purpose of Transfer to 'Y' to replace knobs) we need 6000 unit X 2 Hr/unit = 12000 Hrs which should be released from Existing product having least contribution/Hr.

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For justification we should prepare statement of Comparative Cost.

Statement of Comparative Cost
[overall Company Point of View].

Manufacture		Purchase	
Cost to be incurred in 'x'		Circuit board [6000 unit x ₹600/unit]	
AlfA [₹300 x 6000 unit]	1800000	Purchase Cost	3600000
Contribution to be loss [6000 x 2 Hr x 80]	960000	Total Purchase cost =	36,00000
Additional Cost for Y [₹100 x 6000]	600000		
Relevant Cost	33,60000		

(i) 'x' Can transfer entire 6000 unit of AlfA to y.

(ii) Minimum Transfer Price to be charged from Y. = ₹460

(iii) In order to produce Additional 12000 ALFA (for transfer to replace board), 'x' Department need 12000 unit x 2 Hr = 24000 Hrs. which could be managed as follow subject to interest of Company.

First 20000 Hour from Beta = $\frac{20000 \text{ Hr}}{2 \text{ Hr/unit}}$ = 10,000 AlFA.

Next 4000 Hrs from Regular AlFA = $\frac{4000 \text{ Hr}}{2 \text{ Hr/unit}}$ = 2000 ALFA.

Statement of Comparative Cost.
[For 10000 AlfA]

Manufacture		Purchase Cost	
Cost to be incurred [₹300/unit x 10000 unit]	30,00,000	Purchase Cost [₹600 x 10000]	60,00,000
+ Contribution to be lost [10000 unit x 2 Hr x 80]	1600000		
+ Extra Cost to Y [10000 x 100]	10,00000		
	5600000		60,00,000

[For 2000 AlfA]

Cost to be incurred [₹300 x 2000]	600000	Purchase Cost [₹600 x 2000]	12,00,000.
Contribution to be lost [₹150 x 2000 x 2]	600000		
Extra Cost [₹100 x 2000 unit]	200000		
	1400000		1200,000

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∴ Only 10000 unit of ~~AlfA can~~ be transferred.

(10) [Page-139]

Statement of Ranking.

	P	Q	R	S
Sales Price /unit	70	69	56	46
Variable Cost/unit	66	59	36	37
Contribution /unit	4	10	20	9
Hrs /unit	3	2	2	3
Contribution / Hrs	1.33	5	10	3
Ranking	IV	II	I	III

Statement of Optimal Product Mix. (Present) & Net of Contribution

Product	Qty	Hrs/unit	Hrs	AFC [for every 1000]	Contribution	Net benefit
P	~~30000~~ 6666.66 +666	3	~~20000~~ +2000	2500X1 = 2500	29333 [22000X1.33]	26833
Q	31000 -1000	2	62000 -2000	12600X3 = 37800	300000 [60000X5]	262200
R	28000	2	56000	15000X3 = 45000	560000 [56000X10]	515000
S	18000	3	54000	18000X2 = 36000	162000 [54000X3]	128000
			192000		Net Contribution/benefit ⇒	930,033

Explanation For Product Q

if we reduce 1000 unit of Q from 31000 unit to 30000 unit,

Saving in Fixed Cost = 12600

(-) Contribution Lost 10000 (1000X10)

Net saving 2600

1000 unit of Q, i.e 2000 Hrs Could be utilized only for P.

(ii) In order to produce 20000 units of 'S' Dept 'A' require 20000 units X 3 Hrs/unit = 60000 Hrs (for the purpose of transfer) which can be managed by releasing as follows subject to Interest of Company.

(i) 22000 Hrs from regular 'P' (IV Ranking)

(ii) 38000 Hrs from Regular 'S' (III Ranking)

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For first — Statement of Comparative Cost

[For 2200 Hrs from P] i.e 7333 Unit

Manufacture (S)		Purchase	
Cost to be incurred		Purchase Cost [7333.33 × ₹45]	3,38,000
Variable Cost [7333.33 × 37]	271333		
AFC	18000		
Benefit to be lost	26,833		
	3,16,166		3,38,000

Better to transfer 7333.33 unit.
i.e better to produce Additional 7333 unit of 'S' by reducing 'P' for transfer to Dept 'B'. ∴ TP for 7333 unit = $\frac{316166}{7333} = 43.11$

For (ii) 38000 Hrs to be released from Regular 'S' ∴ $\frac{38000}{3} = 12666.66$ unit

Statement of Comparative Cost

[For 38000 Hrs from S] i.e 12666.66 unit.

Manufacture		Purchase	
Cost to be incurred		Purchase Cost [₹45 × 12666.66]	5,70,000
Variable Cost [12,666.66 × ₹37]	468667		
Avoidable fixed cost [18000 × 2] ~~36000~~			
+ Benefit to be lost [38000 × 3]	114000		
	582,667		5,70,000

38,000 Hrs would continue to be utilized for products 'S' but now, 12,666.66 unit could not be sold but produced & transferred, which means only contribution to be lost is relevant. AFC will continue to occurs hence called irrelevant.

Conclusion: 12,666.66 unit of 'S' should not be transferred by reducing regular production of 'S' mean 12666 unit of 'S' should be purchased. Transfer Price = $\frac{582667}{12666} = 46.002$. (More than 45)

It is in Interest of Company to
(a) Transfer 7333 units of S by reducing 'P'
(b) Not to transfer 12666 unit of 'S' by reducing regular 'S' means 12666 unit of 'S' should be purchased.

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(3) [Page-135]

(i) If transfer is applied

	A	B		Company	
Transfer Price	2000	Sale	3000	A-	800
Cost	1200	- A (TP)	2000	B	(500)
Profit	800	- Cost own	1500	Profit =	300
		Loss	(500)		

A should not Transfer his Product to 'B'.

Market Price will be the Transfer Price where Supply Department has NO spare Capacity.

(ii) As 'A' has spare Capacity upto 200 unit. Hence A Department would like/may Transfer such 200 unit at Variable Cost i.e. ₹1200

Transfer Price = ₹ 1200 to ₹ 2000.

From B point of view

Sale	3000
A's Cost	1200
B's Cost	1500
Profit	300

Better to Transfer 200 unit to 'B' Dept because due to transfer Dept 'B' Could earn ₹300 per unit i.e overall Company ~~Could~~ should earn ₹300 per unit.

(iii) Statement of Profit

	A		B		Company	
External Sales [800×2000]	1600000	Sale [3000×200]	600000	A =	700000
Transfer to B [200×1500]	300000	- A' cost [1500×200]	300000	B =	Nill
(-) Cost [1000×1200]	1200000	- B' cost [1500×200]	300000	Profit	700000
Profit →	700000	Profit →	Nill		

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Department 'B' would not like to Purchase 200 unit form 'A' at ₹ 1500/unit because at this Price No profit would occur while Department 'A' Could Earn (1500−1200)×200 = 60000 due to transfer hence 'B' would like to pay any amount less than ₹1500 but above ₹1200 for 200 units.

(iv) Operating Income from (a) option = Operating Income Under (b)

$1950 \times 1000\ \text{unit} - 1200 \times 1000\ \text{unit} = 800\ \text{unit} \times 2000 - 800\ \text{unit} \times 1200 + 200 \times x - 200\ \text{unit} \times 1200$

$\therefore x = 1750$ Ans

(v) B Department has spare Capacity in any case for 100 unit which Can be transferred at variable cost of ₹1200 per unit. — (i)

For Next 100 unit

Contribution if no transfer for 100 units.

Sale =	(1950 × 900)	1755000
Variable Cost =	(1200 × 900)	1080000
Contribution		675000

Contribution if 'A' transfer 100 unit.

Qty	900	Sale	2000 × 800 =	1600000
Transfer	100	[Variable Cost]	[1200 × 800]	9,60,000
Sales Qty	800			6,40,000

Due to transfer 'A' will have to suffer 35000 (675000 − 640000)

Transfer Price for such 100 unit

Variable Cost =	1200.
+ Contribution lost $\left[\frac{35000}{100}\right]$	350
Transfer Price	1550

For 1st 100 unit	₹ 1200
For Next 100 unit	₹ 1550. Ans

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(5) [Page-137] (i) **Statement of Transfer Price**

Cost to be Incurred $\left[\frac{250000 + 450000}{100000}\right]$	7
+ Contribution to be lost by Non selling the Component to Market (20 - 7)	13
Minimum Transfer Price	20

'A' would not like to receive any . amt less than 20 & would not like to pay any amt More than 20. Hence Proper Transfer Price would be ₹ 20/unit.

Statement of Transfer Price.

Cost to be incurred	7
+ Contribution to be lost by non selling to Market (due to transfer)	13
+ Benefit to be lost in Division 'O' due to transfer	15
Minimum Transfer Price ⇒	35

(13) [Page-141] **Residual Income** :- i.e. Super Profit = $\frac{\text{Business}}{\text{Capital}}$

$\frac{\text{Business}}{\text{Capital}}$

Business Profit — Normal Profit = Residual Income.

= Capital × Rate of Return

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Statement of Present Residual Income (£ in lakh)

Business Profit

Revenue (1,20,000 unit × £180/unit)	2160
(−) Variable Cost (1,20,000 × £160)	1920
(−) Fixed Cost	80
Profit	160
Normal Profit = [750 lakh × 12%]	90
Residual Income	70
Budgeted Residual Income	100
Shortage Residual Income	30

Statement of Transfer Price.

Cost to be incurred due to transfer	160
Modification Cost	8
+ Shortage to be recovered $\frac{3000000}{30000}$	10
Transfer Price ⟹	178

(ii) When purchase price falls below Relevant Cost i.e Purchase Price < 168 i.e in that Case its better to purchase the component from the market. i.e any transfer price will become useless i.e sub optimal.

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(6) (Page-137) (i) Let Transfer Price be x ₹

Sale + Transfer − Variable Cost − Fixed Cost − Interest = Target Profit

$$\left[(60000\,\text{Unit} \times ₹2500) + (40000 \times x) - (100000\,\text{unit} \times ₹1600) - 40000000 - 1200000 \times 11.5\%\right]$$

$$= 2,50,00,000$$

$$15,00,000 + 40000x - 16,00,0000 - 40000000 - 13800000 = 2,50,00,000$$

$$40000x = 8,88,00,000$$

$$x = ₹2,220\,/\text{Unit}$$ Ans

(ii) For Spare Capacity 30,000 units.

Transfer Price = Variable Cost = 1600/unit.

For Next 10,000 unit 'A' will have to reduce Market demand.

Statement of Transfer Price.
[For Next 10000 units]

	₹/unit	
Cost to be incurred	1600	
+ Contribution to be lost due to transfer (opportunity)	900	(2500-1600)
Minimum Transfer Price	2500	

Level	Transfer Price
For 1st 30,000 unit	₹ 1600/unit
For Next 10,000 Unit	₹ 2500/unit.

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(b) # Preparation of Statement of Profit with Given Transfer Price / Method given (No Decision Making)

(14) [Page-142] Working Note

~~Dept x~~

Product	Qty	Hr/unit	Hour
Bicycle	3000	6	18000 (Lit)
Toy	6000	4	24000
		Available	42000

Dept y

2000 Bicycle

S.P. 400

own Cost (Total) 34

Statement of overhead

	Wages	Variable	P/U	Fixed	P/unit
Bicycle	30	252000	14	201600	11.2
		~~168000~~			
Toy	20	168000	7	134400	5.6
		420000		3,36000	

Statement of overhead.

Product	Wages	Variable	Per unit	Fixed	Per unit
Bicycle	[3000x30] 90000	1,80,000	60	1,44,000	48
Toy	[6000x20] = 1,20,000	2,40,000	40	1,92,000	32
		4,20,000		3,36,000	

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Statement of Price [x].

	Bicycle	Toy
Material	36	28
Labour	30	20
Variable overhead	60	40
Variable Cost	126	88
Fixed Cost	48	32
Total Cost	174	120
+ Mark up @ 40%	69.6	48
Selling Price to outsider	243.6	168

(i) **Statement of Profit**

x		Y		Company	
Revenue		Revenue			
Toy [6000 unit X 168 ₹]	1008 000	Bicycle [2000x400] =	800000	x	506800
Bicycle (External) [1000 unit X 243.6]	2,43,600	(-) Transfer Cost [2000x243.6]	487200	y	144800
Bicycle Transfer [2000x243.6]	487200	(-) own cost (2000x34)	68 000	Profit =	6,51,600
Less:- Cost		(-) Fixed Cost	~~200000~~		
V.C Toy [6000 unit X 88]	528 000	Profit =	1,44800		
Bicycle [1000 unit X 126]	1,26 000				
Bicycle [2000 unit X 121]	2,42000				
Fixed Cost [	3,31000				
Profit =	506,800				

(ii) **Statement of Profit**

x		Y		Company	
Revenue		Revenue			
Toy	10,08,000	Bicycle	800000	x —	496800
Bicycle (External)	2,43600	(-) Transfer Cost [2000x238.6]	477200	Y —	154800
Bicycle (Transfer) [2000 x 238.6]	477200	(-) own Cost	68000	Profit	651,600
- Cost V.C		(-) fixed Cost	100 000		
Toy	528000				
Bicycle (external)	1,26 000				
Bicycle (Transfer)	242000	Profit	154800		
Fixed Cost	336000				
	496,800				

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(iii) **Statement of Profit**

	x		Y		Company	
Revenue		**Revenue**				
Toy	10,08,000	Bicycle	800 000		x =	261600
Bicycle (External)	243,600	(-) Cost			Y =	390000
Bicycle (Transfer) (2000 x 121)	2,42,000	Transfer Cost	(242000)			
		Own Cost	(68000)		Profit	651600
		Fixed Cost	(100 000)			
Less: Cost						
Toy [6000 x 88]	528000	Profit	390000			
Bicycle (External)	1,26,000					
Bicycle (Transfer)	242000					
Fixed Cost	331 000					
Profit	2,61,600					

Working for (iv) **Statement of Cost for overtime [2000 bicycle]** (or)

Material		36.
Labour	30	
Overtime Premium	30	60
Variable overhead		60
Variable Cost.		156

Transfer Price = 156 − 5 = 151 / Unit.

Statement of Profit.

x		Y		Company	
Revenue.		**Revenue**			
Toy	10,08,000	Bicycle	800000	x	496 800
Bicycle [3000 x 243.6]	7,30,800	(-) Cost		Y	330 000
Bicycle (External) [2000 x 151]	302000	Transfer	(302000)		826800
(-) Cost. Variable		Own Cost	(68000)		
Toy	528000	Fixed Cost	(100 000)		
Bicycle (External) [3000 x 126]	378 000		330000		
Bicycle (Transfer) (2000 x 151)	3,02000				
(-) Fixed Cost	336000				
	496800				

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Transfer Price with calculus

Basic Terms

Profit will be maximum where Marginal Revenue = Marginal cost

Marginal Cost ⇒ As per economics defination it is change in revenue due to increase in sales Qty by one unit. However it is different from Differential Revenue (Increment)

In term of Normal function → Decrease the Price which will increase the Qty.

Mathematics ⇒ Derivative of Total Revenue Function = Marginal Revenue

If we decrease S.P. by ₹10, sales Qty will increase by 1 unit.

eg

Qty	SP	Revenue	Incremental Revenue = 750 - 840 = 90
5	150	750	i.e Differential Revenue.
6	140	840.	(This is not Marginal Revenue)
		90	Differential / Incremental Revenue

Marginal Revenue

		₹	
Qty Effect - 1 Unit × 140	=	140	(Benefit)
Price Effect - 6 Unit × 10	=	60	(loss)
Marginal Revenue		80	

If we had introduced extra efforts. 6 unit would have been sold at existing price of ₹150.

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Marginal Cost = Variable Cost.

Cost of additional unit i.e. Material, Labour & Variable overhead. It does not include any part of fixed Cost, It is also different from Differential Cost.

As per Mathematics = Derivative of Total Cost function = Marginal Cost.

eg	Unit	VCPU	FC	TC
	5	100	1000	1500
	6	100	1500	1600

Marginal Cost ⇒ 100

(#) Profit will be at Maximum levels where Marginal Revenue = Marginal Cost.

Mathematically

(S.P - V.C) x Qty.

Selling Price.	Qty.	Variable Cost	Fixed Cost	Contribution	Profit	Marginal Revenue
200	–	40	100	–	(100)	
190	1	40	100	150	50	[(190x1)-(10x1)] = 180
180	2	40	100	280	180	[(180x1)-(10x2)] = 160
170	3	40	100	390.	290.	[(170x1)-(10x3)] = 140
160	4	40	100	480	380	[(160x1)-(10x4)] = 120
150	5	40	100	550	450	[(150x1)-(10x5)] = 100
140.	6	40	100	600	500	[(140x1)-(10x6)] = 80
130	7	40	100	630	530	[(130x1)-(10x7)] 60
120	8	40	100	640	$\boxed{540}$	[(120x1)-(10x8)] 40
110	9	40	100	630	530	[(110x1)-(10x9)] 20
100	10	40	100.	600	500.	[(100x1)-(10x10)] 0.

Profit is Maximized at where Marginal Revenue = Marginal Cost. i.e at Qty 8.

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Price function

$P = a - b \times x$

Where, a = higher price at which no Qty to be sold.
b = Reduction in Price at constant Rate
x = Qty sold.

Revenue Function

Price Function X Qty.

$R = (a - bx)x$

Derivative

$y = x^n$

$\Rightarrow \frac{dy}{dx} = nx^{n-1}$

eg $\Rightarrow$ $y = ax^n + bx + c$

$\Rightarrow \frac{dy}{dx} = a.n x^{n-1} + b(1) + 0.$

eg $y = 6x^7 + 2x + 9.$

$\frac{dy}{dx} = 7.6x^6 + 2(1) + 0.$

(eg) $y = x^9$

$\frac{dy}{dx} = 9x^8.$

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Profit will be Maximum when. $MR = MC$.

MR = Derivative of Total Revenue (TR)

MC = Derivative of Total Cost (TC)

$$R = \boxed{(200 - 10x)x}$$

$$R = 200x - 10x^2$$

$$\frac{dR}{dx} = 200(1) - 10 \cdot 2x^1 = \boxed{MR} \text{ ——— (i)}$$

$$TC = VC(x) + FC.$$

$$40x + 100$$

$$\frac{d(TC)}{dx} = 40(1) + 100(0)$$

$$\frac{d(TC)}{dx} = 40 + 0 = 40 = \boxed{MC} \text{ ——— (ii)}$$

$$MR = MC = 200 - 20x = 40$$

$$20x = 160$$

$x = 8$ unit proved

Identification ⇒ If behaviour of Price function is given i.e. Highest Price (a) & Constant Reduction (b) in price with Constant Increase in Qty (x) is given, always apply Concept of Calculus.

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(30) [Page-160] Working Note

(i)

CBD

Price	Qty
320000	X [(i.e) 0]
319667	1

30 unit ⟶ 10000 Reduct.

1 ⟶ $\frac{10000}{30} = 333$

WD

Price	Qty
17,10,000	X (No Qty to be sold)
1685000	1.

2 unit ⟶ 50000

1 ⟶ $\frac{50,000}{2} = 25000$

As nature of Capacity is not given. hence we should Pre assumed the nature is Cost Centre i.e, Sufficient Spare Capacity always exists. Hence transfer at Variable Cost.

We require to have maximum profit for W.D. which could be realised when $MR = MC$

Cost Function $\Rightarrow TC = VC \times x + FC$

$= \left[\left\{\left(4\text{ unit}_{CBD} \times ₹2,20,000\right) + 480000\right\} \times x + 16{,}45{,}36{,}000\right]$

$\Rightarrow \left[(\text{Transfer cost} + \text{own cost}) \times x + F.C\right]$

$\Rightarrow TC = 1360000x + 16{,}45{,}36{,}000$

$\frac{d(TC)}{dx} = 13{,}60{,}000(1) + 16{,}45{,}36{,}000 \cdot (0)$

$\frac{d(TC)}{dx} = 13{,}60{,}000$ —— (i)

Price function

$P = a - bx$

$P = 17{,}10{,}000 - 25000x$

Revenue Function

$P \times Qty = (1710000 - 25000x)x$

$= 17{,}10{,}000x - 25000x^2$

$\frac{d(R)}{dx} = 1710000(1) - 25000 \cdot 2 \cdot x$

$\frac{d(R)}{dx} = 1710000 - 50000x$

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MR = MC

$1710000 - 50000x = 1360000$

$1710000 - 1360000 = 50000x$

$\therefore x = \dfrac{350000}{50000} = 7$ units   putting in price function

$P = 1710000 - 25000x$

$= [1710000 - (\overset{25000}{\cancel{50000}} \times 7)]$

$= 1710000 - 175000$

$= ₹\,15{,}35000$ Ans

It means at 7 unit profit will be Maximized i.e, ₹ 15,35000.

(ii) CBP

Profit will be Maximum When MR = MC.

MC = derivative of Total Cost.

$TC = \overset{VC}{2{,}20{,}000} \times \overset{Qty}{x} + \overset{FC}{9{,}20{,}20{,}000}$

$\Rightarrow \dfrac{d(TC)}{dx} = 2{,}20{,}000(1) + 9{,}20{,}20{,}000.(0)$

$\Rightarrow \dfrac{d(TC)}{dx}_{(MC)} = 2{,}20{,}000$ —— (i)

$P = a - bx$

$= 3{,}20{,}000 - \dfrac{10000}{30}x$

$R = Px = \left(320000 - \dfrac{10000}{30}x\right)x$

$320000x - 333x^2$

$\dfrac{d(R)}{dx} = 3{,}20000(1) - 333.2x.$

$MR = 3{,}20{,}000 - 666x$

MR = MC.

$3{,}20000 - 666x = 2{,}20{,}000$

$x = \dfrac{3{,}20000 - 220000}{666}$

$x = 150.$

$P = 3{,}20000 - 333.33 \times 150$

$= 3{,}20{,}000 - 50{,}000$

$= 2{,}70{,}000.$ (Maximized Profit) where.

$\therefore$ 2,70,000 will be transferred Price.

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For W.D

Cost function $[(2,70,000 \times 4) + 48000] \times x + 16,45,36,000$

$= 15,60,000x + 16,45,36,000.$

$\frac{d(TC)}{dx} = MC = 15,60,000$ —— (i)

$R = (1710000 - 25000x)x.$

$= 1710000x - 25000x^2$

$MR = \frac{d(R)}{dx} = 1710000 - 50000x.$

$\therefore MC = MR$

$1710000 - 50000x = 1560000$

$x = \frac{1710000 - 1560000}{50000}$

$x = 3$ units. [putting in P] Answer

$P = 17,10,000 - 25000(3)$

$= 1710000 - 75000$

$= 16,35,000$ Answer

DATE

(31) [Page-160] 'b'

(i) Total Cost = $(280 + 590)x + 18{,}00{,}000$

$\frac{d(TC)}{dx} = MC = 870$. —— (i)

$P = a - bx$

$= 4000 - 0.1x$

$Px = MR = (4000 - 0.1x)x$

$= 4000x - 0.1x^2$ —— (*)

$\frac{d(R)}{dx} = 4000 - 2 \times 0.1x = 4000 - 0.2x$ —— (ii)

Profit will be maximized when MR = MC

$4000 - 0.2x = 870$

$x = \frac{4000 - 870}{0.2} =$

$x = 15650$ Unit. Ans

$P = 4000 - 0.1(15650)$

$P = ₹\ 2435$ Ans

(ii) A

Total Cost = $\overset{VC}{280} \times \overset{Qty}{x} + \overset{FC}{75{,}00{,}000}$.

$MC = \frac{d(TC)}{dx} = 280x + 7500000$

$MC = \frac{d(TC)}{dx} = 280$. —— (i)

$P = a - bx$

$P = (1000 - \frac{1}{25}x) = 1000 - 0.04x$.

$MR = Px = (1000 - 0.04x)x$

$= 1000x - 0.04x^2$

$\frac{d(R)}{dx} = 1000 - 0.08x$. —— (ii)

DATE

For Maximized Profit MR = MC

~~380~~ $1000 - 0.08x = 280$

$\therefore x = \frac{1000 - 280}{0.08} = 9000$ units.

Price $= a - bx$

$= 1000 - 0.04(9000)$

$= 1000 - 360$

$= £\,640$

If 'A' transfer product at £ 640, then Price of 'B' for maximization of Profit

$TC = (640 + 590)x + 180,00,000.$

$= 1230x + 1,80,00,000$

$\frac{d(TC)}{dy} = 1230$ ——— (i)

$P = a - bx.$

$= 4000 - \frac{1}{10}(x)$

$= 4000 - 0.1(x)$

$Px = (4000 - 0.1x)x$

$= 4000x - 0.1x^2$

$\frac{d(R)}{dy} = 4000 - 0.2x.$ ——— (ii)

$\therefore$ for Profit Maximization MR = MC

$4000 - 0.2x = 1230$

$\therefore x = \frac{4000 - 1230}{0.2} = 13850$ putting in P

$P = 4000 - 0.1x$

$= 4000 - 0.1(13850)$

$\therefore$ Price $= 4000 - 1385$

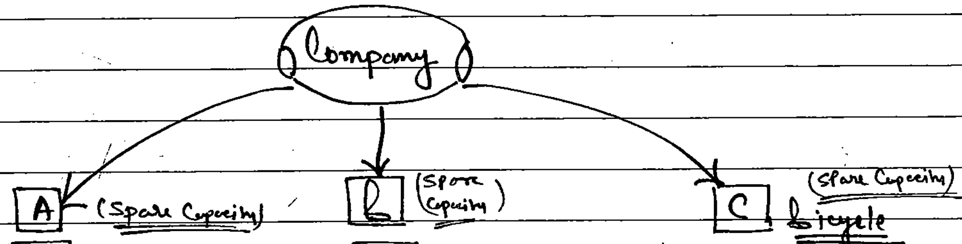
$= £\,2615$ Ans

DATE

(#) Transfer Price with make or buy Decision.

Transfer Price = given :— Decision : Make or buy.
[Inter divisional Transfer]

eg



A	B	C
VC = $\boxed{35}$	VC = $\boxed{20}$	
FC = 10	FC = 25	Chain ⇓
own Cost 45	own Cost 45	⇒ 'B' = 120
Profit 5	+ Transfer Cost to A 50	⇒ PC = 100
50 ⇓	TC 95	∴ Relevant Cost of Mfg : 35+20 = 55
		Purchase Price — 100
Transfer to 'B' at ₹50	Profit 25	
	120 ⇓	∴ Better to Manufacture.
	Transfer to 'C' at ₹120.	Fixed Cost = Sunk Cost
		Profit = Notional / Unrealised / (Not to be forgone (lost))
		Hence :- ignored.

∴ "Decision should be based on "PC should be Compared with Relevant Cost."

[#] What would be your Decision in above Case if Dept 'B' has No spare Capacity. ?

Relevant Cost.

A = V.C = 35
B : V.C = 20
~~Add~~ Contribution 50 (25+25)
105

Better to Purchase from Market at 100.

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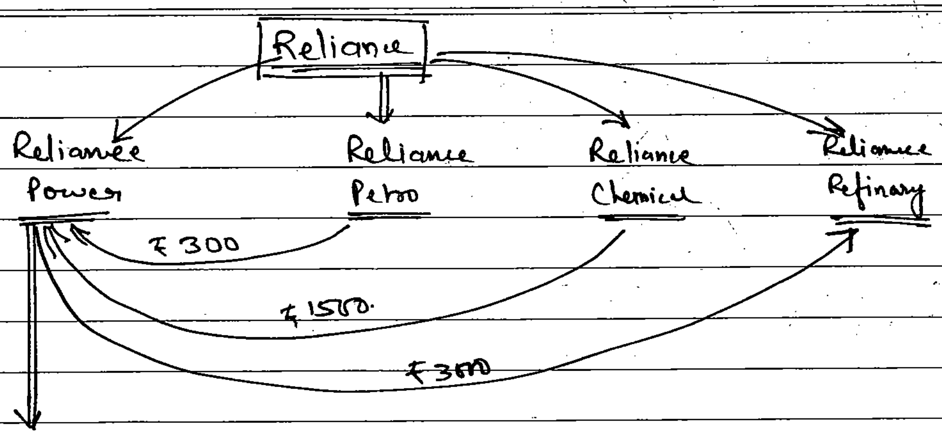
(26) [Page 155]



TP = 3000

Cost = 2400

Profit = 600.

Power. = 60% of own Cost = VC

Chemical = 80% of own Cost = VC.

Petro = 80% of selling Price = VC.

Chemical = 20% of Total Cost = Profit

Statement of Cost

Power   Chemical   Petro.

Statement of Cost.

Power		Chemicals		Petro	
VC (60% of 600)	360	VC (80% of 1250)	1000	VC [80% of 300]	240
FC (b/f)	240 (b/f)	FC	250 (b/f)		
Own Cost	600	Own Cost	1250	Fixed Cost	
+ Transfer Cost from ~~Chemical~~		+ Transfer Cost	Nill [NA]	Profit	60
from Chemical	1500				
from Petro	300				
Total Cost =	2400	Total Cost	1,250 (b/f)		
+ Profit (b/f)	600 (b/f)	Profit (1/5)	250 (b/f)		
Transfer Price	3000	Transfer Price	1500	Transfer Price =	300

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Statement of Comparative Cost

Manufacture		Purchase	
Cost to be incurred.			
Variable Cost		Purchase Cost	₹ 2000
Power	360		
Chemical	1000		
Petro	240		
	1600		2000

Better to receive from Power.

Since Reliance Petro is selling their product in Competetive Market where Unlimited Demand & Unlimited buyers i.e. Capacity is ~~sp~~ not spare

Statment of Comparative Cost

Manufacture		Purchase	
Cost to be incurred.		Purchase Cost	2000
Variable Cost			
Power	360		
Chemicals	1000		
Petro	240		
+ Contribution to be lost.	60		
Transfer Price	1660		2000

Again better to receive from Power.

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25th class

DATE 19/01/2017

[#] Best Strategy Based Question

Best Strategy means "How much Quantity should be produced and How much Quantity should be utilized for.

(a) External sale

(b) How much Quantity should be transfered to Other Department so that

[As per Requirement]
(i) Individual Profit of Department would be at Maximum level.
(ii) Overall profit of the Company would be at Maximum level.

[#] For this purpose We should Consider the following Points.

(i) If supply Department have Spare Capacity, Transfer Price at Variable Cost :

(ii) If supply Department do not have spare Capacity, (Busy). Transfer Price should be at = Variable Cost + [Contribution/benefit to be lost]

(iii) If Supply Department has different options (Selling Price, Transfer Price is given). We should prepare Statement of Ranking

Golden Rule

If Spare Capacity then transfer at Variable Cost
If Busy then transfer at Variable Cost + Contribution lost.

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(21) [Page-148] **For x Point of view**

'x' Department has External Demand for 3000 units with selling Price = 100/unit.

If 'x' Department would like to transfer such 3000 units to 'y' then Transfer Price should be ₹ 100 for such 3000 unit but 'y' can purchase from market at ₹ 90 (a very higher Price) 'y' would not like to pay ₹ 100/unit.

How ever 'x' has spare Capacity upto 4000 unit which could be transferred at its Variable Cost = ₹ 60. It could be acceptable by Dept 'y'.

Best Strategy [x Point of view]

(a) External sale = 3000 unit @ 100
(b) Transfer to 'y' = 4000 unit @ 60.

'y' Point of view [2500 unit of y × 2 unit of x = 5000 unit of x]

Option-I

Receive 4000 unit from x @ 60/unit	=	2,40,000
Purchase 1000 Unit from Markt @ 90/unit	=	90,000
		3,30,000

Option-II

Purchase entire 5000 unit of x from ~~x~~ Market @ 80 = 400 000

Option-III

Purchase 5001 unit of x from Market @ 70 3,50,070

Option-IV

Receive 2500 unit of x from x @ 60	1,50,000
Purchase 2500 unit from market @ 80	2,00,000
	3,50,000

Best strategy from 'y' Point of view will be option-I.

i-e, Receive 4000 unit ~~from x~~ & Purchase 1000 unit from Market due to least Cost.

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(20) [Page-146]

'A' point of view

Capacity 1200 unit
Demand (External) 900 unit

'B' Required 700 unit [$\frac{630}{90\%}$] → Good unit

Statement of Ranking

Option	External sale	Transfer to B. (Unit)	0.1 defective
Price	200	190	150
VC (Mfg)	(120)	120	(120)
VC (selling)	(20)	Nill	(100)
Contribution	60	70	(70)

$= 70 \times 0.9 + (70 \times 0.1)$

Ranking I $= 63 - 7$

$= 56$ Ans. II

Working Note

Defective Unit

Option-I ⇒ Sale as Scrap = 30

Option-II

Reworked = S.P 150
cost 100
Contribution ⟶ 50 Better.

Let 100 unit be transferred to B

Revenue	(100 x 190)	19000
(-) Cost	(100 x 120)	12000
Contribution	(100 x 70)	7000
(-) Return	(10 x 190)	(1900)
Benefit		5100
+ Benefit on defective sale [10 x 50]		500
		5600
Qty 100		100.
Benefit/Unit		56

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Best strategy for 'A'

External sale : 900 units

Transfer to 'B' 300 unit. (balance)

<u>Present Profit (A)</u>

Contribution from External sale	900 x 60 =	54000
Contribution from Transfer	300 x 56	16,800
		70,800
(-) fixed Cost		36000
Profit		34800

(ii) External Demand 600 unit

Transfer to B 600 Unit.

Let Transfer Price be x.

External sale	[600 x 200]	120000
Transfer	(600 x x)	600x
Less: Variable Cost	[1200 x 120]	(1,44,000)
VC (selling)	[600 x 20]	(12000)
Returns 60x		(60x)
Benefit		$-36000 + 540x$
+ Benefit on defective unit 600 unit x (150-100):		3000
(-) Fixed Cost		36000
Profit		34800

$540x - 36000 + 3000 - 36000 = 34800.$

$540x = 1,03,800$

$x = 192.22$

Department 'A' transfer to Dept 'B' at ₹ 192.22/unit to maintain the same profit in (i) above.

classmate

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(18) [Page-146] 'A' point of view

Statement of Ranking.

Option	Transfer to External Sale.		Transfer to B.
1	S.P	160	144
	V.C. (50+25+20)	95	95
	VC (Selling)	13.	–
	Contribution/unit	52	49
	Ranking	I	II.

Best strategy
External sale 18000 units.
Transfer to B 2000 units

'B' point of view

We should decide
1) from where we should receive
2) To whom we transfer / sale

Just knowledge

(i) Receive 2000 units from 'A' @ 144.
(ii) & balance purchase 26000 unit from Market @ 160.

How to utilize.

Statement of Ranking.
For 28000 units

Option	For-2000 unit External Sale	Transfer to S Ltd
S.P	300	250.
V.C		
Transfer Cost	144	144
Material	24	24
Labour	14	14
Var (P/O)	2	2
S&D	26	–
Contribution	90	66
Ranking	I	II

Option	For-26000 unit External Sale	Transfer to S Ltd
Price	300	250.
V.C		
Purchase	160	160.
Material	24	24
Labour	14	14
Var. P/O.	2	2
S&D	26	–
	74.	50
Ranking	I	II

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B has the following option

(i) 2000 Utilize for External sale (which receive from A)

&

24000 Utilize for External sale (Which Purchase from Market)

(ii) Utilize 28000 (all)

2000 Unit which receive from 'A' should be Utilized for sale

20000 Unit Which Purchase from Market should be Utilize for Sale

6000 Unit which purchase from Market should be utilized for transfer.(S)

Contribution in option (i)

Contribution on 2000 Unit x ₹ 90 = 1,80,000

Contribution on 24000 Unit x ₹ 74 = 17,76,000

19,56,000

Contribution in Option (ii)

Contribution on 2000 Unit x ₹ 90 : 1,80000

Contribution on 20000 Unit x ₹ 74 14,80,000

Contribution on 6000 Unit x ₹ 50 3 00 000

19,60,000

Best Strategy for 'B' is Option-(ii). i.e.

External Sale = 22000 unit

Transfer = 6000 unit

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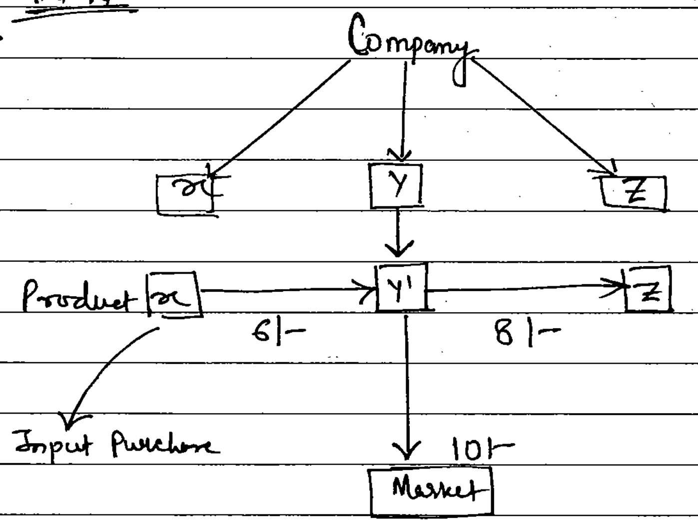
(16) [Page 193]

W.N



'x' Purchase Input
x process Output

'Y' Department :- Either receive from x. ⟶ Output

OR

Purchase from market.
and then processed & ~~trans~~ either transfer to Z.

OR

external sale.

'Z' :— Output 'Y' :- Either purchase from Market

OR

Receive from 'Y'.

x point of view

(1) As 'x' has S.P. 95/unit for 14000 unit, hence 'x' would like to transfer any units upto 14000 @ 95 which is not a acceptable by 'Y' because 'Y' can purchase @ 85 from Market.
[External Sale = 14000 Unit]

(2) 'x' has spare Capacity for 6000 units, hence 'x' can produce & transfer such 6000 unit to 'Y' @ 70 i.e V.C.

i.e, acceptable by 'Y' as 'Y' Cost

if Purchase from Market = 85
if receive from 'x' = 70+6 = 76.

Negotiation	Transfer unit	Transfer Price
	6000 unit	70 to 79.

'Y' Point of View

(1) 'Y' has S.P. ₹ 155 upto 26000 unit which could not be acceptable by Z as Purchase Cost in Z is ₹ 135.
[External Sale = 26000 unit]

(2) 'Y' has Spare Capacity 4000 unit for which 'Y' has following option.
(a) Purchase (Input i.e output of x) from market @ 85
& Processed and then transfer to Z. at = 85+50+8 = 143.
[Not negotiable] because Z has purchase cost ~~for~~ his input ie output of Y is ₹ 135.

[Y should not transfer after purchasing]

(b) 'Y' has another option i.e, Receive 6000 unit from 'x' ~~then~~ & Processed, then transfer to Z 4000 unit.

	Transfer Price = ~~79~~	Transfer Price
Receive	79	70
+ Transfer Cost	6	6
+ Processing	50	50
+ Sending Cost	8	8
	143	134
Remark:	Not Acceptable by Z.	Acceptable by 'Z'. Subject to Interest of Company

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Now we can say: 'Y' Dept would like to transfer 4000 unit to Z @ 134 which 'Y' had received from 'x' at 70.

Overall Benefits for Company

'Y' [Not Transfer]		'Y' transfer	
Sale = 26000 unit		Sale 26000	
6000 'x'	20000 purchase	2000 'x'	24000 purchase
@ 70	@ 85/-	@ 70	85/-
+ 6		+ 6	
76/-		76	

Transfer 4000 unit to 'Z'

Due to transfer 'Y' will have to purchase 4000 unit from market ~~from~~ @ 85 [higher rate by ₹9] while it cost would have been 70 + 6 = 76 per unit if we (Y) had not transferred.

Loss in purchasing	(85 − 76) 4000	36000
Saving in 'Z'	4000 × (135 − 134)	4000
Net loss to Company ⟹		32000

\# 'Y'
- Receive 6000 unit from x = Transfer Price : 76 to 79.
- External sale 26000 unit
- Transfer to Z = Nill.

\# Z Entire Input :- Purchased @ 135 from market.

26th class.

DATE 21 01 2017

[2011]

(15) [Page-143]

Statement of Ranking [For A]

Option	External sale	Special order	Transfer to b <45000	Transfer to b 45000
Qty	30000	15000	<45000	45000
Price	65	55	55	60
Var. cost	35	35	35	35
Selling cost	10	—	—	—
Contribution/unit	20	20	20	25
	II	III	II	I

[#] In any case, Qty for special order & transfer to 'b'. exceed 10,000 units as external Market has Demand 50000 (50,000 - 30 000) which means Fixed Cost 50,000 is better

Best strategy for A. is as under.

(i) Transfer to b = 45000 unit.
(ii) External sale = 5000 unit

Statement of Profit [A]

Contribution

Transfer to 'b'	45000 X 25 =		11,25000
External Sale	5000 x 20 =		1,00,000
Total Contribution			12,25,000
(-) Fixed Cost			
upto 30,000 unit		430 000	
for Next 10,000 unit.		1,00,000	
For last 10,000 unit.		1,00,000	6,30,000
(-) Fixed Cost for transfer to b. [selling o/H]			50,000
Profit ⟹			5,45,000

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(ii) Statement of Ranking [2010]

Option	External sale	Special order	Transfer to 'B' < 45000	Transfer to 'B' 45000
Qty	25000	10,000	< 45000	45000
Price	65	55	45	50
Variable O/H (Mfg)	35	35	35	35
Variable O/H (Selling)	10	—	—	—
Contribution/unit	20	20	10	15
Ranking	I	I	III	II

Best strategy for 'A'

External Sale 25000 unit
Special order 10,000 unit
Transfer to 'B' 15000 unit

Statement of Profit

Contribution		
External Sales	25000 X 20	500,000
Special order	10,000 X 20	200,000
Transfer to 'B'	15000 X 10	1,50,000
		8,50,000
Less:- Fixed Cost		630000
Selling & Distribution		50,000
	Profit ⇒	1,70,000

(iii) [2011 # 'A'] Transfer Price = 60.

	External sale	Special order	Transfer to 'B' < 45000	Transfer to 'B' 45000
Contribution/unit	20	20	20	25

'B' Can Negotiate with 'A' as follows.
(i) Maximum Transfer Price would be = ₹ 60 at Present [Purchase Price]
(ii) Extra ₹ 5 to be achieved just due to transfer, otherwise only 20 ₹ to be achieved instead of ₹ 25.
Hence we can negotiate upto ₹ 5/unit
∴ Transfer Price = 55 to 60.

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(19) [Page-146] 'A' has Selling Price 15 but This could not be Transfer Price because 'B' will have to incurr two (2) ₹ extra while Market Price for 'B' is 15, but this would be applicable for 'C'. However we will have to fix <u>uniform Transfer Price</u>.

Now, we can say 'A' has spare Capacity upto 1250 unit. which could be utilized as transfer to 'B' & (or) 'C'.
Better to transfer to 'C'.

If we transfer to 'B' then 'C' will have to purchase from market at ₹ 17. and
If we transfer to 'C' then 'B' will have to purchase from Market at ₹ 15
[Higher Cost Could be saved : Best Strategy]

Option-I
'A' External sale 3750 unit
Transfer to ~~B~~ 'C' 1250 unit
Variable Cost = 7
Transfer Price = 7 to 13.

Option-II 'A' has another option.

[#] Self ⇒ [Any Department would like to increase the Capacity only when some extra benefit would occur].

Transfer Price for 'B' & 'C'

'B' would like to pay ₹ 13/unit (after incurring ₹ 2 it becomes 15)
'C' would like to pay ₹ 17/unit (equal to Purchase Price)

But as per Question, 'A' has to fix uniform Price for Transfer i.e T.P.
* Transfer Price = 13 (Maximum).

'A' Spare Capacity 1250 Variable Cost = ₹ 7
Extra $\frac{24000}{5000}$ = Variable Cost = 4.8.

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'A' Can transfer 1250 @ 7.
'A' Can transfer 5000 @ 11.80 (7+4.8)

Due to uniform | Concept of benefit.
Transfer Price should be = ₹ 13.

Statement of Cost benefit

	A		B	C
Transfer Price	13	S.P. ⇒	40	50
Variable Cost	7	T.P. ⇒	13	13
		Own Cost ⇒	19	25
		Inspection charge ⇒	2	—
Contribution /unit	6		6	12
Additional Contribution.	30000 [5000x6]		7500 [1250x6]	18000 [1500x12]
Additional fixed Cost	24000 ~~Justified~~.		6000	18700
	Justified.		Justified	Not Justified.

~~Best Strategy for A~~ =

Capacity

A	5000 + 5000	=	10,000 unit
B	2500 + 1250	=	3750 unit
C	2500 + Nill	=	2500 unit

Best Strategy for A.

External Sale 3750 unit
Transfer to 'B' = 3750 unit
Transfer to 'C' = 2,500 unit

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~~Taxation~~

[#] Transfer Price With International / Multinational Transfer Price.

(#) MULTINATIONAL TRANSFER PRICE

[Transfer Price With International Taxation].

If any Company has different unit located in different Country, One unit transfer any good/services to other unit situated in other Country then such transfer would be Considered as "Multinational Transfer Price".

Such transfer should be treated as 'sale' from Government point of view. as it is transfer from one Country to other Country.

If "transferor' Company" ~~to~~ transfer any good & services to any transferee Company situated in other Country at its Variable Cost due to Spare Capacity, under the same management, Transfer Price should be recognized as Sale & Sale price should be treated as equivalent to "Arm length Price" i.e Price to Unrelated Party & accordingly charged taxes.

India — U.K

Transferee Company

~~XX~~ Factory

Custom Duty on Arm length Price + shiping charges from custom station to factory

Transferor. Company.

Shiping cost / Kharfrage charge:

[form factory to Custom station]

Corporate Tax

Sale	xx ~~00~~ [Arm lenght Price]
- Cost	xx
Profit	xx
Tax	?

[#] Arm lenght Price = Selling Price for Calculation of Corporate Tax / Custom Duty.

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(32) [Page-161] (i)

Statement of Minimum Price.
[CECDE]

	TWD
Cost to be incurred	
Material [No Import Duty]	440
Labour	120
Variable overhead	40
Shiping Charges [factory to Custom station]	30
Corporate Tax [750 - 630]X25%	30
Minimum Price	660 TWD
i.e Minimum Transfer Price	1320 ₹. [$660 \times \frac{1500}{750}$]

(ii) Maximum price to be offered by CIPL
Let Maximum Price be 'x'

⇒ x + Shiping Charges + Import Duty ≤ 1490.

x = ~~1490~~	1490
Less → shiping Cost	(10)
Import Duty [₹ 750 X10% X2]	(150)
Maximum Price	(₹) 1330
i.e Maximum Price	665 TWD.

(iii)

Statement of Profit [TWD]

CECDC

Revenue		
External Sale [150000 X 750]		11,25,00,000.
Transfer [3,50,000 X 750		26,25,00,000
	Total Revenue.	3750,00,000
Less:- Cost. [500000 X 600]		3000,00,000
Wharfage Charge [500000 X 30]		1,50,00,000
	Profit	6,00,00,000
	Tax @ 25%	1,50,00,000.
	PAT	4,50,00,000

CIPL

Revenue	
[175000 X 11000 X 0.5]	96,25,00,000.
Less:- Transfer Cost [350000 X 750]	26,25,00,000
Shiping Cost [3,50,000 X 10 X 0.5]	17,50,000
Import Duty [350000 X 750 X 10%]	2,62,50,000
own Cost [~~350000~~ 175000 X 6315 X 0.5]	~~1,10,51,25,000~~ 55,25,62,500
Fixed Cost [3,76,00000 X 0.5]	1,88,00,000
Profit	10,06,37,500
Tax @ 30%	3,01,91,250
- Profit after Tax	7,04,46,250.

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Corporate Tax should be analysed on the profit after Considering transfer Price as equivalent to Arm's lenght Price irrespective of the fact that transfer price is relevant Cost. Hence in the preparation of Statement of Profit we Consider Transfer Price as Arm length Price. Further we can say Transfer Price Notional Price for the Company as whole group. ie it has no effect on overall profit of Company.

∴ Overall Profit of Company = 11,54,46,250. TWD.

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27th class

DATE 22 01 2017

~~[Indian Subsidiaries]~~

(33)(i) Page-163

(a) If Purchase from Japanese Manufacturer [Outsider]

	₹ (in lakh)
Purchase Cost = [₹ 320 X 150000 unit]	480
Receive from China group. [¥30 X ₹9.8 X 150,000 unit]	441.
+ Duty @ 29.5% [441 X 29.5%]	130.095
	571.095

SAVING IN COST if purchase from outsider Japanese vendor [571.095 - 480]	91.095 lakh.
Tax burden due to saving in Cost. (i.e Higher Profit) [91.095 X 34%]	30.9723 lakh.
Net Saving	60.1227 lakh.

(b) [China subsidiaries] [₹ in lakh]

Contribution to be lost on [30000 unit X 30 (-20) X 9.8]	29.40
Extra burden of Excise Duty. [~~29.40 X 10%~~] [120000 X 30 X 9.8 X 10%]	~~3528~~ (35.28)
Total loss to China Subsidiaries	64.68 lakh.
Tax saving due to loss [@ 25% on 64.68]	16.17 lakh
∴ Net loss ⟹	48.51. lakh

Net benefit for group if Purchase from Japanese Vendor = 11.6127 lakh [60.1227 - 48.51]

Now we can say its better to Purchase from Japanese Manufacturer Company due to overall saving of ₹ 11,61,270.

(ii) Other Issue that should be Considered

(a) Quality of the Component should be standard. i.e, sub-standard Component should not be purchased.

(b) Delivery of the Component should be at scheduled. Early delivery will Increase Storage Cost, delay in delivery will stop our Production.

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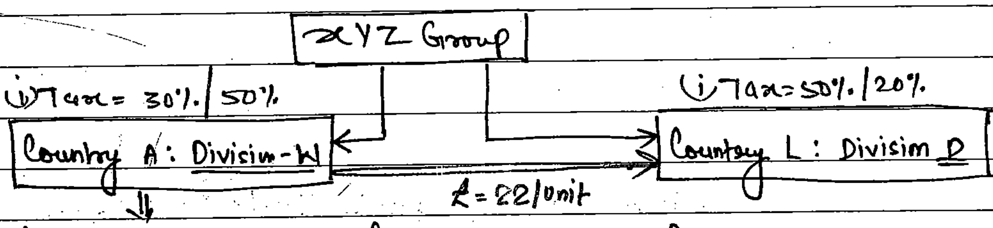
(c) Price should be constant.

[Note :- Self] = If we had no Information, Excise Duty would have been calculated on Total Cost.

(3A) Page-163



Capacity = 100 000 unit of B unit
Sale = 85000 unit
V.C = £ 15/unit
S.P = £ 25/unit

Purchase = 40000 unit of B from 'O' of Country L.
Purchase Price = £ 20/unit

VC = 15 + x (S&D)

Contribution on sale = Cost of Transfer. [7]

$25 - (15 + x) = 22 - 15$

$10 - x = 7$

$x = 3.$

Statement of Net Benefits (Group).

		(i) £	(ii) £
'D' point of view.			
if purchase from outsider ('O')	[20×40000]	8,00,000	
if Receive from Internal ('W')	[22×40000]	8,80,000	
Saving in local Purchase ~~Tax burden~~		80,000	80000
Tax burden @ 50% / 30%		40 000	24000
Net Saving	(a)	40,000	56000
'W' Point of View.			
Contribution lost due to spare	[15000 × 7]	(1,05000)	(105000)
Tax saving [@ 30% of 105000]		31,500	52500
Net loss ⟹	(b)	(73,500)	(52500)
Net Saving	[40000 - 73500]	(33500)	3500 Net Profit

Better to Receive from 'W'

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(23) (i) Page-151

Statement of Ranking [Division A].

Product	X	Y	Z
S.P	480	460	400
V.C	330	240	280
Contribution/Unit	150	220	120
Hours.	3	4	2
Contribution/Hr	50	55	60
Ranking	III.	II	I

Statement of Optimization/Product Mix.

Product	Qty	Hr	Hour (Total)
X_{III}	4000	3	12000 (b/f)
Y_{II}	5000 [3000+2000]	4	20000 [12000+8000]
Z_I	3000	2	6000
			38000

Statement of Profit

		A	B	Company.
Contribution			Revenue. 360000 [120x3000]	A 1380000
Sale	4000 unit of x @ 150	600000	(-) Transfer. 1200000 [400x3000]	B= 850000
Transfer	3000 unit of Y @ (400-240)	480000	(-) own cost 1350000 [450x3000]	
Sale	2000 unit of Y @ 220.	440000	(-) Fixed Cost 200000	
Sale	3000 unit of Z @ 120.	360000		
Less:- Fixed Cost		500000		
Profit		1380000	8,50000	2230000

Statement of Cost Benefit.

(ii) 'A' Point of view. ₹ P.U.

Loss due to transfer. [460-400] 60

B Point of view.

Contribution due to transfer (1200-850) 350.

Contribution by Purchasing (1100-840) 260 ~~90~~

Net Benefit due to Transfer 90

Overall benefit due to Transfer ⇒ 30

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Comment = Better to transfer.

Statement of Profit

A			B			Company	
Contribution			Revenue	60,00,000	[1200×5000]	A	1560000
[Sale x]	4000 @ 150	600000	(−) V.C.			B	1150000
[Transfer]	5000 @ [460−240]	1100000	Transfer	2300000	[460×5000]		2710000
[Sale Z]	3000 @ 120	3,60,000	Own V.C	2250000	[450×5000]		
Less: Fixed Cost		(500000)	Fixed Cost	200000			
Profit ⇒		15,60,000	Interest	100000	[1000000×10%]		
			Profit	11,50,000			

(B) [Page-138] Working Note

G = "Transferer" R = "Transferee"

G = Transfer Capacity = 100 unit (1t) R = Demand = 20% of Capacity of G.

= 20% of 100

= 20 unit.

G

(1) Production Capacity (Can be produced) = 100. Prod^n level. (are producing = 60 unit). Demand 40 Spare 20 TP VC+FC.

S.No	Division having more Advantage	Reasons
(i)	G	Fixed Cost is sunk, still recognized as Transfer Price = Total Cost although having spare Capacity.
(ii)	G	Fixed Cost & ~~Contribution~~ Profit (both as Constant) to be charged inspite of having spare Capacity.
(iii)	R.	'R' will receive at Minimum Cost due to having Spare Capacity 'G'
(iv)	G	'G' could transfer Partially unit at VC & Partially at MP. but in this situation whole are transfered at Market Price.

(24) [Page-151]

Statement of Net Benefit.

Proposal - I **A's point of view**

50 Machine otherwise to be purchased.		[4000 X 50]	20000.
Now its Cost			
own Cost	600		
'B' Cost	1500		
Variable (Mfg.)		[2100 X 50]	1,05000
Benefit			95000

~~B's Point of view~~

Loss on transfer to B.

500 Component of 'C' at 600

S. Price	800#	
Loss	200 X 500 unit	100 000
Loss →		5000

₹800 taken as selling price because ₹1000 is sold in external market ~~to~~ without any interruption. i.e, if A transfer to B then he will transfer first from special sale which gives lower Contribution as ~~exp~~ compare to external Market sales

Proposal II

Benefit on 50 Machines.

Purchase Price =	4000		
(-) own Cost	(~~600~~)		
Other (B) Cost	(1700)	~~2800~~	
Benefit/unit	~~2300~~ 1700	[1700 x 50]	8500

Loss on 700 unit

Benefit ~~lost~~ on transfer.	[700 - 600] X 900	90000.	
Benefit lost on sale	[750 X 200]	(150000)	
	[150 X 300]	(45000)	(105000.)
Net loss →			2000

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Proposal- III

Purchase Cost	4000	
Transfer Cost	4000	Nill.

Benefit on Transfer

Transfer Price	1000	
Variable Cost	600	
	400 X 900 unit	360000

Benefit could have been realised on $750 \times \overset{(1000-800)}{200}$ (150 000)
External Sale i.e Benefit lost due to same. $150 \times \frac{300}{100}$ (45000)

Excess benefit due to transfer. ⟹ 165000

Discount from Option I to Option II = (2300-2100) 200.
Market Price 4000
∴ % Rate = $\frac{200}{4000} \times 100 =$ 5%.

(17) [Page-174] **Working Note**

Capacity = 7000 unit i.e 7000 x 2Hr/unit = 14000 Hrs.

S.P	1000	1120
V.C	500	500
Contribution	500.	620
	6000 unit	5000 unit

(1) 7000 Purchase from Market.
Budget: 7000 X 900 = 63 00 000.

P-T-O

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Statement of Cost benefit

Total Quantity	External sale	Transfer to 'y'	Offer	Hire	Contribution.
7000	6000	1000			6000 x 500 - [1000 x (780 - 500)]

Working Note =(1) If 'x' transfer 1000 unit to 'y'. 'y' will have to purchase 6000 unit from market @ 920.

Total budget = 630000.
Purchase cost. [920 x 6000] 552000
Transfer Price ⇒ 7,8000

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28th class
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~~Pricing Decisions~~

Transfer Pricing [Summary]

(i) Price to be charged from one department to another Department within company
(ii) It is different from Selling Price
(iii) Transfer Price = Notional (acceptable by Receiving Department)
(iv) $\boxed{\text{Transfer Price}}$

Fixed by Management ← → Fixed by Management Accountant.

TP = MP = TC + Return. TP = Relevant Cost
(i) Spare Capacity = TP = VC (silent)
(ii) Busy (Com. best TP = MP = VC + Cont Lost]
MKt

(2) Prepare Statement of Profit

Given Transfer Price / Method. (No Decision Making)

(3) Best Strategy

How much Quantity to be produced
How much Quantity to be (i) External sale
(ii) Transfer.

So that (a) Department profit to be Maximum [Question: Requirement]
(b) overall profit of Company. to be Maximum [Question: Requirement/silent]

(4) Calculus:- Identification

[S.P. Very high, No Qty to be sold
Reduction in Selling Price will Increase Qty]
P = a − bx [a = Higher Price ; b = Reduction in Price ; x = Qty]
R = Px
MR = Derivative of Revenue function.
MC = Derivative of Cost function.

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Profit should be maximum at MR = MC & TC = VC(x) + FC.

⑤ <u>Multi National Transfer Price</u>

Transfer Price from one country to other = Multinational Transfer Price.

Transfer Price = Selling Price = Arm length Price. [Govt Point of view).
irrespective of Actual transfer Price.

All taxes should be analysed on such Transfer Price.

<u>Transferer</u> (1) shipping Cost (where
(2) Corporate Tax.

<u>Transferee</u> (1) Import Duty
(2) shipping charges.

⑥ Transfer Price Given & Decision for Make or Buy.

Always Purchase Cost should be compared with Relevant Cost.

Chapter-6

PRICING DECISION

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PRICING DECISION

If we Produced & sale the Goods, Proper Price should be charged from Customer.

Price here means to be charged from Customers.

Some Reasonable guidelines should be followed to fix the Price

(a) For a New Product to be Introduced in market (First time by the Company)

$\boxed{\text{Price (Minimum)} = \text{Only Variable Cost} + \text{Avoidable Fixed Cost}}$

(b) For Developing Product:

Price = Variable Cost + Avoidable Fixed Cost + Unavoidable Fixed Cost.

(c) For a Developed Product.

$\boxed{\text{Price} = \text{Total Cost} + \text{Margin.}}$

Basic Term

1. Return (Profit) = Profit after Tax.
2. Mark Up = Profit before Tax.
3. Value added = Labour & overhead (Variable + fixed)

or

Total Cost less Material Cost

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(4) **Incremental Cost** = Extra Cost to be incurred (out of Pocket exp)

= Material + Labour + Variable overhead + Avoidable fixed Cost

= It does not include any Part of Existing fixed O/H.

(5) **List Price (MRP)**

List Price Means without Discount Price i.e. Trade Discount is available on List Price.

(6) **Equation**

PAT = PBT − Tax Amount = PAT.

or Sales − Total Cost − (Tax Rate × PBT) = PAT.

or, [S − TC − TR × (S − TC)] = PAT.

$$\boxed{(S-TC)(1-TR) = PAT.}$$

(6) [Page-193]

(i) Let sales value be x.

$(Sales - TC)(1 - TR) = PAT.$

$(x - 220000)(1 - 0.52) = 10\% \times (200000.)$

$(x - 220000)(0.48) = 20000$

or $0.48x - 105600 = 20000$

$x = \frac{125600}{0.48} = \cancel{2{,}61{,}665.6}$

$x = 2{,}61{,}666.\dot{6}$

$S.P = \frac{261666.\dot{6}}{20000} = 13.08\dot{3}$/unit

(ii) Let sales value be x.

$(S - TC)(1 - TR) = PAT$

$(x - 220000)(1 - 0.52) = 10\%$ of x.

$0.48x - 105600 = 0.1x.$

$0.48x - 0.1x = 105600$

$\therefore x = \frac{105600}{0.38}$

$x = 2{,}77{,}894.73.$

$\therefore S.P = \frac{277894.73}{20000} = 13.8947$

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(iii) $(S - TC)(1 - TR) = PAT$

Let sale be x [List Price]

$$[x - 0.35x - 220000]\,[1 - 0.52] = 20\%\,x$$

$\therefore\ 0.48x - 0.168x - 105600 = 0.2x$

$= 0.312x - 0.2x = 105600$

$$x = \frac{105600}{0.112}$$

$x = 942857$

$\therefore$ S.P/unit $= \dfrac{9,42,857}{20000} = 47.14$/unit Ans

(iv) **Statement of Price**

Material	60000
Other Variable Cost	1,20,000
Fixed Cost =	40,000
	2,20,000
+ Markup [40% of 220000]	88000
Sales Value	308000
Qty	20000
SP/unit	₹15.40/unit

(v) **Statement of Price**

Material	60000
Other Variable Cost	1,20000
Fixed Cost	40000
Total Cost	2,20,000
+ Markup [50% * 180000]	90000
Sale value	3,10,000
Qty	20,000
S.P/unit	₹15.50/unit

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(vi) **Statement of Price**

Material	60000
Other Variable Cost	1,20,000
Fixed Cost	40,000
Total Cost	2,20,000
+ Mark up [60% of [2,20,000-60000] =	96000
Sales Value	3,16,000
Qty	20000
S.P/Unit	₹ 15.8/Unit.

(7) [Page-193] Return here is before Tax.

$(S-TC)(1-TR) = PAT.$

$x \times 40000 - 0.2 \times 4000x - 550000 - 60 \times 40000 = 25\%[800000 + 50\% \text{ of } 40000 \times (x-0.2x)]$

$= 32000x - 550000 - 2400000 = 200000 + (32000x \times 25\%)$

$32000x - \cancel{4000}x = 200000 + 550000 + 2400000$

$x = \dfrac{3150000}{28000}$

$x = 112.5/\text{unit}.$

(12) [Page-196] **Statement of Present Profit.**

Sale	10,00,000
Less:- Variable Cost	480000
Contribution	520000
(-) Fixed Cost	481000
Profit	40000

(i) **Statement of Profit 1**

Sales [150000x9]	1350000
(-) Variable Cost [$\frac{480000}{100000} \times 150000$]	7,20,000
Contribution	6,30,000
(-) Fixed Cost	480000
Profit	1,50,000

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(ii) **Statement of Profit**

Sales [1,20,000 X 10 X 1.2]	1440,000
Less:- Variable Cost $\left[\frac{480000 \times 120000}{100000}\right]$	5,76 000
Contribution	8,64 000
(-) Fixed Cost	480000
Advertisement Cost	2,25 000
Profit	1,59,000

(iii) **Statement of Profit**

Sales [1200 000 X ~~12~~ X 1.1]	~~1584000~~ ~~14,40 000~~ 1320000
Less:- Material [250000 X 1.2]	300 000
Labour [120 000 + ~~(20000 X 1.1)~~ X 1.55]	198 000
Variable O/H [30 000 X 1.2]	36 000
Variable S/D	60 000
Fixed Cost	480 000
Adv. Cost	60000
Profit	86 000

[W.N = [120 000 unit X 1.5 X 1.1] = Wages for labour]

(iv) Let selling unit be x.

Sale = $10 \times x$	$10x$
(-) Material	$2.5x$
(-) Labour	$1.5x$
Variable Prodn O/H	$0.3x$
Fixed Prodn O/H	2,30 000
Adm. O/H	100 000
S&D O/H $(0.5+0.2) \times x$	$0.7x$
Fixed S&D O/H	150 000
Profit =	10% of $10x$ i.e. x

$10x - 2.5x - 1.5x - 0.3x - 230000 - 100000 - 0.7x - 150000 = x$

$\therefore x = \frac{480000}{4} = 120000$ unit

$\therefore$ Profit = 120000 X 10 X 10% = £120 000 Ans

classmate Proposal (ii) is best

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On the basis of above analysis we can say II proposal would be better.

(4) (Page-197) Working Note

Sales - Variable Cost - Fixed Cost = Profit

Sale = Profit + Total Cost.

Sale - Variable Cost = Profit + Fixed Cost

Sales - Variable Cost = Contribution.

$\boxed{S = VC + \text{Contribution.}}$

Statement of Cost [Product - 'x']

P Material =	[5kg X £6] in Dept - A	30
Q Material =	[8kg X £3] in Dept - B.	24.
		54
Labour A	[2 Hours X £4]	8
B	[3 Hours X £3]	9.
Variable overhead		
Department A	[30 X 1]	30
B.	[3 X 2]	6
	Total Variable Cost	107
Fixed overhead. A	2.20 X 30	66
B	3 X 3	9
	Total Cost ⟹	182

Calculation of Investment for x in Department 'A' & 'B'

Working Capital (Total) 1,24000. F.A.

How much part of Plant (F.A) should be related / attributed to Product 'x' for 'A' & 'B'

	Dept 'A'	'x'	~~Dept B'~~ Others
Net Plant & Machinery.	70,00,000	21,00,000	49,00,000
Depn (12 months X 80000)	960000.	0.8 X 30 X 12000 unit = 288000.	672,000 (b/f)
% =	100%	30%.	70%

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Department - B

	'B'	'x'	Others
Plant & Machinery.	1,20,000.	36000	84000.
Depn [@ 1000 × 12]	12000.	[0.1 × 3 × 12000 = 3600]	8400 (b/f)
[%]	100%	30%	70%

Fixed Assets for 'x' = 21,00,000 + 36000 = 21,36000.

Total Investment for 'x' = Fixed Assets + Working Capital
= 2136000 + 124000
= 22,60,000.

(A) (i) Statement of Price

Variable Cost (Per unit)	107
+ Contribution $\left[\frac{2260000 \times 40\%}{12000}\right]$	75.33
	182.33 ⇒ Price/unit

(ii) For New Product =
Minimum Price = Variable Cost = 107.

(b) Statement of Price

	₹/unit
Variable Cost	107.
Fixed Cost	75
Total Cost ⇒	182
+ Return $\left[\frac{20\% \text{ of } 2260000}{12000}\right]$	37.66
Price ⇒.	219.66

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(8) Page-178 **Working Note** = Break up of variable O/H & semi variable O/H.

$$\text{Variable O.H.} \quad \frac{\text{Change in Cost}}{\text{Change in Qty}} = \frac{22000-20000}{14000-10000} = \frac{2000}{4000} = 0.5/\text{unit}$$

$\therefore$ Fixed overhead: $[20000 - [0.5 \times 10000]] = 15000$

Calculation of Prime Cost.

Level in Qty.	10,000	14000
Sales	200000	2,80000
(−) Profit [20% of sales]	40000	56000.
Total Cost (a)	1,60,000	2,24000
Variable O/H	50000.	70000
Variable O/H (Semi)	5000	7000
Fixed (Semi)	15000	15000
Fixed O/H (Others)	40000	40000.
~~Prime Cost.~~ (b)	1,10,000	132000
Prime Cost = (a−b)	50000	92000.
Prime Cost/unit.	5	6.57.

\# Note: It's not possible to calculate Prime Cost on 14000 unit because 20% Profit on sales will be applied only in working i.e 10,000 but not on 14000 units.

Statement of Price.

Prime Cost		5.00
Variable overhead.	[5.0+0.5]	5.50
Variable Cost		10.50
Desired Profit = [20% of sale i.e 25% of Cost]		2.625
Price ⇒		13.125

Fixed Cost should not be charged due to spare Capacity.

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[#] Export Price :-

(1) Free on Board [FOB]
(2) Cost Insurance & Freight [CIF]

Seller (India) — Buyer (U.K)

Ex Factory Price (100) + Transportation charges from Factory to Custom Station (20)
+ Duty & Clearance charge (15) + Loading charges (15)
= 100+20+15+15
= 150

F.O.B. — Freight & Insurance (Transit) 50 — C.I.F 200

CIF + Import Duty = Landed Cost.

(#) Ex Factory Price + Transportation + Duty & Clearance Charge + Loading = Free On Board (F.O.B)

(#) F.O.B + Transit Insurance & Freight = Cost Insurance Freight

(#) CIF + Custom Duty = Landed Cost for Buyer.

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(9) [Page-174] F.O.b = 50% of Comp. Inc's F.O.b.

Design & Drawing = 8 course.

Royalty = 10% of [SP − Cost of Standard Item − Cost of Imported kits].

[WN#]

Note if we had.

10% of SP less Cost of Standard item & Imported kits.

then we do = [10% SP − Cost of Import kit − Cost of Standard item]

FOB = $2040 & ₹/$ = 55. = 2040 × 55 × 50% = 56100

∴ Cost of

+ Insurance & Freight = ₹2000/kit.	2000
CIF	58100
+ Custom Duty @ 40%	23240
Landed Cost ⟹	81340
+ Drawing & Design $\frac{8,00,00,000}{\cancel{800000}}$	100
	81440

+ Cost of Material & Supply to be obtain in India will be 150% of Cost of supply made by Comp Inc. 67320 → 50% Standard: 33660; → 50% Non standard. 33660.

[$56100 \times \frac{100}{125} \times 150\%$]

+ Cost of assembly of Other Variable	8000
Cost to Comp Tee (India)	1,56,760

Statement of Cost & Price

FOB Price Paid (Dismantled kit)	56100
+ Insurance & Freight	2000
CIF	58100
+ Duty @ 40%	23240
Landed Cost of kit from Comp. Inc. ⟹	81340
+ Material & Supply bought in India [56100 × 80% × 150%]	67320
+ Assembly & other Variable	8000
+ Design & Drawing	100
Total Cost excluding Royalty.	1,56,760.
+ Royalty	9,251
Total Cost	166,011
+ Profit (~~20% of SP~~ i.e. 25% of Cost)	41503
SELLING ...	207514 → 2,07,514

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Working-ko

let Royalty be 'Y' & selling Price = 'x'

$\therefore$ Royalty = 10% of [S.P - Cost of standard item - Cost of Imported kit]

$$Y = 10\% \text{ of } [x - 67320 \times 1/2 - 81340] \quad \text{—— (i)}$$

Total Cost excluding Royalty + Royalty + $\frac{1}{4}$ of Total Cost = Selling Price (x) –

$$156760 + y + \frac{1}{4} \text{ of } (156760 + y) = x.$$

$$(156760 + y)\left(1 + \frac{1}{4}\right) = x.$$

$$156760 + y \times \frac{5}{4} = x \quad \text{—— (ii)}$$

Solve

$y = 9251$

$x = 207514$.

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(3) Page-191 ~~Working~~

Statement of Cost/Unit

	X Total	X Variable	X Fixed		Y Total	Y Variable	Y Fixed
Material	15	15	—	Material	14	14	—
Labour	9	9	—	Labour	6	6	—
Factory O/H	9	4.5 (50%)	4.5 (50%)	Factory O/H	6	3 (50%)	3 (50%)
Factory Cost	33	28.5	4.5	Factory Cost	26	23	3
+ Adm. O/H.	3.3 (10%)	—	3.3	Adm. O/H. [10% of F]	2.6 (10%)	—	2.6
+ Selling & Dist	3	1.5	1.5	S&D	4	2	2
Cost of Sales	39.3	30	9.3	Cost of Sales	32.6	25	7.6

Fixed Cost = 9.3 X 100000 + 7.6 X 200000
= 930000 + 15,20,000
= 24,50,000.

Capital Employed = Fixed Assets 50,00,000
+ Working Capital $\left[\frac{39.3 \times 100000 + 32.6 \times 200000}{12} \times 6\right]$
= 5225000

∴ Capital Employed = 50,00,000 + 52,25,000
= 1,02,25000.

Return = 20% of Capital Employed
i.e. Profit = 20% of 1,02,25000
∴ Profit = 20,45,000.

Total Contribution = Fixed Cost + Profit
= 24,50,000 + 20,45000
= 44,95,000

Total Hrs 3 Hrs X 100000 unit + 2 Hrs X 200000 unit = 700000 Hrs.

Contribution / Hr = $\frac{44,95000}{700000}$ ~ 6.42142857142.

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Cost = Expences to Produce the Goods.

Interest = Interest is an expenses but not a Cost, however it is charge against Profit.

Return = Earning from Business.

	Ram	Shyam
Sale	xx	xx
Cost	xx	xx
Profit [Return from Business]	100	120
(−) Interest	–	25
	100	95

Statement of Selling Price

	x	y
Variable Cost/unit	30	25
+ Contribution/Unit	[6.42X3Hr] = 19.26	[6.42X2Hr] = 12.84
Selling Price/unit	49.2642857142	37.8428571428

~~Self~~ Understanding

Return = Earning from Business.

	Ram	Shyam
Sale	xx	xx
(−) Cost	(xx)	(xx)
Profit	100	120
(−) Interest	–	(25)
Net Profit	100	95

(#) Return from Business

	x	y	Total
Unit	100 000	200 000	
Sale Price	49,26,428.	75,68,571.	12,495,000
Less Variable Cost	30,00,000 [100 000 x 30]	50,00,000 [200 000 x 25]	80 00 000
			24 50 000
Less Fixed Cost			
Profit			20,45,000
Less Interest (i) 50% of 52,25000 x 20% [Bank Borrowing]	5,22,500.		
(ii) 20% of 50,00 000 [Long Term]	10,00,000		15,22,500
Net Profit ⇒			5,22,500

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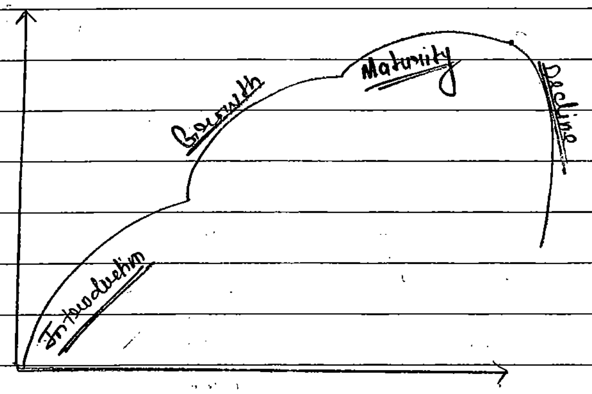
Pricing Policy with Life Cycle Costing



	Introduction	Growth	Maturity	Decline
Advertisement exp.	High	Gradually Reduce	Normal	High.
Demand	Not known	Gradually Increase	at Peak level	Decrease.
Competition	No. Competition	Entry to Competition	Perfect Competition.	Out of Competition
Profit	loss.	Increase	High level	Decrease.

Pricing Policy are of Different types. for different Product

Pricing Policy [for New Product only].

Penetration [Low Price to High Price]

1. It is for new product for Company (already exist in market)
2. Price very low to Increase the Qty Price = Variable Cost.
3. Initial Stage = No Profit but later stage will Provide higher Profit.
4. It should be applied where market expansion is possible. i.e. Demand is elastic.

Skimming [High Price to Low Price]

1. It is for New Product [New Invention] by Company which was not available in the World
2. Very high Price at Initial stage & high Profit at Initial Stage
3. Price gets closer to Cost at later stage due to development of Technology i.e. Profit rate reduces but Qty may increases.

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(13) [Page-197]

Statement of Cost & Price

Week	Stage	Qty	Total Qty	SP	VC
1- 10	Introduction	220/week	2200	750	375
11- 20	Growth	550/week	5500 } =13750	600	300
21 - 30	Growth	825/week	8250	525	300
31- 70	Maturity	1100/week	$\boxed{44000}$	450	225 [for 1st 22000]
					188 [for Next 22000]
71-80	Decline	880/week	8800	300	225
81-90	Decline	660/week	6600	300	225
91-100	Decline	440/week	4400	300	225
101-110	Decline	220/week	2200	300	225
≥111		—	—	—	—

31-70 week represent "Maturity stage" due to higher level of Demand while
71-80 week represent "Decline stage" due to reducing Qty (Demand).

(ii) Above Pricing is represent "Skimming" due to shift from high to low price.

Statement of Contribution

Stage	Maturity		Decline
Period.	31-70		71-110.
Qty.	44000		22000.
	First 22000	Next ~~22000~~	
Selling Price	450	~~450~~	300
Variable Cost	225	~~188~~	225
Contribution/Unit	225	262	75
Total Contribution	4950000 [225x22000]	5764000 [262 x 22000]	1650000 [75x22000]

Possible reason for change in cost.
1) Due to learning Technology
2) Due to bulk Production
3) Discount on Material
4) Reduction in wastage

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Statement of Cost

Variable			
Material	2,10,000		
Labour.	1,20 000	[150 000 x 80%]	
factory overhead.	55200	[92000 x 60%]	
Administrative overhead.	14000	[40000 x 35%]	
			3,99,200.
Fixed			
Labour	30000		
Factory O/H.	36800		
Admin. O/H.	26000		92,800
Total Cost			4,92,000
+ Commission			48 000
+ Profit			60,000.
			6 00 000

Total Cost + Commission + Profit = Sale. (x)

$492000 + 8\%$ of x + 10% of $x = x$.

$\therefore x = 600000$.

(ii) Selling Price / bottle = ₹14

Variable Cost / unit = ₹ 9.98 $\left[\frac{399200}{40000}\right]$

Commission = [8% of 14] 1.12

11.10

Break-Even Point (Unit) $= \frac{\text{Fixed Cost}}{\text{Contribution/unit}} = \frac{92800}{14-11.10} = \frac{92800}{2.9} = 32000$.

Break Even Point (Sales) = 32000 x 14 = ₹448 000.

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(5) Page-192

Let sale value be x

Equation

$(\text{Sales} - TC)(1 - \text{Tax Rate}) = PAT$

$(x - 1460000)(1 - 0.40) = (1200000 + 50\% \text{ of } x) 12\%$

$(x - 1460000)(0.6) = 1,44000 + 0.06x$

$0.6x - 876000 = 1,44000 + 0.06x$

$0.6x - 0.06x = 144000 + 876000$

$0.54x = 10,20,000$

$x = \frac{10,20,000}{0.54} = 18,88,888.88$

$\therefore$ S.P/unit $= \frac{18,88,888.88}{30000} = 23.61$ Rs

(1) (Page-190)

(i) Skimming Pricing Policy :- Modern drug is a new product for the market. Initial stage price will be higher as it develope. Price become new.

(ii) Skimming Pricing Policy :- Latest version of Mobile Phone indicate a new product for ~~new~~ the Market, as it develope, price become low.

(iii) Penetration :- New Product for the Company but not for the market, hence in order to expand, penetrate the market we should maintain the price at very low level i.e, Variable Cost + Avoidable Fixed Cost.

(iv) Skimming :- Due to high, Innovative technology Product introduced in the market.

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(10)
(Page-195)

Statement of Cost
[Product 'Z']

			Per unit (₹)
Material			
Department - A.		30	
Department B.		25	55
Labour			
Department A		30	
" B.		40	70.
Variable overhead.			
Department A	₹6×3hr = 18		
" B.	₹3×4hr = 12		30
Variable overhead selling & Distribution			
$\frac{30000}{1500}$		20	20.
Variable Cost			175
Fixed Cost			
Department A	₹8×3hr = 24		
" B.	₹4×4hr = 16		40
Total Cost			215

Capital Employed

Fixed Asset.

Department A	2500000 × 30%	750000
B.	1500000 × 30%.	450000
Value of P&M for 'Z' in Dept 'A&B'		1200000
Working Capital.		400000.
Capital Employed		1600000

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(i) Statement of Price.

Variable Cost		175
+ Contribution	$\frac{1600000 \times 21\%}{1500 \times 12\ month}$ =	18.66
Selling Price /unit		193.66

(ii) (1) In Case of Well established Product.

Price = Total Cost + Mark up. (Reasonable)
= 215. (There is no Reasonable Markup given).

(2) In Case of New Product.
Price = Variable Cost
= 175.

(II) Page-195

(i) Skimming Policy : As demand could not be analysed hence It indicates a new product to be introduced first time in market

(ii) Penetration : A new product but it has heavy demand which indicates it already exists in market.
Mass mfg because high demand of same type of product already exist in market. but we are producing first time of existing one.

(iii) Transfer Price : Market Price less Variable selling & Distribution cost.

(a)

(a) Fixed Cost (Selling & Distribution) is irrelevant Cost because we will have to produce 80% product for market, fixed Cost is ~~irrelevant~~ irrespective of Qty.

(iv) Pricing Policy :- Minimum Price = Only Relevant Cost due to spare Capacity.

(v) Pricing Policy :- Any amt. which customer would like to pay that may be less than Relevant Cost. Otherwise we will have to remove / Dispose off without recovering any Amt.

Chapter-8

Budgetory Control

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Budget is a statement which is to be utilized/prepared in advance for future activities, so that we can utilize our resources in optimum manner.

We have different types of budget like.

(1) **Sales Budget**: How much Qty to be sold to match Market Demand.

Qty to be sold X Selling Price.

(2) **Production Budget** How much Quantity to be produced to meet sales requirement.

Sales in Qty	XX
+ Desired Closing stock	XX
Total	XXX
(-) if any opening stock	XX
Production Budget	XXX

(3) **Raw Material Consumption Budget**: How much Qty of Raw Material to be utilized for Target Production.

Raw Material Required for Per unit of finishe Goods. X Qty of finished Goods to be produced.

(4) **Raw Material Purchase Budget**: How much Qty of Raw Material to be purchased to meet the requirement of Raw Material

Consumption of Raw Material.	XX
+ Closing stock of Raw Materia	XX
(-) Opening stock of Raw Matirial	(XX)
Purchase of Raw Material	XXX

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(5) **Labour Requirement budget :-** How much Labour required to produced Product.

Labour Required for per unit of Finished Goods × Qty of Finished Goods to be Produced.

(6) **Fixed & Flexible budget**

(*) **Fixed budget :-** When Demand is fixed & Mgt would like to know the total Cost/Profit at a particular level, we should Prepare a budget Called Fixed budget.

Statement of Cost/Project		
Material		xx
Labour.		xx
Variable overhead		xx
fixed overhead.		xx.
Total Cost	A	xxx
Sales.	b	xxx
Profit (b-A)		xxx

(*) **Flexible budget :-** When Demand is uncertain, flexible, Management would like to know the total Cost/Project at every level, we should prepare a budget Called Flexible budget.

Statement of Cost/Project	70%	80%	100%
Material	xx	xx	xx
Labour	xx	xx	xx
Variable overhead	xx	xx	xx
fixed overhead	✓	✓	✓
Total Cost (A)	xxx	xxx	xxx
Sales (b)	xxx	xxx	xxx
Profit. (b-A)	xxx	xxx	xxx

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(5) (Page-315)

Statement of Profit (Domestic Sale). (₹ in Lakh)

Level	60% (operate)	80% (Planning)	100% (Cost Relation)
Prime Cost (75% of factory Cost)	21.6	28.8	36
factory overhead. (b/f)	9.9 (Given)	10.80 (given)	12 (given)
Factory Cost. (2/3 of sale) (a)	31.5	39.6	48. (72×2/3)
+ Administration & selling			
Variable	6.48	8.64	10.80
Fixed.	3.60	3.60	3.60.
(b)	~~10.08~~ 10.08	12.24	14.40
Total Cost. (a+b)	41.58	57.84	62.4
Sales.	43.20.	57.6.	72
Profit.	1.62	5.76	9.6.

On Domestic sale Profit is 10% of sales.

Statement of Price

Cost to be incurred		₹ in lakh
Prime Cost		6.
factory overhead:		
80%	10.80	
120%	15.60	4.2.
+ Shipping Cost		1.00.
+ Administrative selling overhead. (ignored)		—
~~Profit~~ ~~1/9 of~~ Total Cost.		11.20
Profit (1/9 of total Cost)		1.24
Sales.		12.44

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(1) [Page-311]

Flexible Budget

Level		5500	6000	6500
Sales	(A)	550000 100 X 5500	600000 100 X 6000	637000 98 X 6500
Less:- Cost				
Material		~~79200~~ 14.40 X 5500	~~86400~~ 14.40 X 6000	~~93600~~ 14.40 X 6500
Wages - Variable		113437.5 20.625 X 5500	113437.5 [20.625 X 5500]	113437.5 [20.625 X 5500]
Fixed [53625 X 1.1]		58987.5	58987.5	58987.5
Overtime Premium.			15468.75 20.625 X 500 X 1.5	30937.5 20.625 X 1000 X 1.5
Factory overhead. Variable		16500 3 X 5500	18000 3 X 6000	19500 3 X 6500
Fixed		76450	76450	76450
Selling overhead - Variable		110000 [20 X 5500]	120000 [20 X 6000]	130000 [20 X 6500]
Fixed.		92400	92400	92400
Total Cost (B)		5,46,975	581143.75	615312.5
Profit (A - B)		3025	18856.25	
			18856.25	21687.5

Working Note [#1] Material

Q_1 Material - $66000 \div 5500 = 12/\text{unit}$

Q_2 Material $54000 \div 4500 = 12/\text{unit}$

Q_3 Material. $12 \times 1.2 = 14.40/\text{unit}$.

(#) Wages

$Q_1 = \frac{156,750}{5500} = 28.5$

$Q_2 = \frac{138000}{4500} = 30.6$.

$\therefore$ wages is Semi Variable

Variable wages: $\frac{\text{Change in wages}}{\text{Change in Qty}} = \frac{156750 - 138000}{5500 - 4500} = \frac{18750}{1000} = 18.75$

$\therefore$ Fixed: $156750 - 18.75 \times 5500 =$

$= 156750 - 103125 =$

$= 53625$.

Rate | Hr | Unit | day = Variable
Rate | week | month | Quarter = Fixed.

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Revised wage Rate

Variable = 18.75 × 1.1 = 20.625

Fixed = 53625 × 1.1 = 58987.5

Working #3 Factory overhead

Variable Q_1 $\frac{86500}{5500}$ = 15.636

Q_2 $\frac{83500}{4500}$ = 18.44

Q_3

Q ∴ semi-variable.

Variable Factory overhead = $\frac{86500 - 83500}{5500 - 1000} = \frac{3000}{1000} = 3$.

Fixed Factory overhead = 86500 − 5500×3 =
= 86500 − 16500 = 69500.

Revised fixed f/o = 69500 × 1.1 = 76450.

(4) Selling overhead

Q_1 $\frac{179000}{5500}$ = 32.54

Q_2 = $\frac{173000}{4500}$ = 38.44

Variable selling O/H = $\frac{179000 - 173000}{5500 - 4800} = \frac{6000}{300} = 20$

Fixed selling O/H = 179000 − 5100×20 =
= 179000 − 102000 = 77000

Revised fixed selling O/H = 77000 × 1.2 = 92400.

Note: Irrespective of opening stock, whatever we produced match with sales. i.e. whatever we are going to sale, that particular should be produced. And here sale for Next Quarter = 5300, 6000, 6500.

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(13) [Page-321]

Production Budget for the year 2014

Sales for year	61500
+ Closing stock of finished goods	6,500
(–) ~~Clear~~ Opening stock of F. Goods	(4000)
Budgeted Production ⇒	64000

Production Budget (Quarterly)

	Q_1	Q_2	Q_3	Q_4	Total
Sales = 2/3 of Q_1	8000 [12000 × 2/3]	10000 (2/3 × 15000)	11000 (2/3 × 16500)	12000 (2/3 × 18000)	
1/3 of Q_2	5000 (15000 × 1/3)	5500 (1/3 × 16500)	6000 (1/3 × 18000)	6500 (b/f)	
	13000	15500	17000	18500	64000

Statement of Cost.

	Q_1	Q_2	Q_3	Q_4	Total
Quantity	13000	15500	17000	18500	
Labour Cost	78000 [₹6 × 13000]	93000 [6 × 15500]	102000 [6 × 17000]	1,11,000 [6 × 18500]	384000
Variable overhead.	19500 [₹1.5 × 13000]	23,250 [1.5 × 15500]	25500 [1.5 × 17000]	27750 [1.5 × 18500]	96000
Fixed overhead $\left[\frac{180000}{4}\right]$	45000	45000	45000	45000	180000
	142,500	161250	~~323,750~~ 172500	1,83,750	660000

Statement of Profit. (Budgeted for Year-14)

Sales (₹17 × 61500)	10,45,500
Less:- Material. [10 Lbs × 0.5/Lbs × 61500 unit]	3,07,500
Labour. [₹6 × 61500]	3,69,000
Variable O/H. [1.5 × 61500]	92250.
Contribution	2,76,750
Fixed Cost	1,80,000
Profit ⇒	96750

\# Variable overhead/unit = $\left[\frac{307500 + 369000 + 92250}{61500}\right] = 12.50.$

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(ii) Selling Price = 17 ; Variable Cost = 12.50.

$$\text{Break Even Point} = \frac{\text{Fixed Cost}}{\text{Contribution Per unit}} = \frac{180000}{17-12.5} = \frac{180000}{4.5} = 40{,}000 \text{ unit.}$$

Q4

Q.	Sale	Cummu. Sales
Q_1	12000	12000
Q_2	15000	27000
Q_3	16500.	43500.

∴ In Q_3 Break Even Sales will be acheived.

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Statement of Profit (Domestic) [₹ in Lakh]

	60%	80%	100%
	Current	Planning	Cost Relation
Prime Cost [75% of Factory Cost]	21.60	28.8	36
Factory overhead. [Given]	9.90	10.80	12.
Factory Cost [2/3 of Sales]	31.50	39.60	48
Administration & selling Expenses			
Variable	6.48	8.64	10.8 (14.4)
Fixed.	3.6.	3.6	3.6
	10.08	12.24	14.40
Total Cost (A)	~~41.58~~	~~51.84~~	~~62.40~~
Sales Value (B)	43.20.	57.60.	72.00
Profit (B-A)	1.62	5.76.	9.60

On Domestic Sales Profit is 10% of sales

Statement of Price [Order = 40%]

Prime Cost		600000
Factory overhead.		
at 80%	10.80 L	
at 120%	15.00 L	4,20,000
Shipping Cost		1,00,000.
Administrative & selling overhead		—
Total Cost		11,20,000
Profit [1/9 of Total Cost]		1,24,444
Sales =		12,44,444

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Statement of Profit (2014)

	Revenue (125 X 20 000 unit)		2500 000
Less:-	Material $(16 \times \frac{2500000}{125})$	320 000	~~3,20 000~~
	Labour (40 X 20 000) =	800 000	
	Variable O/H (12 X 20 000)	2,40,000	13,60 000
	Contribution		1140 000
Less:-	Fixed Cost		675000
	Profit		465000

Working Note

	Present	Revised
Material	16 P.U.	16X1.1 = 17.60/unit
Labour	40. P.U.	$40 \times 1.05 \times \frac{100}{112} = 37.5$
Variable overhead.	12. P.U.	$[12 \times 1.05 \times \frac{100}{112}] = 11.25$
Fixed overhead.	675000	800000.
		66.35

Let 1 Finished Goods Required 1 Labour Hour.

Labour Cost = 40/unit

Efficiency = 112% $\left(\frac{\text{Standard Hour}}{\text{Actual Hour}}\right)$

$\therefore$ Actual Hour = $\frac{1}{112\%}$ = 0.89285714285

$\therefore$ Labour Rate = 40/Hr X 1.05 = 42.

Labour Cost = 0.89285714285 X 42 = 37.50.

It is assumed that Variable overhead is also to be based on Direct Labour Hour $\therefore$ Efficiency increase in Var. O/H also

(ii) Let Price be x

Sale - Total Cost = Profit

$[x \times 20000 - 66.35 \times 20000 - (675000 + 125000)] = \text{Profit} (465000)$

$20000x - 13,27000 - 800000 = 465000$

$20000x = 25,92000$

$i.e. \; x = 129.6.$

Present Price = 125.

Increased = 129.6 - 125 = 4.6.

% Increased = $\frac{4.6}{125} \times 100 = 3.68\%$

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If Technical Director's view is accepted, we should Increase the selling Price by 3.68% to maintain same level of Profit in 2015.

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(iii) As per the Marketing Director

Statement of Cost Benefit (2015)

Option	I	II
Incremental Contribution	117300 [20000 x (125-66.35)]	586500 [10000 x (125-66.35)]
Incremental Cost	100 000	500 000
Incremental benefit ⇒	17300	86500

∴ better to select option II.

Level of output = (2015) = 20000 unit + 10000 unit
= 30,000 unit.

Statement of Profit. (2015)
(As per Marketing Director)

Revenue [30000 x 125]	3750000
less:- Variable Cost [30000 x 66.35]	19,90 500
less:- Fixed Cost [675000 + 125000]	800 000
Advertisement	500 000.
Profit ⇒	4,59,500

(2) Page-312

Working Note

Total Capacity $= \frac{10000}{50\%} = 20,000$ units.

75% Capacity $= 20000 \times 75\% = 15000$ units.

Spare = 5000 units.

Statement of Cost

	Per unit	change	New
Material	10	10% increase	11/unit
Labour/Wages	16	10% increase + 5% efficiency decrease	18.52 [#1]
Variable Production overhead	25 #2	10% increase	27.5
Fixed Production overhead	350000	10% "	385000
Variable selling overhead	10	10% "	11
Fixed selling overhead	120000	50% "	1,80000

(#1) Working = 1 finished good Req. = 1 Hr.

= 16/unit = 1 Hr × ₹16/unit.

Efficiency = 95% = $\frac{\text{Standard Hour}}{\text{Actual Hour}}$

$95\% = \frac{1}{\text{Actual Hour}}$

∴ Actual Hour = 1.05263 Hr

∴ Labour Cost = 1.05263 Hr × 16 × 1.1 = 18.52

[#2] Production overhead

Variable $= \frac{650000 - 600000}{12000 - 10000} = \frac{50000}{2000} = 25$/unit [#2]

∴ Fixed = [650000 − (25×12000)] = 350000

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Selling overhead

$$\text{Variable} = \frac{240000-220000}{12000-10000} = \frac{20000}{2000} = 10/\text{unit}$$

∴ Fixed = [2,40000 − (10 × 12000)] = 1,20,000.

(i) Statement of flexible budget. [2013-14]

Level	[At − 75%] ie 15000 unit	At 95% (18000 unit)
Material	165000 (11×15000)	198000 (11×18000)
Labour/wages.	277800 (18.52×15000)	3,33,360 (18.52×18000)
Production overhead		
Variable	412500 (27.5×15000)	495000 (27.5×18000)
Fixed.	385000 (350000×1.1)	420000 (350000×1.2)
Selling overhead		
Variable	165000 (11×15000)	198000 (11×18000)
Fixed.	180000 (120000×1.5)	180000 (120000×1.5)
Total Cost	15,85,300	18,24,360
Cost/unit	105.67	101.3533

(ii) At 75% Capacity

Total Cost = 15,85,300
+Profit (20% on sales) 3,96,325
i.e. (25% on cost)
Sales. Value = 19,81,625

Statement of Cost benefit

Incremental Revenue. [100 × 3000 unit]	300000
Incremental Cost [18,24360 − 1585300]	239,060
Incremental Benefit (Net benefit)	60,940

∴ better to accept Export order.

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Statement of Production

Product	1	2	3
Sales.	10,000	16000	15000
+ Closing stock	—	1000	2000
(–) opening stock	—	(7000)	(7000)
Production	10,000	10,000	10,000

Labour Hours available

= 8 Hrs X 6 days X 13 week = 624 Hrs

Lost 124 Hrs

Production Hours. 500 Hrs

Operation I

Product	1	2	3	Total.
Labour Hours	3000. $\left[\frac{18 \times 10000}{60}\right]$	7000 $\left[\frac{42 \times 10000}{60}\right]$	5000 $\left[\frac{30 \times 10000}{60}\right]$	15000 Hrs.
No. of worker.	$\left[\frac{1}{500} \times 3000\right]$ = 6	14 $\left[\frac{1}{500} \times 7000\right]$	10 $\left[\frac{1}{500} \times 5000\right]$	20 worker.
Labour Cost	6000. [3000 X ₹2]	14000 [7000 X ₹2]	10000 [5000 X 2]	30,000. [15000 X 2]

Operation II

Product	1	2	3	Total
Labour Hours	—	2000 $\left[\frac{12 \times 10000}{60}\right]$	4000 $\left[\frac{24 \times 10000}{60}\right]$	6000.
No. of labour	—	4 $\left[\frac{1}{500} \times 2000\right]$	8 $\left[\frac{1}{500} \times 4000\right]$	12 labour.
Labour Cost	—	[2000 X 2.5] = 5000	10000 [4000 X 2.5]	15000 [6000 X 2.5]

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Operation (3)

Product	1	2	3	Total
Labour Hours.	1500 $\left[\frac{9 \times 10000}{60}\right]$	1000 $\left[\frac{6 \times 10000}{60}\right]$	—	2500
No. of labours.	$\left[\frac{1}{500} \times 1500\right]$ = 3	$\left[\frac{1}{500} \times 1000\right]$ 2	—	5 labours
Labour Cost	[1500×3] = 4500	[1000×3] 3000	—	[2500×3] = 7500.

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Sales Budget = Selling Price X Qty sold.

How much Qty to be sold to earn profit $\frac{120 \text{ Lakh}}{12}$ = 10/month after Recovery of fixed Cost of ₹ 30 Lakh. i.e. 40 Lakh. as Contribution.

Ratio = 1:2:4.

Total Contribution = 40 Lakh/month.

[(Contribution/unit of A X Qty of A) + (Contribution/unit of B X Qty of B) + (Contribution/unit of C X Qty of C)] = 40 Lakh.

Statement of Contribution/unit.

Product →	A	B	C
Selling Price	450	550	650.
Less:- Variable Cost			
Material (Component)			
— Frame	(1×45) = 45	(1×45) = 45	(1×45) = 45
— S	(10×15) = 150	(2×15) = 30	(6×15) = 90
— T	(2×15) = 30	(14×15) = 210	(10×15) = 150
— U	(8×5) = 40	(10×5) = 50	(2×5) = 10.
Labour Skilled	(6×6) = 36	(4×6) = 24	(3×6) = 18
Unskilled.	(8×5) = 40	(6×5) = 30	(6×5) = 30
Variable overhead	9	11	7
Contribution/unit.	100	150	300.

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Let Total Qty be x.

$\therefore$ Qty of A $= \frac{1}{7} \times x = \frac{x}{7}$

Qty of B $= \frac{2}{7} \times x = \frac{2x}{7}$

Qty of C $= \frac{4}{7} \times x = \frac{4x}{7}$

Total Contribution = 40,00,000.

$100 \times \frac{x}{7} + 150 \times \frac{2x}{7} + 300 \times \frac{4x}{7} = 4000000$

$\frac{100x}{7} + \frac{300x}{7} + \frac{1200x}{7} = 4000000$

$1600x = 40,00,000 \times 7$

$\therefore x = \frac{40,00,000 \times 7}{1600}$

$x = 17500$ unit.

Sales Budget

Product	Qty	Selling Price	Sales
A	2500	450	11,25000
B	5000	550	27,50,000
C	10000	650	65,00,000
		Total Sales.	1,03,75,000

Production Budget

Product	Sales + Closing (90%) − Opening (of closing)	= Production.
A	2500 + 450 − 500	= 2450
B	5000 + 900 − 1000	= 4900
C	10000 + 2700 − 3000	= 9700.

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Statement of Parts Usage Budget

Product	Frame	S	T	U
A	(1 X 2450) 2450	24500 (10 X 2450)	4900 (2 X 2450)	19600 (8 X 2450)
B	4900 (1 X 4900)	9800 (2 X 4900)	68600 (14 X 4900)	49000 (10 X 4900)
C	9700 (1 X 9700)	58200 (6 X 9700)	97000 (10 X 9700)	19400 (2 X 9700)
Total	17050	92500	170500	88000

Statement of Purchase Budget

	Frame	S	T	U
Consumption	17050	92500	170500	88000
+ Closing stock	1350	900	18000	9000
(−) Opening Stock	(1500)	(1000)	(20000)	(10000)
Purchase	16900	92400	168500	87000
Rate	45	15	15	5
Amt. (₹)	7,60,500	13,86000	25,27,500	4,35,000

Statement of Labour Hours.

Product	Production	Skilled	Unskilled
A	2450	6 X 2450 = 14700	8 X 2450 = 19600
B	4900	4 X 4900 = 19600	6 X 4900 = 29400
C.	9700	3 X 9700 = 29100	6 X 9700 = 58200
		63400	107200

Every worker will do 80 Hr X 25 days = 200 Hr/month.

∴ No. of Labour. $\frac{63400}{200}$ = 317 Skilled $\frac{107200}{200}$ = 536. unskilled.

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Labour Cost = 63400 X ₹6 + 107200 X 5 = ₹916400 Ans

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Production Budget

Product	K	G
Sale	40000	75000
+ closing	5000	10000
(−) opening	(15000)	(25000)
	30000	60,000

Statement of Material Budget

Product	A	B	C
K	60,000	1,20,000	—
	(2×30000)	(4×30000)	2,40,000
G	240,000	1,20000	(4×60000)
Material	(4×60000)	(2×60000)	
C	—	480000	—
		(2,40000×2)	
	300000	7,20,000	2,40,000

(2) Economic Order Quantity (EOQ) $= \sqrt{2AO/CS}$ — ORder

for A $= \sqrt{\dfrac{2 \times 300000 \times 1000}{10\% \times 15}}$ — 15 times. $\left[\dfrac{300000}{20000}\right]$

$= 20000$ unit

for B $= \sqrt{\dfrac{2 \times 7,20,000 \times 1000}{10\% \times 25}}$ — 30 times. $\left[\dfrac{720000}{24000}\right]$

$= 24000$ Unit

No. of order in / Month $= \dfrac{12}{15} = 0.8$ times i.e every 0.8 Month time
(A) we should place order
i.e 24 days.

(B) $\dfrac{12}{30}$, 0.4 times i.e every 0.4 month time
we should place order i.e. 12 days

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Production budget

	RB	RD
Sales	75000	50,000
+ Closing stock	31250	11250
(−) opening stock	(25000)	(10,000)
Production ⟹ budget.	81,250	57,250

(ii) Raw Material Consumption budget & Purchase budget.

	A	B	C
R B	406250 [81250×5]	203125 [81250×2.5]	—
R D	256250 [57250×5]	153750 [57250×3]	57250 [57250×1]
Consumption of Raw Material	662500	356875	57250
+ Closing stock	45000	40000	8750
(−) opening stock	40000	36250	7500
Purchase ⟹	667500	360625	52500

(iii) Production budget

	RB	RD
Sales	75000	50000
Closing	—	—
(−) opening	(25000)	(10,000)
Production	50,000	40,000
Labour Required (in Hrs)	4	6
Total Hour Require	200000	240,000
Total Hour Require	440,000.	

∴ Labour is not our principal (key) Factor because its availability is more than its requirement. Now we can say Only Demand which is restricted is our key Factor because it is not unlimited.

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Flexible Budget.

level	4000	3200
Material	1,80,000	1,44000
	[45X4000]	[45X3200]
Labour	1,44000	1,15,200
	[36 X 4000]	[36X 3200]
Variable overhead	88000	70,400
	[22X 4000]	[22X3200]
Fixed overhead	90,000	90,000
Total Cost (B)	5,02,000	419,600
Sales. (A)	6 00 000	480 000
	[150X 4000]	[150X3200]
Profit (A-B)	98,000	60,400

Production Budget

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	A	B
Sales	1800	2,400.
+ closing stock.	450	800
	$\left[\frac{1800}{12\times5}\times15\right]$	$\left[\frac{2400}{12\times5}\times20\right]$
(-) Opening stock.	(510)	1200.
Production →	1740	2000.

Raw Material Consumption Budget

Product A =	1740 X 5kg =	8700 kg	
Product B =	2000 X 3	6000 kg	
		14700 kg	
+ Closing stock of Raw Material		2450 kg	$\left[\frac{14700}{12\times5}\times10\right]$
(-) Opening stock of Raw material.		2150 kg	
Budgeted Raw Material Purchase.		15000 kg	
Rate/kg		₹ 12/kg	
Amt Required		₹ 1,80,000	

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Labour Requirement budget

Product A [~~1770~~ 1740 x 5 Hours] = 8700

Product B [2000 x 4 Hours] = 8000

Labour Hours.	16700	[without down time] i.e on 100% efficiency.
+ loss Due to Efficiency	4175	$\left[\frac{16700}{80} \times 20\right]$
Hours Required with Efficiency effect =	20875	→ Efficiency = $80 = \frac{SH}{AC} =$
+ Down time. [20% of 20875]	4175	
Total Labour Hours Require =	25050	
Rate / Hour.	₹8	

Normal Labour Hours in budgeted period. =

= 8 Hour x 5 days x 12 week x 45 workers.

= 21,600 Hours. available in single Shift.

∴ Overtime Hour = 25050 − 21600 = 3450 Hours

∴ Labour Cost = (21600 x 8) + (3450 x 8 x 1.5)

= 1,72,800 + 41,400

= ₹ 2,14,200 Ans

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Production Budget

	Chairs	Table	Benches
Sales.	4200	800	500
+ Closing	200	300	50
(−) opening	(400)	(100)	(50)
Production	4000	1000	500

Raw Material Purchase Budget

	Timber	Upholstery
Chairs	$(0.5 \times 4000) = 2000$	$(0.25 \times 4000) = 1000$
Table	$(1.2 \times 1000) = 1200$	—
Benches.	$(2.5 \times 500) = 1250$	—
	4450	1000
+ Closing	650	260
(−) opening	(600)	(400)
Purchase	4500	860
Cost	₹50	₹20
Total Cost	₹ 225000	₹17,200.

Fixed & finishing Material is our Indirect Labour.

Direct Wages Cost Budget

	Carpenters	Finisher
Chairs	$\left[\frac{45 \times 4000}{60}\right] = 3000$ Hr	$\left[\frac{15 \times 4000}{60}\right] = 1000$ Hr
Table	$\left[\frac{60}{60} \times 1000\right] = 1000$ Hr	$\left[\frac{15 \times 1000}{60}\right] = 250$ Hr
Benches.	$\left[\frac{75 \times 500}{60}\right] = 625$ Hr	$\left[\frac{30 \times 500}{60}\right] = 250$ Hr
Labour Hours.	4625 Hr	1500 Hr
Rate / Hr	₹ 6	₹ 4.8
Direct wages Cost	₹ 27,750	₹ 7200

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Statement of Variable Cost

	Chair	Table	Benches
Direct Material			
Timber	$(0.5 \times 50) = 25$	$(1.2 \times 50) = 60$	$(2.5 \times 50) = 125.$
Upholstery.	$(0.25 \times 20) = 5$	—	—
(a)	30	60	125
+ Direct Labour			
Carpenter.	$\left[\frac{45}{60} \times 6\right] = 4.5.$	$\left[\frac{60}{60} \times 6\right] = 6$	$\left[\frac{75}{60} \times 6\right] = 7.5$
+ Direct expenses	—	—	—
Prime Cost	34.5	66	132.5.
+ Indirect Material (5% of a)	1.5	3.0	6.25.
+ Indirect Labour. (Finisher)	$\left[\frac{15}{60} \times 4.8\right] = 1.2$	$\left[\frac{15}{60} \times 4.8\right] = 1.2$	$\left[\frac{30}{60} \times 4.8\right] = 2.4.$
+ Indirect Expenses.	—	—	—
Variable Cost	37.2	70.2	141.15.

Statement of Budgeted Income.

	Chair	Table	Benches
Budgeted sales Unit	4200	800	500
Selling Price / Unit	50	85	158
Total Sales (A)	2,10,000	68000	79000.
Variable Cost /. (B)	1,56,240	56,160	70575.
Contribution (A-B)	53760	11840	8425.

Total Contribution	74025
(-) Fixed Cost (8000x3)	24000
Net Profit	50,025

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(#) Lead Period means Time Gap between Placing the Order & Receiving the Order, the day of Placing the order should not be included in lead period. However the day of Receiving the order should be included.

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Statement of Production [for 6th Period]

	x	Y
Sales.	45000	42000
+ Closing Stock	21,000	10,800
	[52500 X 40%]	[27000 X 40%]
(-) Opening Stock	(18000)	(16800)
Production for 6th Period ⇒	48000	36000

Statement of Consumption of Raw Material. [for 6th Period].

Raw Material.	A	B	C
For x	60000	24000	—
	[1.25 X 48000]	(0.5 X 48000)	
Y.	72000.	—	54000
	[2 X 36000]		(1.5 X 36000)
(a) Total Material to be used	1,32000	24000	54000.
20 day in 1 Period	20 day	20 days	20 days
Daily Consumption	6600 kg	1200 kg	2700. kg

Statement of Raw Material Closing stock & ORDER Placed. [For 6th Period].

Raw Material.	A (in kg)	B (in kg)	C (in kg)
Opening stock	96000	54000	84000.
+ Order Received in 6th Period [10th day]	90000.	—	60000
Reorder Received (14th day) [W.N#=1]	90000.	—	—
Less:- Consumption during 6th Period.	(1,32000)	(24000)	(54000)
Closing stock	1,44000.	30000	90000.

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Working Note (A)

	Day		Used	Closing stock
Opening stock	1	96000	6600	89400
	2	89400	6600	82800
	3	82800	6600	76200
	4	76200	6600	69600 [below R.O.Q.].

For-A ∴ We should place 90000 kg (Purchase lot) on 4th day of 6th Period. & Receive 14th day of 6th Period. Simultaneously Payment Will be made on 4th day of 7th period. (1 Period 20 days.)
∴ After 14 days Order Receive then, After 6 day of 6th Period & 4th days of 7th Period Payment will be made).

Statement of ORDER & DATE

	Qty	Date of Placing	Date of Delivery	Date of Payment	Amt
A	90000 (old)	20th days of 5th Period.	10th days of 6th Period.	20th days of 6th Period.	90000×1 = 90000.
	90000 (fresh)	4th day of 6th period	14th days of 6th period.	4th day of 7th period	90000×1 = 90000.
B	30000 fresh.	8th days of 6th period.	13th days of 7th period.	3rd days of 8th Period.	30000×2 = 60000.
C	60000 (~~Fresh~~ old.)	9th day of 5th period.	4th days of 6th period	14th days of 6th Period	60000×1 = 60000.

For B ∴ We should place 30000 kg of B (Purchase lot) on 8th days of 6th Period & same will be received on 13th days of 7th Period. And Payment will be made on 3rd day of 8th Period.

$$\text{ORder} = (54000 - \overset{1}{1200} - \overset{2}{1200} - \overset{3}{1200} - \overset{4}{1200} - \overset{5}{1200} - \overset{6}{1200} - \overset{7}{1200} - \overset{8}{1200}) = 44400.$$

∴ Re order = 8th days of 6th Period.

Delivery 8th days + 25 days = [8th + 12 days of 6th Period + 13 days of 7th Period]

Payment 10th days: 13th days of 7th Period + 10 days
= 3rd days of 8th Period.

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For C

		Opening stock	Used	Closing stock
Opening stock	1	84000	2700	81300
	2	~~87300~~	2700	78600
	3	78600	2700	75900
+60000	4	75900	2700	133200
	5	~~135900~~ 133200	2700	70500
	6	70500	2700	67800
	7	67800	2700	65100
	8	65100	2700	62400
	9	62400	2700	59700.

∴ 4th days = 133200 − 2700 × No. of Days = 60000
= 133200 − 2700 × 11 = 103500. in 6th Period.:
∴ No need. to Place the order.

Qty old order of 60000 kg of 'C' to be received on 4th days of 6th Period. No Fresh order is required to place.
Date of Payment = 14th days of 6th Period.

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Production budget

	K	F	A
Sales	1,40000	1,90,000	420000
+ Closing stock	25000	38000	50000
- Opening stock	(30000)	(36000)	(90000)
Production.	90% = 1,35000	80% 1,92,000	95% 380000.
+ loss.	15000	48000	20,000
Gross Production	1,50,000	2,40,000	400000.

(#) Working

	Cost	Profit	S.P
K	24	$\frac{1}{4} \times 24 = 6$	30
F	15	$\frac{1}{3} \times 15 = 5$	20
A	20	$\frac{1}{5} \times 20 = 4$	24.

Qty sold

K $\frac{420000}{30} = 1,40,000$

F $\frac{380000}{20} = 1,90,000$

A $\frac{10,080000}{24} = 4,20000$

Closing stock

	₹	C/U	Qty
K	600000	24	25000
F	570000	15	38000
A	10,00,000	20	50,000.

Opening stock

K	720000	24	30000
F	540000	15	36000
A	180000	20	90000.

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Labour Cost Budget

Department x	K	F	A
Grade 1	540,000	12,96 000	720 000
	[2Hr x 150 000 x 1·8]	[3Hr x 2,40000 x 1·8]	[1 x 400 000 x 1·8]
	360,000	768000	9,60,000
Grade -2	[1·5Hr x 150 000 x 1·6]	[2 x 240 000 x 1·6]	[1·5 x 400000 x 1·6]
	9,00,000	20,64000	16,80,000.

Department Y			
Grade-1	900000	480000	800000
	[3Hr x 150000 x 2]	[1 x 240000 x 2]	[1 x 400000 x 2]
Grade-2	5,40,000	648000	18,00,000
	[2·4Hr x 150000 x 1·8]	[1·5 x 240000 x 1·8]	[2·5 x 400000 x 1·8]
	1440000	~~648000~~ 1128000	26,00,000

(ii) page-31 **Working Note**

① Material A = $\frac{90000}{15000 \text{ unit}}$ = ₹ 6/unit

B = $\frac{75000}{15000 \text{ unit}}$ = ₹ 5/unit

② **Labour**

Labour	Q_1	Q_2	Q_3
Qty	10000	20000	15000.
Labour Cost	180000	285000	2,30000

Variable Cost = $\frac{2,30,000 - 180000}{5000} = \frac{50000}{5000}$ = 10/unit.

Fixed = 2,30000 X 15,000 X 10 = 80000.

	Q_1	Q_2	Q_3
∴ Variable	(10000x10) = 1000	(10x2000) = 20000	(10x15000) = 150000
Fixed.	80000	80000	80000
Overtime Premium	—	1000x5 = 5000.	—

In Quarter - IV.

Statement of Learning Effect. LC = 10 Hr × ₹1 per Hr = ₹10/unit.

Cummulative Production.	Avg time Per unit	Total Time.	Initial Time.
1.	10 Hr	10	10
2	8 Hr	16	6 (2nd unit)

Now time for Each unit require 6 Hour in forth Quarter.

Labour Cost (Variable) = 6 Hr × 1.125 = 6.75
[in Quarter-IV]

Fixed = 80000 × 1.125 = 90000.

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Production budget

Product -'x'

Sales.	50,000
+ closing	11,000
(-) Opening	(15000)
Production	46000

Raw Material Consumption budget

	Y.	Z	Empty bag
Requiredment.	1,15000	345000	46000
	[2.5 kg x 46000]	[7.5kg x 46000]	[1x46000]
+ Closing	28000	47000	28000
(-) Opening	(32000)	(57000)	(37000)
Purchase	1,09,000	3,35000	37000.
Rate	1.20	0.20	0.8
Amt.	1,30,800		29600

Statement of Variable Cost/bag.

	₹	
Raw Material		
Y (2.5kg x 1.2) =	3.00	
Z (7.5 kg x 0.2) =	1.50	
Empty bag (1x0.8) =	0.80	5.30
Labour. $\left[\frac{9 \text{ mint}}{60 \text{ mint}} \times ₹5/\text{Hour}\right]$		0.75
Variable Manufacturing Cost		0.45
Selling & Administration (5% of 9)		0.45
Total Variable Cost		6.95

Statement of Net Income. [for 2nd Quarter]

Sale (9X 50000)	4,50000
Less:- Total Variable Cost (6.95X50000)	3,47500.
Fixed Cost (Manufacturing)	30000
(Selling & Administrative)	25000
Net Income	47500

Chapter- 9

CVP ANALYSIS

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(#) CVP (Cost Profit Volume) Basic Marginal Cost.

(1) Calculation of Break Even Point (simple)

(2) Composite Break Even Point

(3) Indifference Point (> 2 Alternative)

(4) Break Even Point with Semi Variable Cost.
(TYPE - I & II), Semi Fixed Cost.

(5) Break Even Point with Application of Tax.

(6) Break Even Point with [FIFO, LIFO].

(#) BREAK EVEN POINT How much Qty should be produced & sold to acheive NO Profit, NO loss, that Target output is known as Break Even Point.

Sales - Variable Cost - Fixed Cost = Profit.

⇒ Qty sold × S.P - Qty sold × VC - Fixed Cost = Profit

For BEP

let Qty to be sold x

$x \times S.P - x \times V.C - F.C = 0$

$x(SP - VC) = \text{Fixed Cost}$

$x = \frac{\text{Fixed Cost}}{SP - VC} \Rightarrow \frac{\text{Fixed Cost}}{\text{Contribution/unit}}$

$$\boxed{BEP(\text{unit}) = \frac{\text{Fixed Cost}}{\text{Contribution/unit}}}$$

$$\boxed{BEP(₹) = \frac{\text{Fixed Cost}}{\text{Contribution/Unit}} \times S.P. = \frac{\text{Fixed Cost}}{\frac{\text{Contribution/unit}}{SP/\text{unit}}}}$$

$$BEP(₹) = \frac{\text{Fixed Cost}}{\text{PV Ratio}}$$

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PV Ratio means Ratio of Contribution as % of Selling Price.

$$PV\ Ratio = \frac{Contribution}{Selling\ Price} = \frac{SP - VC}{SP}$$

\# If Selling Price or/& Variable Cost change, then PV Ratio change.

\# If Selling Price Increase or Variable Cost Decrease } PV Ratio Improve

\# If Selling Price Decrease or Variable Cost Increase } PV Ratio Decrease/Falls.

\# Volume Change or/& Fixed Cost Change } No Change in PV Ratio.

eg

	Present		Now (Volume effect)	Now (Price effect)
Sales	1 unit × 100		200 (2 unit × 100)	200 (1 unit × 200)
V.C	1 unit × 80.		160 (2 unit × 80)	80 (1 unit × 80)
PV Ratio =	$\frac{20}{100} = 20\%$		$\frac{2 \times 20}{200} = 20\%$	$\frac{120}{200} = 60\%$

\# **Margin of Safety Sale.** = Any Qty over & above BEP is known as Margin of Safety Sales. (i.e, Sales where we are safe). Any Qty Over Break Even Point will generate Contribution, which is our Margin (Profit) because fixed cost have been Covered upto Break Even Point.

Margin of safety = Total Sales − Break Even Sales.

Margin of safety + Break Even sales = Total Sales.

$$\frac{BES}{Total\ sales} + \frac{Margin\ of\ safety\ sales}{Total\ sales} = \frac{Total\ sales}{Total\ sales}$$

Break Even Ratio + Margin of Safety Ratio = 100%.

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i.e if Break even Ratio = 30%
Margin of safety Ratio = 70%.

(#) Margin of Safety X Profit Volume Ratio = Contribution = Profit.

$\Downarrow$

Sale X P/V Ratio = Contribution.

$\Downarrow$ OR

Margin of safety. = $\frac{\text{Contribution / Profit}}{\text{PV Ratio}}$.

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	unit	₹	%
Margin of safety sales =	7500	₹187500	75%
Break Even Sales.	2500		25%
	10000		100%

Margin of safety Sales = 75% of sales, which is ₹ 187500.

= 1,87500 = 75% of Total Sales.

∴ Total sales = $\frac{187500}{75\%}$ = ₹2,50,000.

Total Cost = ₹ 1,93,750.

∴ Profit = 250000 - 193,750 = ₹56250

Margin of safety sales X PV Ratio = Contribution / Profit

∴ PV Ratio = $\frac{\text{Contribution / Profit}}{\text{Margin of safety sales}}$ = $\frac{56250}{187500} \times 100$ = 30%

Break Even Point = 25% of 2,50,000
= ₹62,500 ~~unit~~

62500 = $\frac{\text{Fixed cost}}{\text{PV Ratio}}$

∴ Fixed cost = 62500 X 30%
= ₹ 18750 Ans

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Statement of break evenPoint (FIFO)

Nature	Qty	Contribution/unit	Total Contribution
Opening stock	4000	$(100-70)=30$	1,20,000
Current	19000	$(100-80)=20$	3,80,000 (b/f)
		Fixed Cost=	500000

Statement of ~~Contr~~ break Even Point (LIFO)

Nature	Qty	Contribution/unit	Total Contribution
Current	25000	$100-80=20$	500 000
Opening	—	—	—
		Fixed Cost =	500 000

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Product x, y

fixed Cost f_1 & f_2.

Unit Contribution represented by C_1 & C_2 for x & y respectively.

$C_2 = 0.8C_1$ —(i) $\left(C_2 = C_1 - \frac{1}{5} \text{ of } C_1 \right)$: $C_2 = (C_1 - 0.2C_1) = 0.8C_1$

$f_1 + f_2 = 150000$ —(ii) :

Break even Point (x) = 1800 unit

$$\frac{\text{fixed Cost of } x}{\text{Contribution Per unit}} = 1800 \text{ —(iii)}.$$

At 3000 unit, Profit will be same from x & y. i.e,

Profit from x = Profit from y (at 3000 unit)

$3000c_1 - fc_1 = 3000c_2 - fc_2$

$\Rightarrow 3000c_1 - 1800c_1 = 3000 \times 0.8c_1 - fc_2$

~~$\Rightarrow fc_2 = -3000c_1 + 1800c_1 + 3000 \times 0.8c_1$~~

$\Rightarrow 3000c_1 - 1800c_1 = 3000 \times 0.8c_1 - (150000 - f_1)$

$1200c_1 = 2400c_1 - 150000 + f_1$

~~f_1~~ $1200c_1 = 2400c_1 - 150000 + 1800c_1$

$c_1 = 50.$

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$C_2 = 0.8 \times 50 = 40.$

$F_1 = 1800 \times 50 = 90000$

$F_2 = 150000 - 90000 = 60000.$

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Present Cost	Per unit	Next Year
Material	30	33
Labour	20	25
Variable O/H	20	20
Fixed O/H	?	+50000.
	70	78

Working

Present	Sale	15000	
+ Order		10000	
Capacity will have to ↑		25000	utilize.
Still we have spare		5000	spare
Total Capacity (20000+10000)		30000	

(3) Besides
150000
15000.
300000

We should analyse benefit from both the Alternative. If benefit exist in each case, we should accept both as these are not mutually exclusive event

Statement of Comparative Cost benefit

	Spare Capacity to be utilized	Additional order 10,000 unit
Revenue.	5000 x 100 = 500000	10,000 x 120 = 1200000
Less:- Variable Cost	5000 x 78 = 390000	10000 x 78 = 780000
Avoidable Fixed Cost		
S & D.	20000.	—
Equipment	—	$\frac{1000000}{10\ Years} = 100000$
Administrative	—	60000.
Benefit	90,000.	260000

Recommendation = Better to accept both alternative due to:
① Not mutually exclusive event
② both have benefit

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Composite Break Even Point [Group Break Even Point]

If we have different Products & It's not Possible to seggregate fixed Cost separately for each product, we should Calculate How many units of each Product should be produced | sold to Cover overall fixed Cost, such Qty is known as Group Break Even Point (Composite break even Point).

1) Ratio of Qty sold always Predetermined [If not given, Assume = 1:1]

2) Sales Ratio = Qty sold × S.P.

	Qty	SP	Sales (₹)
A	1000	10	10,000
B	2000	5	10,000.

[Sales Ratio = 1:1

Sales Qty Ratio = 1:2.]

eg

Statement of Break Even Point

Sale value Ratio	Product	Qty	SP	VC	Contribution/unit	Total Contribution	PV Ratio
50%	A	1000	10	8	2	2000	20%
50%	B	2000	5	4.	1	2000.	20%
		3000			0.75	4000	

Fixed Cost 60000

$$\boxed{\text{Break Even Point (Unit)} = \frac{\text{Group Fixed Cost}}{\text{Group Contribution/unit.}}}$$

$$\boxed{\text{Group Contribution/unit (Composite)} = \frac{\text{Total Contribution}}{\text{Total Qty}}} = \frac{4000}{3000} = 1.33$$

$$OR = \frac{2 \times 1 + 1 \times 2}{1+2} = \frac{4}{3} = 1.33. \quad \boxed{\frac{C_1 \times Q_1 + C_2 \times W_2}{W_1 + W_2}}$$

$$\boxed{\text{Group Break Event Point} = \frac{\text{Group Fixed Cost}}{\text{Group Contribution/unit}}} = \frac{60000}{1.33} = 4500 \text{ Unit}$$

Divide Group ~~Contribution~~ BEP (unit) in sales Qty Ratio =

Break Even Point (₹) = $\frac{\text{Group fixed Cost}}{\text{Group PV Ratio}}$

Group PV Ratio (Composite) = $\frac{\text{Total Contribution}}{\text{Total Sales}} = \frac{4000}{20000} = 20\%$

OR

$$\frac{PV_1 \times W_1 + PV_2 \times W_2}{W_1 + W_2}$$

Where, W_1 & W_2 = Sales value Ratio.

$$\frac{20\% \times 50\% + 20\% \times 50\%}{50\% + 50\%}$$

Group Break even Point = $\frac{60000}{20\%}$ = 300000.

(#) Group Break even Point Always divided into sales value Ratio.

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(3) Page-339 Break Even ~~sales~~ points for Evening New Paper means Target output so that ① Fixed Cost of Evening New Paper Cover.
② Any loss due to evening in morning also Cover

Fixed Cost 10,000/week
(Relevant)

Variable Cost (Relevant = Cost to be incurred = 0.22/paper.
+ Contribution to be lost due to evening

Contribution in Morning New paper = 0.80/paper.

Contribution lost = $\frac{0.80}{0.10}$ = 0.08/Evening paper.

Relevant Variable Cost = 0.30 / Evening paper.

Break Even Point (Evening) = $\frac{10000}{0.50-0.30}$ = 50,000 Copy.

Statement of Profit

Revenue (50000 X 0.5)	25000
− Variable Cost (50000 X 0.22)	11,000
− Fixed Cost	10 000
Profit	4000
Loss in Morning (5000 X 0.8)	4000
Net Profit	Nill

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Capital Turnover $= \dfrac{\text{Sales}}{\text{Capital Employed}}$

$2.5 = \dfrac{\text{Sales}}{\text{Capital Employed}}$

$2.5\ C.E = \text{Sales}$

$C.E = \dfrac{\text{Sales}}{2.5}$ —— (1)

Profit $=$ 15% of Capital Employed.

$= 15\%$ of $\dfrac{\text{Sales}}{2.5} = \dfrac{15}{100} \times \dfrac{\text{Sales} \times 10}{25}$

Profit $= 0.06$ Sales —— (2)

Break Even Sales $= \dfrac{\text{Fixed Cost}}{\text{PV Ratio}}$

40% of Capacity $= \dfrac{\text{Contribution} - \text{Profit}}{\text{PV Ratio}}$

$\boxed{\begin{array}{l} \text{Sales} - \text{Variable Cost} - \text{Fixed Cost} = \text{Profit} \\ \text{Contribution} - \text{Profit} = \text{Fixed Cost.} \end{array}}$

40% of Capacity $= \dfrac{\overset{30\%\text{ of sales}}{\text{Contribution}} - 0.06\text{ Sales}}{30\%}$

40% x 30% of Capacity $= 0.3\text{Sales} - 0.06$ Sales

$\dfrac{40}{100} \times \dfrac{30}{100} \times \dfrac{100}{24}$ of Capacity $=$ Sales.

50% of Capacity $=$ Sales.

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Statement of Profit/loss

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Product	Sales	PV Ratio	Contribution	Increase in sales
x	250000	50%	1,25,000	$\frac{2.5}{12.5} \times 100000 = 20000$
y	400000	40%	1,60,000	$\frac{4}{12.5} \times 100000 = 32000$
z	600000	30%	1,80,000	$\frac{6}{12.5} \times 100000 = 48000.$
		Present Contribution	4,65000	Increase in sales mix 100000
		Fixed Cost	5,02,200	
		Present Loss	37200	

$$\text{Group PV Ratio} = \frac{\text{Total Contribution}}{\text{Total sales}} = \frac{465000}{12,50,000} = 37.2\%$$

$$\text{Break even Sales} = \frac{\text{Group Fixed Cost}}{\text{Group PV Ratio}} = \frac{5,02,200}{37.2\%}$$

$= ₹\ 13,50,000$

Change i.e, Increase in sales $= 13,50,000 - 12,50,000$

$= ₹\ 100000$ Ans

$\therefore$ Ratio of $x:y:z = 2.5:4:6.$

Mix Sales of $x = \frac{2.5}{12.5} \times 100000 = 20000$

$y = \frac{4}{12.5} \times 10000 = ~~40000~~\ 32000$ Answer

$z = \frac{6}{12.5} \times 100000 = 48000$

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<u>Concept</u> = If we have Three (3) Alternative, required to Calculate Indifferences Point,

(1) Arrange these alternative according to fixed Cost (i.e, in Ascending / Descending Order)

(2) Calculate Indifferences Point for I & II, II & III and III & I

(3) Analyse the Results and convert into statement of Range.

Statement of Indifferences Point.

<u>M_1 & M_2</u>

Base for Indifferences point: =

Statement of Indifferences Point

	M_1 & M_2	M_2 & M_3	M_3 & M_1
Base for Indifferences Point:	$\frac{\text{Change in FC}}{\text{Change in VC}}$	DO	DO
	$= \frac{2,50,000 - 150000}{200-100}$	$\frac{150,000 - 70000}{400-200}$	$\frac{2,50,000 - 70000}{400-100}$
	$= \frac{100000}{100}$	$= \frac{80000}{200}$	$= \frac{180000}{300}$
	= 1000 unit	400 unit	= 600 unit.

Statement of Range.

Level	Preference
> 1000	M_1 is better
400	M_2/M_3 is Indifferences.
401 to 999.	M_2 is better.
00 to 399	M_3 is better.
∴ for 1200	M_1 is better.

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Working

On Comparing M_1 with M_2 & M_3.

if M_1 Compare with M_2 : >1000 M_1 is better.
if M_1 Compare with M_3 : >600 M_1 is better.

∴ It means always >1000 M_1 is better.

On Comparing M_2 with M_3 & M_1

if M_2 Compare with M_3 : >400 M_2 is better.
if M_2 Compare with M_1 <1000 M_2 is better.

∴ Between 400 to 1000 M_2 better.

On Comparing M_3 with M_2 & M_1

if M_3 Compare with M_2 : <400 M_3 is better
if M_3 Compare with M_1 : <600 M_3 is better.

∴ Always <400, M_3 is better.

Pretty: Higher level of High fixed cost & EPI.
& Lower level of low fixed cost

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Working Note

	E		Z	
	Qnt	Contribution/unit	Qty	Contribution/unit
Present	3000	25	2000	20
Additional	1000	25	1000	20
			1000	20.
	4000		4000	
	1000	20	1000	15
	1000	15	1000	10.

fixed Cost = 46000
Increase in fixed Cost = 47500
Increase in Qty = 4000.

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$$\text{Composite Break Even Point} = \frac{\text{Group Fixed Cost}}{\text{Group Contribution / Unit}}$$

$$\text{Group Contribution / Unit} = \frac{3000 \times 25 + 2000 \times 20}{3000 + 2000} =$$

$$= \frac{75000 + 40000}{5000} = 23.$$

(i) $\therefore$ Composite Break Event Point $= \frac{46000}{23} = 2000$ units.

Statement of Minimum Additional unit to cover Additional fixed Cost.

Product	Additional Qty	Contribution Per unit	Contribution (Desired)
E	1000	25	25000
Z	1000	20	20000.
Z or E	125	20	2500 (b/f)
		Fixed Cost =	47500

Statement of Total Mix.

	E Qty	E Cont/unit	E Total Contribution	Z Qty	Z Cont/unit	Z Total Contribution
Present	3000	25 ✓	75000	2000	20 ✓	40000.
Additional	1000	25 ✓	25000	1000	20 ✓	20000
(first) Additional	—	—	—	1000	20 ✓	20000.
Additional	1000	20 ✓	20000	~~1000~~	~~15~~ X	~~15000~~
Additional	~~1000~~	~~15~~ X	~~15000~~	~~1000~~	~~10~~ X	~~10000~~
	5000		120000	~~4000~~		80000

As total Additional Qty would be only 4000. Hence E should be restricted to 5000 units & Z should be restricted to 4000 units.

(iii) $\therefore$ Total Contributions 200000.

− Fixed Cost 93500

Total Profit 106500 Ans

Average Contribution/unit $= \frac{200000}{9000} = 22.22$ Ans

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Break Even Point with Semi Variable Cost.

Semi Variable Cost (TYPE No. 1) : Lot Wise

Lot Wise | Batch | Group.

- # Cost Which remain same for Every lot.
- # Cost will increase as No. of lot increase
- # Lot size always Uniform.

eg Bus Rent = 2000
Bus Capacity = 100 Passenger.
₹ 2000 increase for every 100 Passengers or Part thereof.

This means

Level	Cost	Lot (in bus)
0 - 100	2000	1
101 - 200	4000	2
201 - 300	6000	3
301 - 400	8000	4.

Lot wise = Variable
but unitwise = Fixed
∴ Semi Variable

(16) Page-348 Spare Part Cost ₹ 2000 for every 100 units.

(i) Statement of Profit

Level	2000	3000
Sales	2000×500 = 1000000	3000×500 = 1500000.
Less:- Variable Cost	2000×300 = 600000	3000×300 = 900000.
Less:- Semi Variable Cost	20 lot×2000 = 40000	$\frac{3000}{10}$ (lot) ×200 = 60000
Benefit	3,60,000	5,40,000
Less:- Fixed Cost	100000	100000
Profit	2,60,000	4,40,000

(ii) Fixed Cost = 1000.
Semi Variable Cost = 2000 for every 100 unit
Selling Price = 500.

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Step-1 Break Even Point Just to Cover only fixed Cost.

$$\frac{\text{Fixed Cost}}{\text{Contribution/unit}} = \frac{100000}{200} = 500/\text{unit}$$

Step-2 Semi Variable Cost for above level 500 unit i.e. 5 lot.

= 5 lot × 2000/lot = ₹10,000

New Break Even Point for Cover Fixed Cost & Semivariable Cost

$$\frac{FC + SVC}{\text{Cont/Unit}} = \frac{100,000 + 10000}{200} = 550 \text{ unit}$$

Step-3 = Identify Break Even Point near to 500 unit

Statement of Break Even Point.

Range	400-500	501-600	601-700
Fixed Cost	100000	100000	100000
Semi Variable Cost	(5×2000) = 10000	(6 lot×2000) = 12000	(7 lot×2000) = 1400
Total	110000	112000	114000
Contribution/Unit	200	200	200
Break Even Unit	550	560	570.
Remarks	Loss [∵ BEP is exceeds Upper limit of Range] [550 > 500 BEP upper limit]	[Final BEP]	

560 unit is our Final Break Even Point because Company will Never suffer loss after 560 unit as

(i) Contribution of 560 unit (112000) will cover Cost upto 600 unit i.e. We have surplus Contribution in this Range if we Produce upto upper level of unit. = (600 unit − 560 unit) × 200/unit

= ₹8000

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Break Even Point वो होता है जिसके बाद Production करने पर कभी भी Loss Incurred नहीं होगा।

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(ii) If we go in Next Range & increase 1 unit of Production.
Semi Variable Cost will incurs of ₹ 2000.
Contribution / unit = 200.

Already Contribution:	8000
Contribution for Extra 1 Unit =	200
	8200
(-) Semi Variable Cost for increasing level	2000
Surplus ⟹	6200

OR Check for BEP

$$\left[\boxed{\text{Upper Limit of the Range} - \text{Break Even Point of Range}} + 1 \text{ unit of Next Range}\right] \times \underset{\text{Per unit}}{\text{Contribution}} > \text{Semi Variable Cost of Next Range}$$

$$\left[600 - \underset{+1}{560}\right] \times 200 > 2000.$$

$$41 \times 200 > 2000$$

$$8200 > 2000 \text{ proved.}$$

(iii) Fixed Cost = 180000
Cont/unit = 200.

$$\therefore BEP = \frac{180000}{200} = 900 \text{ unit.}$$

SVC for 900 units = 9 lot × 2000 / lot = 18000

BEP to Cover above SVC

$$= \frac{SVC + FC}{Cont/unit} = \frac{180000 + 18000}{200} = 990 \text{ unit.}$$

Statement of Break Event Point.

Range	800 to 900	901 - 1000	1001 to 1100.
Fixed Cost	180000	180000	180000
Semi Variable Cost	18000	20000	22000.
Total	198000	200000	202000.
Contribution/unit	200	200	200.
Break Event Point	990	1000	1010.
Remarks.	Loss	BEP upto 1000 unit	Final BEP.

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Check for 1000

$\left\{(\text{Upper Limit} - \text{Break even}) + 1\right\} \times \text{Contribution} > 2000$

$[(1000 - 1000) + 1 \times 200] > 2000$

$200 > 2000$. false.

Check for 1010

~~1010~~ $\left[\left\{(1100 - 1010) + 1\right\} \times 200\right] > 2000$.

$[(90+1) \times 200] > 2000$

$18200 > 2000$. True.

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Fixed Cost	Year-1	Year-2
Machine	2400000	
+ Duty 12%	288000	
	26,88,000.	
Life	3 years	
Depreciation	896000	8,96000
Other Fixed Cost.	400000.	424000
	1296000	13,20,000
Monthly fixed cost =	1,08,000	1,10,000

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Statement of Profit

Year-1	Monthly	Yearly	Year-2	Monthly	Yearly
Qty	3000	36000	Qty	3000	36000
Selling Price	200	200	Selling Price	200	200.
Variable Cost	120	120	Variable Cost	120	120
Contribution/unit	80	80	Contribution/unit	80	80
Total Contribution	240000	2880000	Total Contribution	2,40000	28,80000
(−) Semi Variable Cost	24000	288000	(−) Semi variable Cost	24000	288 000.
	$\left[\frac{3000}{50}\times 400\right]$	$\left[\frac{36000}{50}\times 400\right]$		$\left[\frac{3000}{50}\times 400\right]$	$\left[\frac{36000}{50}\times 400\right]$
Benefit	216000	2592000	Benefit	216000	2592000
(−) Fixed Cost	(108000)	1296000	(−) Fixed Cost	110000	1320000
Profit	108000	1296000	Profit	106000	1272000

(ii) First Year

Monthly Break Even Point.

Month Fixed Cost = 108000.

Contribution/unit = 80

SVC = ₹400 for every 50 unit :

$$BEP = \frac{108000}{80} = 1350 \text{ unit.}$$

$$SVC \text{ for } 1350 \text{ unit} = \frac{1350}{50} \times 400 = 10800$$

Break Event Point for Fixed Cost & Semi Variable Cost = $\frac{10800 + 108000}{80}$

= 1485 unit.

Statement of Break Event Point.

Lot	1451 - 1500	1501 - 1550	1551 - 1600.
Fixed Cost	108000	108000	108000
Semi Variable Cost	30 lot × 400 = 12000	31×400 = 12400	32×400 = 12800
Total Cost	1,20000	1,20,400	1,20,800
Cont/unit	80	80	80
Break Event Point	1500	1505	1510
Remarks.	Upto 1500 unit BEP.	Final Break EvenPoint	

Check I classmate $(1500-1500)+1\times 80 > 400 = 80 > 400$ false

$(1550-1505)+1\times 80 > 400 = 3680 > 400$ True.

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(iii) When Upper limit of the Range less Break Even Point with 1 unit of Next Range will not Provide sufficient Contribution to Cover Semi Variable Cost of Next Range the 2nd (next) Break Even Point would be final.

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Statement of fixed Cost (Present)

Sales	500 000
less:- Profit (400 000 x 12.5%)	50,000
Total Cost	4,50,000
less:- Variable Cost	3,90 000
fixed Cost (b/f)	60,000

Statement of Profit [Next Year]

Sales. [500000 X 1.1 X 1.04]	572000
less:- Variable Cost [390000 X 1.1 X 0.98]	420420
Fixed Cost [60000 x 0.98)	54000
Profit	92780

Profit 92780

Capital Employed 400000

Profit is % of Capital Employed = $\frac{92780 \times 100}{400000}$ = 23.195%.

∴ Proposal of sales Manager Could be accepted.

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Overhead Caused due to Machine Hours used = Variable Cost

Overhead Caused due to batch related = Semi Variable Cost

Specific fixed overhead = Avoidable Fixed Cost

General fixed overhead. = Unavoidable Fixed Cost.

Statement of Profit

	Total	Alfa	beta	Gamma	Theta.
Sales. (units)		200000	2,60,000	1,60 000	300000
Sales Revenue (₹)	1,4560000	2600000	45,20 000	42,40 000	3200 000
less:- Relevant Cost					
Material	530 0000	600000	1820000	1880000	1000000
Labour	5360000	800000	2080 000	1280000	1200000
Variable O/H [M.H]	620000	1,60 000	1,56000	64000	240 000
[Batch]	460000	1 00 000	130000	80 000	1,50,000
Avoidable Fixed Cost	1400000	10,00000	100 000	200000	10000
Unavoidable F.C	620000	—	—	—	—
	800000	(60 000)	2,74 000	736000	510 000

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(1) Variable overhead ~ $\frac{620000}{1550000} = 0.40/Hr$

(2) Semi Variable Cost = 4,60 000

Qty 920 000

$\therefore$ Lot = $\left[\frac{920000}{100}\right]$ 9200

Cost Per lot = $\frac{460000}{9200} = 50/Lot$

(ii) Break Even point to Cover fixed Cost: $\frac{1000000}{[13-(3+4+(2hr \times 0.4/Hr)]}$
(Alpha)

$= \frac{10,00000}{13-7.8} = 192,307 unit.$

Semi Variable Cost for 1923 X 50 = 96150.

Break Even Point to Cover above SVC = $\frac{1000000 + 96150}{5.20}$ =

= 2,10798 unit Base

i.e 2108 Lot. Not taken Base for Calculation BEP.

Statement of Break Even Point (Alpha).

	[2,10,801 to 210900] OR Unit Lot 2108 - 2109.	2126 to 2127	2127 to 2128
Fixed Cost	1000000	1000000	1000000
S.VC.	1.05 450	106350	106400
Total	11.05 450	11,06,350	11,06,400
Contribution/unit	5.2	5.2	5.2
Break Even Point	2,12,586	212759 unit	2,12,769
BEP (Lot)	2125 (approx)	2127 lot.	2128 lot
Remarks.	It indicates our BEP is too far then this Range It's better to Prepare Range Just Closer to 212586 units 212600 - 212700 units	Loss.	BEP.

Check [21280 - 212769] + 1 X 5.2 > 50

166.4 > 50 True

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<u>Point</u>

If we have different product (More than one) & General fixed Cost is given for all Combined & also specific ~~for~~ Fixed Cost for each product ~~costs~~ also given then in order to calculate BEP for individual Product we should Consider only Specific Fixed Cost (Nothing part of General fixed Cost).

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Semi Fixed Cost

1) Cost Per lot will never remain same
2) Size of lot may be uniform or may not be same
3) In other words we can say that Cost Increase on No. of lot increase but does not maintain Linear Relation.
4) We should Calculate break even point for every Range & It's not possible to calculate Final break even point.

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Note # Expenses allocated on basis of bed Capacity (Area) are fixed.

Expenses allocated on basis of Patient Days are Variable

∴ Variable overhead = 2,62800

Patient Days = $\frac{1138800}{65}$ = 17520

Variable overhead Per Patient | Per days = $\frac{262800}{17520}$ = 15.

∴ Contribution | Patient | Days = 65 - 15 = 50.

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Statement of Break Even Point. [Skin].

Range.	10000 to 14000.	14001 to 17000	17001 to 23725	23726 to 30000
Fixed Cost	700000	700000	700000	700000.
Semi fixed Cost	295000	310000	510000	635000
	[21x5000 + 11x10000 + 4x20000]	[22x5000 + 12x10000 + 4x20000]	[30x5000 + 16x10000 + 10x20000]	[35x5000 + 18x10000 + 15x20000]
Total	995000	1010000	1210000	1335000
Contribution/ PatientDay	50	50	50.	50
∴ BEP	19900	20200	24200	27100.
Remarks	Loss.	Loss.	Loss.	BEP. upto 30000 patient Days.

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Statement of Total Cost

Level	60	120	180	240	300
Fixed Cost.	—	—	—	—	—
SVC.	1900	2850	3800	4750	5700.
	[2x950]	[3x950]	[4x950]	[5x950]	[6x950]
SFC Entrance fees	200	300	300	450	450.
Prize Cost	1050	1050	1300	1400	1500.
Variable Cost	2700	5400	8100	10800	13500
	[45x60]	[45x120]	[45x180]	[45x240]	[45x300]
Total Cost	5850	9600	13500	17400	21,150.

As we have Semi fixed Cost & semi Variable Cost (both simuntaneously) then always we should calculate BEP for every range defined in Semi fixed Cost.

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Statement of break event.

Range ⇒	upto 50.	51 to 100.	101 to 125	125 to 150	151 to 200	201 to 250	251 to 300 above.
Prize Fixed Cost	900	1050	1050	1200	1300	1400	1500.
Entrance	200	200	300	300	300	450	450.
SVC (bus)	950	1900	2850	2850	3800	4750	5700.
Total	2050	3150	4200	4350	5400	6600	7650.
Contribution Per student [65+10-45]	30	30	30	30	30	30	30.
BEP.	68.33 ie 69.	105	140	145	180	220	255.
Remarks.	loss	loss	Loss	BEP Only upto 150 stud.	BEP upto 200 Student	break even upto 250 student	break Event upto 300 Student

Last Year Student joined Trip = 300 × 72% = 216 Students.

Remark If we had analysed the above statement in last year then Decision would have been as follow to avoid the loss.

1) BEP - 220. & Student = 216.
∴ Either to manage 4 more student
OR Reject application of 16 student for Joining the trip.

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(#) Calculation of BEP with SVC (which remain fixed upto certain level & becomes variable after that.

(19) Installed Capacity = Will have space only but not have other facilities like Machinery etc.
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Labour

upto 100 000 Hrs : Fixed 800000.

100,001 to 150000 Hrs : @ 8/Hr Variable

150001 & above @ 12/Hr Variable.

Fixed overhead

Labour = 800000

Production overhead = 100 000 (10x10000)

Selling overhead = 100 000

Statement of Contribution/unit

	Labour Hr	100 000 Hr	Next 50000 Hr	Next 50 000 Hr
	Qty	10 000 unit	5000 (Next)	Next 5000.
	Selling Price	245	245	245
Less	Material	70	70	70
	Labour.	–	80	120
	Variable O/H.	50	50	50.
	Contribution/unit	125	45	5

Statement of Break EvenPoint

Qty	Contribution/unit	Total Contribution
8000	125	10,00 000

8000 unit ⇒ Break EvenPoint 10 00 000 Fixed Cost

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(ii) Labour 800000
Production overhead 100000
Fixed Selling overhead 395000
Fixed overhead. 12,95000

Statement of break even Point

Qty	Contribution/unit	Total Contribution
10000	125	12,50,000
1000	45	45000 (b/f)
11000 = break even unit		12,95000

(iii) Labour 800000
Production overhead 100000
Fixed selling overhead 600000
Fixed overhead. 1500000

Statement of BEP

Qty	Cost/unit	Total Contribution
10000	125	1250000
5000	45	225000
5000	5	25000 (b/f)
20000 unit = break Point		1500000 = fixed cost

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Statement of Cost [for Per 1000 unit]

~~Prime Cost~~		Variable	Fixed
Prime Cost	15003	15003	—
Works overhead	7490	5992	1498
Administrative O/H	2850	1855	795
Selling overhead	99	—	99
	25242	22850	2392

Selling Price 25150

Selling Price/Unit = $\frac{25150}{1000} = 25.15$

Variable Cost/Unit = $\frac{22850}{1000} = 22.850$

Fixed Cost = $\frac{2392}{1000} \times 100000 = 239200$

Break Even Point =

$\frac{239200}{25.15-22.85} = 104000$ unit

Statement of Absolute share

Level	PBT Incremental unit [25.15-22.85]	Tax 50%	Worker Share (40%)	Staff 30%	Management (30%)
105000	2.30×1000 = 2300	862.5	575	431.25	431.25
106000	2300	862.5	575	431.25	431.25
107000	2300	862.5	575	431.25	431.25
108000	2300	862.5	575	431.25	431.25

Works men = 40% of PAT (Let WS = x)

x = 40% of (PBT − Tax)

x = 40% of (PBT − 50% of Taxable Profit)

x = 40% of (PBT − 50% (PBT − WS))

x = 40% of [PBT − 50% of PBT + 50% of WS]

x = 40% of [2300 − 50% of 2300 + 50% of WS]

x = 40% of $(1150 + 0.5x)$ = $460 + 0.2x$

$0.8x = 460$ $x = 575$

Tax = (2300 − 575) × 50%

= 862.5

Staff & Mgmt = (2300 − 862.5) × 30%

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Statement of Cost & Profit
[Current Period]

Material (35X6000)	210000
Labour (12.5X6000)	75000
Work overhead	
Variable (31.25X6000)	1,87500
Administrative overhead	
Variable [6X25%X6000]	9000
Variable overhead.	481500
Fixed	
Works overhead [31.25X6000]	187500
Administrative (4.5X6000)	27000
Total Cost	696000
Total Cost (143-25)X6000 as per SP&L	708000
Other Cost i.e S&D O/H.	12000

Working Note

60% of Capacity i.e, 6000.

∴ Total Capacity = 10,000

(#) Fixed overhead/unit only : $\frac{\text{Fixed overhead}}{\text{Actual output}}$

(#) Recovery Rate = $\frac{\text{Fixed overhead}}{\text{Normal Capacity}}$

(#) Actual is Not given

$\frac{\text{Fixed overhead}}{\text{Normal Capacity}}$ = Per unit.

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5 **Statement of Cost (Revised)**

Material (35 X 1·06 X 6000)	2,22,600
Labour (12·5 X 1·08 X 6000)	81 000
Variable overhead (31·25 X 6000)	187500
Administrative overhead. (1·5 X 6000)	9,000
Fixed overhead.	
Works overhead. (187500 X 1·1)	206250
Administrative overhead. (27000 X 1·1)	29700
Selling & Distribution overhead (12000 X 1·1)	13,200
Total Revised Cost ⟶	749,250

Profit on 6000 unit =

Sale = (6000 X ₹ 143)	858000
(−) Revised Total Cost	749,250
Profit ⟹	1,08,750
Target Profit	1,67,300
Deficit ⟹	58,550

Statement of Minimum Price.
[2000 unit]

Cost to be Incurred	Per unit
Material.	37·1
Labour	13·5
Variable overhead.	31·25
Administrative v/o	1·50
Variable Cost	83·35

Total Variable Cost for 2000 unit : 2000 X 83·35 = 1,66,700.
+ Desired Profit. 58,550
Minimum Sale 225,250
∴ Selling Price ∔ $\left[\frac{225250}{2000}\right]$ 112·625.

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Statement of Profit [12500 unit]

[80X80%]

	A	B
Sales (64x12500)	800000	800000
Variable Cost	(625000)	(562500)
	[50x12500]	[45x12500]
Fixed Cost [W.N].	(1,50000)	(2,25000)
Profit =	25000	12500

Working Note :- Fixed Cost

	A	B
Capacity	$\frac{12500}{20000}$ = 62.5%	$\frac{12500}{15000}$ = 83.33%
Fixed Cost	150000	200000.
	Below Efficiency	Above Efficiency.
Additional	—	25000
	150000	225000

On the basis of above Calculation (Analysis) we can say that A will cater the market Demand & Pay 40% to B. ie 25000 X 40% = 10.000.

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Statement of Profit (Year-I)
[Per tonne] [~~₹ in 000~~]

Profit =	7 56 000
Quantity	1,26,000
∴ Profit / Tonne	₹ 6 / tonne

This is to be maintained in Year-II.

Statement of Cost (Year-II) & Sale. [Per Tonne].

Selling Price		185
Material	$\left[\frac{12960000}{1,44000}\right]$	90
Labour	$\left[\frac{1872000}{144000}\right]$	13
Variable overhead.		40
Variable Cost		143
Fixed overhead.		5472000

∴ $185x - 143x - 5472000 = 6x$. [Let x be the Qty to be Produced]

∴ x = 1,52000 Tonne Ans.

Working	Year-I	Year-II
Factory, Administrative & selling & Distribution	9702	11232
(−) Inflation Effect.		810
	9702	10422
Qty	126000	144000

Variable overhead $\frac{10422000 - 9702000}{144000 - 126000} = 40/-$

Fixed = ~~xxxxxxxx~~ (10422000 − (40 × 144000)) = 46,62,000

\+ Inflation Effect 810000

547200

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Marginal V/s Absorbtion

Marginal Costing ⇒ [Decision Making / Relevant Costing]

This approach should be applied just before production to analyse the situation i.e, How much Qty to be produced, either to accept offer,

It also applied at end of Production to reconcile.

Statement of Profit [Marginal].

Variable Mfg Cost (Production)		XX
+ Opening stock		XX
- Closing stock		XX
Variable Mfg Cost of Goods sold.		XX
+ Variable Selling & Distribution O/H		XX
Total Variable Cost of Sales		XX
Sales.		XX
Contribution		XX
Less:- Fixed Cost		
Factory	XX	
& Administrative	XX	
Selling & Distribution	XX	XX
Profit		XXX

Absorbtion Costing :- [Traditional]

This approach should be applied during the production. We should prepare Cost Sheet for Every Product at the time of its Production (Just before the production of every unit) & Fixed overhead should be charged with the application of Recovery Rate.

Fixed Cost = 100 000

Qty. to be Produced = 1000 unit

∴ Recovery Rate = $\frac{100\,000}{1000} = 100/-$

If we Produced 900 unit & Profit comes after charging F.O i.e. 100/unit = XXX

then we have to deduct [unabsorbed F.C] 10000

Profit = XXXX

$[100\,000 - (100 \times 900)] = 10000$

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In Marginal Costing closing stock should be valued at Variable Cost.

In Absorbtion Costing Closing Stock should be valued at Total Cost.

(25) [Page-356]

Statement of Profit (Marginal)

	May	June
Variable Mfg Cost.	2×24000 = 48000	[2.20×24000] = 52800
+ Opening stock	—	[2×3000] = 6000
− Closing stock	2×3000 = (6000)	[2.2×500] = (1100)
Variable Mfg Cost of goods sold.	42000	57700
+ Variable S&D	—	—
Variable Cost of sales	42000	57700
Sales.	[5×21000] = 105000	[5.5×26500] 145750
Contribution	63000	88050
(−) Fixed Cost.		
Factory	40000	44000
S&D.	14000	15400
Profit	9000	28650

Statement of Profit (as Per Absorbtion).

	May	June
Variable Mfg Cost	2×24000 = 48000	[2.2×24000] = 52800
Fixed Mfg Cost	1.6 ⇐ $\left[\frac{40000\times24000}{25000}\right]$ = 38400	1.76 $\left[\frac{44000\times24000}{25000}\right]$ = 42240
	[3.6×24000] 86400	[3.96×24000] 95040
+ Opening stock	—	+[3.6×3000] 10800
− Closing stock.	[3.6×3000] 10800	−[3.96×500] (1980)
Cost of Goods Sold	75600	103860
+ O&A OH / S&D OH.	14000	15400
Cost of sales	89600	1,19,260
Sales	105000	1,45,750
Profit	15400.	26490.
Less:- Under Recovery	[40000 − 38400] = 1600	[44000 − 42240] = 1760
Profit ⟹	13800	24730

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Chapter- 12

Activity Based Costing

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Coverage

Question based on ABC.

Question based on Direct Product Productivity (D.P.P.) [big bazar, super market]

Question based on Customer Profitability.

⇒ We have Three (3) systems to Records the Cost.

(1) Marginal Costing [इस system में हम Fixed Cost को Per Unit में नहीं दिखाते]

(2) Absorption Costing

(3) Revised Absorption Costing [ABC].

⇒ # In $\boxed{\text{Marginal Costing}}$ burden of Fixed Cost should be Presented in Totally but not identified on each unit/ Product. Hence Called Periodical Cost (Fixed Cost)

Sales	xx
(–) Variable Cost	xx
Contribution	xxx
(–) Fixed Cost (Total)	xx
Profit ⇒	xxx

⇒ # In Absorption Costing

Cost sheet should be prepared for every product, just before its production.

Total Cost for every product should be analysed [FC+VC]

Every Product will Absorb its burden of Fixed Cost with the application of Recovery Rate i.e,

$$\frac{\text{Budgeted Fixed overhead.}}{\text{Budgeted output.}} = \text{Recovery Rate.}$$

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eg budgeted fixed factory overhead.

Factory Rent	100000	
Machine Rent	400000	[Machine used by A: B: C = 2:0:8 Ratio]
Other	100000	
	600000	

Budgeted Output 1000

Output	A	400
Output	B	500
Output	C	100

Statement Of Cost

	A	B	Revised B	C	Total
Qty	400	500	500	100	1000
Variable Cost	400000	500000	500000	100000	1000000
Fixed Cost	240000	300000	—	60000	600000.
Total Cost	6,40000	800000	500000	1,60,000	1600000.
Sales.	10,00000	700000	700000	200000	
Profit	360000	(100000)	200000	40000	

Marginal	Absorption	ABC
1) Fixed overhead should not be identified with product, It should be charged only against Contribution	All fixed (factory) overhead should be recovered from each Product with Single Recovery Rate i.e. a) Out put Based or b) Material Cost basis or c) Labour Cost basis or d) Labour Hour basis or e) Machine Hour basis. or f) Prime Cost basis. (c) # Non Activity oriented Should be charged as per Recovery Rate [out of six (6) Method of Absorption]	In this system, All overhead should be divided into two (2) parts. 1) Activity Oriented. 2) Non Activity Oriented. #(a) Activity oriented overhead should be distributed according to Activity used i.e. if a product does not use Consume any activity, that product should not absorb fixed overhead of that activity. (b) # If a product consume higher volume of Activity, that Product should absorb higher burden of that activity.

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→ (#) In Activity Based Costing (ABC), We should Prepare two (2) Statement.

(1) Statement of Cost Pool. [Overhead Distribution chart]

(2) Statement of Cost

Cost Pool
[ABC]

Overhead	Amt (A)	Activity	No. of Activity (B)	Cost Per Activity [A/B]
a) Activity oriented.				
Store exp.	XXX. 150000.	Requisition slip or Material Qty	XXX. 1000. [A=100; B=200; C=700]	XXX 100/Requisition.
Set up Cost [Oil, Greese, clean]	XXX 200000	No. of set up / production Run.	XXX 500 [A=100; B=200; C=200]	XXX 400 per set up.
Inspection Cost [before set up]	XXX	No. of set up [Every set up require one Inspection..]	XXX	XXX
Packing.	XXX	No. of Delivery	XXX	XXX.
(b) Non Activity oriented	XXX	Any Method of Absorption	XXX	XXX

Statement of Cost

Product	A	B	C
Material	XXX	XXX	XXX
Labour	XXX		
Variable overhead.	XXX		
Overhead			
Setup Cost [Cost Per Activity x No of Activity]	XXX		
Inspection	XXX		
Stores.	XXX		
Packing	XXX		
Other.	XXX		
	XXX		

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(5) [Page 460]

Cost Pool [as per Absorption]

Overhead 51000 MHR Rate $\frac{2920}{[480+3\times200+4\times160+5\times240]}$ 17.465/Hr.

Statement of Cost [As per Absorption].

	A	B	C	D	Total
Material	2400 [10x240]	4000 [20x200]	4800 [30x160]	9600 [40x240]	
Labour	12000 [50x240]	12000 [60x200]	11200 [70x160]	19200 [80x240]	
Overhead	[17.465x480] 8383.2	10479 [17.465x600]	11,177.6 [17.465x640]	20958 [17.465x 5 x 240]	51000
	22783.2	26479	27177.6	49758	~~51000~~

Cost Pool (As per ABC)

Overhead	Amt	Activity	No. of Activity	Cost/Activity
Set up Cost	10000	No. of setup	42 [12+10+8+12]	238.09
Store	7000	No. of Requisition	80 [20+20+20+20]	87.5
Inspection	4000	No. of set up	42 [12+10+8+12]	95.238
Output handling Dispatch	10000	No. of order	84 [24+20+16+24]	119.04
Machine oriented	20000	Machine Hours	2920 [480+600+640+1200]	6.849

Cost sheet [As Per ABC]

	A	B	C	D	
Material	2400	4000	4800	9600	20800
Labour	12000	12000	11200	19200	54400
Setup Cost	2857.08 [238.09 x 12]	2380.9 [238.09x10]	1904.72 [238.09x8]	2857.08 [238.09x12]	10000
Store	1750 [87.5x20]	1750	1750	1750	7000
Inspection	1143 [95.23x12]	952 [95.23x10]	762 [95.23x8]	1143 [95.23x12]	4000
Output Handling	2857	2381	1905	2857	10000
Machine Cost	3288	4110	4383	8219	20000
	26295	27574	26705	45626	126200

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Working (1) No. of Set Per Product

20 unit —— setup time - 1 time.

No. of setup.

A = $\frac{240}{20}$ = 12

B = $\frac{200}{20}$ = 10

C = $\frac{160}{20}$ = 8

D = $\frac{240}{20}$ = 12

42

(2) No. of Requisition for each Product

A = 20

B = 20

C = 20

D = 20

80 —— 7000.

∴ 1 —— $\frac{7000}{80}$ = 87.5.

(3) No of Production Run for each Product

A = $\frac{240}{20}$ = 12.

B = $\frac{200}{20}$ = 10

C = $\frac{160}{20}$ = 8

D = $\frac{240}{20}$ = 12.

42

(4) No. of order for each Production

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Statement of Differences

	A	b	C	D.	Total
Total Cost (Absorption)	22784	26479	27178	49759.	126200
Total Cost (ABC)	26295	27574	26705.	45626.	12600
Excess Cost in ABC	3511	1095	-473	-4133	Nill

Product A & b have higher burden of Cost in ABC System ~~because~~ / as Compared to Absorbtion because A & b Consumes higher ~~Value~~ volume of activity as Compared to Machine Hours. While C & D Consumes low activity as Compared to Machine Hours resulting low Cost in ABC.

(13) [Page-468] Working

	Present	Budgeted.	
ATM services	700000	800000	
Computer Processing	500000	1000000	[250000+250000 x3]
Issuing Statement	1800000	2000000.	[1800000 + 100000 +100000]
Customer Inquiry	200000	3600000	[200000 x 1·80]

Cost Pool (As per ABC)

Overhead.	Amt	Activity	No. of Activity	Cost / Activity.
ATM Expenses	800000	No. of ATM Transaction.	200000 [150000 + 0 + 50000]	4/ Per ATM Transaction
Computer Processing	1000000	No. of Computer Transaction.	20,00,000 [1500000+200000+300000]	0.5/ Per Transaction
Issuing Statement	2000000	No. of statement	500000 [350000+50000+100000]	4/ Per Statement
Customer Inquiries	360000	Telephone Minutes	720000 [360000+180000+180000]	0.5/ Per Mint.

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Cost sheet (As per ABC).

	Deposit	Loan	Credit Card	Total.
ATM Expenses.	600000	—	200000	800000
	[150000x4]		[50000x4]	
Computer Processing	750000	100000	150000	1000000
	[1500000x0.5]	[200000x0.5]	[300000x0.5]	
Issuing Statement	1400000	200000	400000	2000000.
	[350000x4]	[50000x4]	[100000x4]	
Customer Inquiries	[360000x0.5]	90000	90000	360000
	180000	[180000x0.5]	[180000x0.5]	
Total Cost (A)	2930000	390000	840000	4160000
No. of Accounts (B)	58600	13000	14000	
Cost Per Account (A/B)	50.	300	60.	

(7) [Page-462] (#) Inspection Quality = Inspection Setup -'

(#) Quality Inspection = Quality check of Production. ie Warehouse

Cost Pool (As Per Absorption).

Overhead. 2100000 Labour Hour. 40000 Hrs. 52.5./Labour Hour.

[P=960, Q=100 & ....]

Statement of Cost [as Per Absorption]

	P	Q	Total
Material.	6000	4000.	10000
Labour.	5760 [960x6]	600 [100x6]	6360
Overhead.	50400 [960x52.5]	5250 [52.5x100]	55650
	62160	9850	72010

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Working Technical staff salary.

	Total	Machine Maintainace	Setup	~~Cht~~ Quality Inspect
(1) Tech. staff salary	600000	180000	240000	180000.

(2) Machine Maintainance		Stores	Production	Warehouse
Existing	200000	20%	80%	—
Technical staff.	180000			
	380000			
Machine operation	+ 1000000			
	1380000	276000	11,04000	—

Cost Pool. (ABC)

	Amt	Activity	No. of Activity	Cost/Activity
Store	576000. [276000+300000]	Direct Material Consignment Receive.	1000 [10+20+.....]	576/Consignment
Production	1344000 [240000+11,04000]	Prod. set up	2000. [20+30+...]	672/setup.
Ware House	180000	Quality Inspection	500 [30+10+.....]	360/Inspection.
	[2100000			

Statement of Cost [As per ABC]

	P	Q	Total
Material	6000	4000	
Labour.	5760	610	
Store	5760 [576x10]	11520 [576x20]	
Production	13440 [672x20]	20160 [672x30]	
Ware House.	10800 [360x30]	3600 [360x10]	
	41760	39880	

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Statement of Sales Value
[Order]

		[3000 unit]
Material.		10000.
Labour.	[400 Hrs x 6/Hr]	2400.
Production Run.	~~[...]~~ [672 x 10]	6720
Store	[576 x 30]	17280
Warehouse	[360 x 20]	720
Design Cost	$\left[\frac{60000}{2400} \times 300\right]$	7500
	Total Cost.	51,100
	+ Mark up [20% of 51100]	10,220
	Sales ⇒	61320

(2) [Page 457]

Statement of overhead
[ABC]

Overhead	Total	Fixed (40%)	Variable (60%)
Equipment Operation expenses	100000	40000	60000
Equipment Maintenance expenses	20000	8000	12000
Wages to Technician	80000	32000	48000.
Wages to store Men	40000	16000	24000
Wages to Dispatch staff	60000	24000	36000
		120000	180000

Fixed overhead

	Equipment	Production	Stores	Quality and warehouse	Dispatch
Technicians wages. (32000)	9600 (32000x30%)	12800 (32000x40%)	—	9600 (32000x30%)	—
Equipment Maint. Fixed exp.					
Technician Staff 9600					
Existing 8000					
Equip. Operation 40000					
57600	—	40320 (70%)	8640 (15%)	—	8640 (15%)
Wages to store items	—	—	16000.	—	—
Wages to dispatch staff	—	—	—	—	24000.
120000		53120	24640	9600	32640

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Cost Pool [ABC]

Fixed O/H		Activity	No. of Activity	Cost / Activity
Production	53120	No of setup	1000 [10+20+ ...]	53.120 / setup
Store	24640	No. of Material received	2000 [10+20 ...]	12.32 / Consignment
Warehouse	9600	No. of Quality Inspection	500 [10+30+ ...]	19.2 / Inspection
Dispatch	32640	No. of order	400 [20+10+ ...]	81.6 / order
Variable O/H				
50%	90000	Labour Hrs	2000 [25+100+ ...]	45 / LHr
50%	90000	Quality Inspection	500 [10+30+ ...]	180 / Inspection
	300000			

Statement of Cost [ABC].

(8)
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Statement of Machine Hour

Department	x	Y	Total
Setup	470	900	1370
Supervision	1200	1200	2400
Machines	10800	9000	19800
Purchasing (15:15)	2220	2220	4440
Warehouse & Dispatch (18:15)	1690	1410	3100
Power Plant (90:75)	1800	1500	3300
Total Cost	18180	16230	34410
Machines Hour	900	750	
Overhead/Hr	20.2	21.64	

Product Cost Statement

	A	B	C	D
Material	10000	5000	10000	5000
Labour	3000	4000	5000	1000
Overhead	10100	8080	10820	5410
	[1000×0.5×20.2]	[800×0.5×20.2]	[1000×0.5×21.64]	[500×0.5×21.64]
	23100	17080	23820	11410

Cost Pool [ABC]

Overhead	Amt	~~No. of~~ Activity	No. of Activity	Cost/Activity
Setup overhead	1370	Setup Hours	137 [15+32+10+80]	10/setup Hrs
Machines	19800	Machines Hrs	1650 (500+400+500+250)	12/MHr
Order Processing	2840	No. of order	110 (10+20+20+60)	25.82/order
Finished Goods Storage	5600	Avg. Holding of FG	400 (0+100+100+200)	14/Holding unit
Dispatch	4800	No. of Delivery	300 (10+40+50+200)	16/Delivery

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Working Note

	A	B	C	D
Lot size	100	50	100	25
Qty	1000	800	1000	500
No. of Lot	10	16.	10	20
Hrs/setup	1.5.	2.	1	4
Set up Hours	15 hr	32 hr	10 hr	80 hr

Statement of Cost [ABC].

	A	B	C	D	Total
Material.	10000	5000	10000	5000	30000
Labour	3000	4000	3000	1000	11000
Overhead					
Setup OH.	150	320	100	800	1370
Machines.	6000	4800	6000	3000	19800
Order Processing	258	516	516	1550	2840
Finished Goods.	–	1400	1400	2800	5600
Dispatch.	160	640	800	3200	4800
	19568	16676	21816	17350	75410

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(18) [Page 473] Cost Driver :- Allocation base with the help of which Cost Could be assigned to product like Rent → Area

Setup Cost → No of setup

Depreciation → Cost of Machine.

Statement of Fixed Cost [let No. of setup be x]

Particulars	Present	Changed
Setup Cost [42 × 450]	18900	[450 − 90]x
Engineering [500 × 10]	5000	4220 [422 × 10]
Others	72,100	72100
Total ⟹	96000	76320 + 360x

(i) In order to break even

Contribution = Fixed Cost ∴

$76320 + 360x = 5 \times \underset{\text{Unit}}{1008} \times x$

$360x + 76320 = 5040x$

$5040x - 360x = 76320$

$4680x = 76320$

$x = 16.30$ Run

i.e., 17 setup required.

Qty = 17 Run × 1008 unit = 17136 unit.

(ii) We should analysed other fixed Cost i.e, 72100 into Activity oriented to have true Cost of these/each product and correct decision could be analysed.

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xyz

Purchase & sales
- Mail order
  - Post 10%
  - Telephone - 20%
  - Internet - 70%
- Retail outlet
  - Department 50
  - Own shop. 10

Gross Profit = 40% of cost.

Statement of Profit

	Department store	Own shops
Sales	50 000	100 000
Less Purchase	35714	71428
Gross Profit	14286 $\left[\frac{40}{140}\times 5000\right]$	28572 $\left[\frac{40}{140}\times 100000\right]$
Less:- Expenses		
Telephone	600 [15x40]	5250 [15x350]
Sales visit	500 [250x2]	1000 [250x4]
Shop order	500 [20x25]	3000 [20x150]
Packaging	2800 [100x28]	15000 [100x150]
Delivery	4200 [150x28]	22500 [150x150]
Rental	—	300000
	5686	-318178
	x 50	x 10
Net Profit/(loss)	284300	(31,81780)

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Statement of Profit (Mail).

	Post	Telephone	Internet
Sales Revenue.	1600000	4800000	2,24,00,000
	[200×8000]	[300×16000]	[400×56000]
Less:- Purchase	11,42,857	34,28,571	1,60,00,000
Gross Profit	4,57143	13,71,429	64,00,000
	[$\frac{40}{140}$×1600000]	[$\frac{40}{140}$×4800000]	[$\frac{40}{140}$×2,2400000]
Less:- Processing Mail order.	[5×8000] 40000	[6×16000] 96000	[3×56000] 168000
Dealing of Mail order	[4×8000] 32000	[4×16000] 64000	[1×56000] 56000
Packaging	[2×8000×10] 160000	[2×16000×10] 3,20000	[1×56000×10] 560000
Internet	—	—	80000
Profit	225,143.	891,429	5534000

(6) [Page 46]

Working (1)

Basic budgeted Information

	x	y	z
1 Cubic Meter	1	2	3
Cubic Meter	1000	2000	3000
Packaging Ratio	1000	4000	9000.
∴ Packaging Material	100000	400000	900000
	[1400000×$\frac{10}{140}$]	[1400000×$\frac{40}{140}$]	[1400000×$\frac{90}{140}$]

	Receipts	Storage
Labour.	[300000×30%] = 90000	[300000×70%] 210000
Overtime	[10000×50%] = 5000	[10000×50%] = 5000
Occupancy	[200000×40%] = 80000	[200000×60%] = 120000.
Administrative & Mgt.	[20000×40%] = 8000	[20000×60%] = 12000.
	183000	347000
x	10×1000 = 10000 [$\frac{10}{40}$×183000] = ~~45750~~	10000. ~~86750~~ [$\frac{1}{4}$×347000]
y	20×2000 = 20000 ~~45750~~	20000 86750 "
z	20×3000 = 60000 [~~$\frac{20}{40}$×183000~~] ~~91500~~	60000. 173500 [$\frac{2}{4}$×347000]
	90000	9000
	∴ Cost/Unit = 0.203	~~38.5~~ 3.88

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① Basic Budget Information

a) Packaging = 1:4:9

b) Others = 1:2:3. (Ratio of output)

② Additional Information

a) Packaging = 1:4:9

b) Others = Receipt : ~~Oth~~ Store.
↓ Product ↓ Product.

Statement of Budgeted Cost
[Only Basic budgeted Information is to be used]

	X ltd	Y ltd	Z ltd
Packaging [1:4:9] [W.N#1]	100000	400000	900000
Others [5.3 lakh] in [1:2:3]	88333	1,76,667	2,65,000
Total Cost (A)	1,88,333	5,76,667	11,16,500
Qty (B)	10000	20000	30000
Cost / Cubic Metre [A/B]	18.83	28.83	38.83

Statement of Budgeted Cost
[Addition Information is to be used]

	X ltd	Y ltd	Z ltd
Packaging (W.N#1)	100000	400000	900000.
Others [W.N#2]			
Receipt of Inspection	20333 ~~45750~~ [0.203×10000]	~~40667~~ ~~45750~~ [0.203×20000]	~~1,22,000~~ ~~91500~~ [0.203×30000]
Storage.	38500 [3.85×10000]	77000 [3.85×20000]	115500. [3.85×30000]
Total Cost (A)	~~233500~~ 158,833	~~533500~~ 517667	~~11,65500~~ 1137500
Qty (B)	10,000	20000	30000
Cost/cubic Meter.	~~23.35~~ 15.883 15.8833	~~26.675~~ 25.88335	~~38.83~~. 37.916

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(4) Page-459 [(a)-1] **Cost Pool**

Overhead	18,48 000	Direct labour Hr	~~88000~~ 88 000 [40000+40000+8000]	21 | Labour Hr.

[a-2] **Cost Pool**

Receipts	435000	No. of Receipts	270. [15+35+220]	1611.11 | Receipts
Others	1413000	Machine Hour	76000. [40000+20000+16000]	18.59 / MHr.

(b) **Cost Pool [ABC]**

Set up Cost	30000	No. of setup.	30 [3+7+20]	1000 | set up.
Machine	7,60,00	MHr	76000 [40000+20000+16000]	10 | Per MHr.
Receiving	435000	No. of Receipts	270 [15+35+220]	1611.11 | Receipts
Packing	250000	No. of Delivery	32 [9+3+20]	7812.5 | Delivery
Engineering [Design]	373000	No. of order. [∵ Every order has its Design]	50 [15+10+25]	7460 | order.

[a-1] **Statement of Cost**

	x	Y	Z	Total
Material.	3750000 [30000x5x25]	2000000 [20000x5x20]	968000 [8000x11x11]	6718000.
Labour.	[30000x1.3x8] 320000	480000 [20000x2x12]	48000 [8000x1x6]	848000.
Overhead.	840000 [21x40000]	[21x40000] 840000	168000 [21x8000]	1848000 [21x8000]
	4910000	3320000	1184000	94,14,000

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[Q-2]

Statement of Cost

	x	Y	Z	Total
Material	3750000	2050000	968000	6718000
Labour	320000	480000	48000	848000
Overhead				
Receipts	24167 [1611.11x15]	56389 [1611.11x35]	354,444 [1611.11x220]	435000
Others	7,43,684 [18.592x40000]	3,71,842 [18.592x20000]	2,97,474 [18.592x16000]	1413000
	48,37,851	29,08,231	16,67,918	94,14,000

(b) Statement of Cost

	x	Y	Z	Total
Material	3750000	2050000	968000	67,18000
Labour.	320000	480000	48000	848000
Overhead				
Setup				30000
Receiving				435000
Machine				760000
Packaging				250000
Engineering.				373000

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Cost Pool

Making	Amt (₹)	Basis	No. of Activity	Cost/Activity
Variable	350000	Time base	42000	8.33/mint
Avoidable FC	84000	Time base	42000	2/mint
Unavoidable f.c.	126000.	Time base.	42000	3/mint.
			[26250+15750]	

Working Total Hr

	Making	Packing	
V_4 (5000 unit)	26250 [5.25x5000]	30000 [6x5000]	final
V_2 (3000 unit)	15750 [5.25x3000]	12000 [4x3000]	final.
	42000	42000	

~~Making~~ Packing	Amt	Basis	No. of Activity	Cost/Activity
Variable	280000	Time based	42000	6.66/mint
Avoidable f.O	56000	"	42000	1.33/mint.
Unavoidable f.o.	84000	"	42000	2/mint.
			[30000+12000]	

working

Statement of Cost

	V_4	V_2	Total
Relevant Cost			
Material	400000 [80x5000]	240000 [80x3000]	640000
Variable Conversion Cost (Making)	218750 [8.33x26250]	131250 [8.33x15750]	
Avoidable fixed Cost [Making]	52500 [2x26250]	31500 [2x15750]	
Avoidable fixed Cost [Packaging]	40000 [1.33x30000]	16000 [1.33x12000]	
Avoidable conv. Cost (Packing)	200000 [6.66x30000]	80000 [6.66x12000]	
	911250	498750.	
Not Relevant Cost			
Un Avoidable f.c (Making)	78750 [3x26250]	47250 [3x15750]	
Un Avoidable fc (Packing)	60000 [2x30000]	24000 [2x12000]	
	138750	71,250	
	1050000.	570000	
Per unit =	210	190.	

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Statement of Profit

		V_4	V_2
	Sales	10 00 000 [5000x200]	600 000. [3000x200]
(-)	Relevant Cost	911250	498750.
	Benefit	88750	101250.
(-)	Not Relevant Cost	(138750)	(71250)
	Profit	(50 000)	30000

Comment: We should not discontinue V_4 product just on the basis of loss Amt. because (a) Unavoidable F.C. ~~are~~ will continue to occur, Hence Decision should be taken only on the basis of benefit amt & both Product have positive Benefit

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(3) [Pg-938]

Cost Pool (Absorption).

	Amt	Activity	No of Activity	Cost/Activity
Dept-1	1150000.	LHr	183333	6.1 LHr
			[30000+80000+150000] [10000×3 + 20000×4 + 30000×5]	
Dept-II	1500000	MHr	500000	3/MHr.
	2650000		[40000+80000+210000] [10000×4]+[20000×4]+[30000×7]	

1) Over Recovery of Department -I

2) Under Recovery of Department II

Statement of Cost

	A	B	C	Total
Material.	500000	800000	900000	2200000
Labour.	300000	800000	1500000	2600000.
Overhead				
Dept-1	180000 [6×30000]	480000 [6×80000]	900000 [6×150000]	1560000
Dept-II	120000 [3×40000]	240000 [3×80000]	630000 [3×210000].	9,90,000
	1100000	23,20,000	3930000	73,50,000

Cost Pool (ABC)

	Amt	Activity	No. of Activity	Cost/Activity.
Receiving/Inspection	1400000	No of Purchase Requisition	5000 (1200+1800+2000)	280/Requisition
Production Scheduling & Machine setup.	1200000	No. of setup.	800 (240+260+300)	1500/setup.
	2600000			

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Statement Cost Sheet (ABC)

	A	B	C	Total
Material	500000	800000	900000	2200000.
Labour	300000	800000	1500000	2600000.
Overhead				
Receiving/Inspection	336000 [280X1200]	504000 [280X1800]	560000 [280X2000]	1400000
Production/Setup of Mach.	360000 [1500X240]	390000 [1500X260]	450000 [1500X300]	1200000
	1496000	2494000	3410000	7400000

NO Over/Under Recovery in ABC because Budgeted Activity for Actual O/H becomes equal to Total Budgeted Activity.

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(14) Pg. 469

Statement of Cost Benefit

Revenue (2000X20)	40000
less:- Relevant Cost	
Material (2000X3)	6000
Labour (400X7)	2800.
Set-up	
Fixed (₹50 X 100 Hr)	5000
Variable (₹8X25Hr)	200.
Machining Fixed	
Variable (4000X1)	4000.
Net Benefits =	22000

Working Note / For 25 Hours, we will have to manage 100 Hr block @ 50/Hr i.e ₹50/Hr X 100 Hr. = ₹5000

If we acquired/accept the offer, Present Income will increase by 22000 & It's better to accept the offer.

(b) If we had 50 Hrs of unused setup, for accepting the offer there is no need to manage extra 100 Hr block. Hence Fixed Cost would have been sunk or irrelevant. resulting Net Benefit from offer = (22000 + 5000) = 27000 Ans

DATE

Direct Product Profitability :- D.P.P

Value Chain

Company

⇓ (Purchase)

Warehouse (Stores)

⇓

↓ ↓ ↓ ↓ ↓

Super Market shops eg big bazar.

⇓

Customer

If a Company purchase different products & stores these products in warehouse & then from warehouse such Goods transferred to different Shop, Management would like to know the profitability from each product. This system is known as Direct Product Profitability. (DPP)

Points should be Considered

1) Capacity of 1 (one) Warehouse is always equal to Capacity of all shop (eg big bazar)

2) All Common expenditure of warehouse should be apportioned on the basis of = [Space occupied X Multiplied by Time usage] i.e,
[Space occupied by Particular Product X Time usage of that Product in warehouse]

(3) For Refridgerated product, Expenditure related to refridgerator. (eg:- Refridgerator's Dep^n, Maintenance, Power, Salary, Rent etc.) product should be apportioned only Refridgerated product and not for all.

(4) For individual Profitability, Ignore Head office expenses i.e Facility Cost.

DATE

Ware House → Common Exp. for All (Rent, salary) → Space occupied × Time

Ware House → Exp. Related to Refridgerated Product. (Only Refridgerated Product eg. Ice cream chocolate.) Space occupied × Time.

Statement of Profit

	x (Refridgerated)	Y	Z
S.P.	xx	xx	xx
(−) P.C.	xx	xx	xx
Gross Profit	xx	xx	xx
Less:- expenditure			
Ware House			
Common	xx	xx	xx
Refridgerated	xx	—	—
Shops			
Common	xx	xx	xx
Refridgerated	xx	—	—
Transport	xx	xx	xx
Profit	XX	XX	XX

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Statement of Profit

Particulars	Butter Jelly.	Fruits & Nuts	Icy Cool.
Selling Price/unit	84	42	26.
Purchase Price/unit	76	34	22
Gross Profit/unit (A)	8	8	4
Less:- Warehouse Cost	Per cubic Meter	Per cb. mtr	Per cub Mtr
Common	1·375×1=1·375	1·375×1·5= 2·0625	1·375×0·5=0·6875
Refridgeration Cost.	6·08×1= 6·08		6·08×0·5=3·04.
Retail Store Cost			
Common	2×1= 2	2×1·5= 3	2×0·5= 1.
Refrigration	4·36×1= 4·36	1 —	4·36×1=4·36.
Transport	76·5625	50	76·5625.
Total a	90·3775	55·0625	85·~~6495~~ 65
Unit/Cb.mtr. b	42×300=12600	28×144= 4032	40×72= 2880.
Cost/unit - a/b=(L)	0·007172817416	0·01365637	0·02973958333
Profit/unit (A-L)	7·99283	7·98634	3·9702604
Sale (unit) II	18000	4608	1152.
Profit for Month [I×II]	1,43,871	36,801	4574.

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Working Note (1) Warehouse

(#) Common PIM

Labour & staff	27000
Material Handling	28000
	55000

Capacity of Warehouse = 40000 cb. mtr i.e. also the Capacity of Shop.

Cost / cb. mtr for month = $\frac{55000}{40000}$ = 1.375 / cb. mtr / Month.

(#) Refrigeration Cost 152000

Capacity of Refrigerator. 25000 cb. Metre.

Refrigeration Cost / cb Mtr for month $\frac{152000}{25000}$ = 6.08 / cb mtr / Month.

(2) Retail Stores

Common

Labour	33000
Other	47000
	80000

Capacity of Retail shops 40000 cb. mtr

Cost / cb Mtr / Month = 2 / cb. mtr / month.

Refrigeration Cost

Cost	109000
Capacity	25000

Cost / cb mtr / month = 4.36 / cb mtr / Month

(3) Transport

Normal Van = 3200

Capacity 64 cb. Mtr

∴ Cost / cb. Mtr / trip 50 / cb. Mtr / ~~month~~ period trip

Refrigerated Van = 4900.

Capacity. 64

Cost / cb / Mtr = 76.5625 / cb Mtr / trip.

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Statement of operating Income

	Soft Drink	Fresh Produce	Packaged	Total
Sales.	7,93,500	21,00,600	12,09,900	41,04000
Less:. Cost of Goods Sold	600000	1500000	900000	3000000
Gross Profit	1,93500	600600	3,09,900	11,04000
Support Cost [@ 30% of CoGS]	180000	450000	2,70000	900000
Operating Income	13500	1,50,600	39,900	2,04000
Operating Income as % of sale.	1.70%	7.16%	3.29%	

30%

Statement of Operating Income (ABC)

	Soft Drink	Fresh Produce	Packaged	Total
Sales.	7,93500	21,00,600	12,09,900	40,04000
Less:- CoGS.	600000	1500000	900000	30,00000
Gross Profit	193500	6,00600	3,09,900	11,04000
Less:- Support Cost				
Cost of Bottle Returned.	12000	—	—	12000
Ordering Cost	[100X360]=36000	[100X840]=84000	[100X360]=36000	156000
Delivery Cost $\left[\frac{252000}{3150}=80\right]$	[80X300]=24000	[80X2190]=175200	[80X660]=52800	252000
Shelf-Stocking Cost $\left[\frac{172800}{8640}\right]=20$	[20X540]=10800	[20X5400]=108000	[20X2700]=5400	172800
Customer Support $\left[\frac{307200}{1536000}\right]=0.2$	[0.2X126000]=25200	[0.2X11.04000]=220800	[0.2X306000]=61200	3,07,200.
Profit =	85500	12600	105900	2,04,000.
% of Sales	10.77%	0.6%	8.75%	

Comment :- Soft Drink Product line Provides higher Income i.e, 10.77% of sales in ABC as Compare to other / Traditional Method. Hence We should Promote Soft Drink Product line.

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(#) **Customer Profitability** :- If we have Different group of Customer(s), we should select the Customer or Customer group who provides the higher Benefit.

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Statement of Customer Profitability

	A	B	C	D
Income				
Interest @ 9%	6000×9% = 540	Nill	2000×9% = 180	100×9% = 9
Commission (1·5%)	80000×1·5% = 1200	26000×1·5% = 390	34000×1·5% = 510	8000×1·5% = 120
Annual fees	50	Nill	50	Nill.
Total (A)	1790	390	740.	129
Expenses				
Customer Transaction	800×0·5 = 400	520×0·5 = 260	272×0·5 = 136	200×0·5 = 100.
Enquiry Cost	6×5 = 30	12×5 = 60	8×5 = 40.	2×5 = 10.
Annual Cost	108	108	108	108.
Replacing Card Cost	—	2×120 = 240	1×120 = 120	Nill.
Total (B)	538	~~568~~ 668	404	218.
Income (A−B)	1252	(278)	336.	(89)

(ii) Customer Profile

Particulars	Profitable	Non Profitable.
Annual Purchase	Higher Amt	Lower Amt.
Transaction	Low	High.
Average Outstanding balance	Higher	Lower.

(24) [Page-478]

Statement of Present Customer Profitability.
(ABC)

Group	W	X	Y	Z	Total
Contribution	500000	900000	1400000	2500000	5300000
Less:- Support Cost					
Telephone Enquiries [20:15:22:30]	2,29,885	172,414	2,52,874	3,44,827	10,00,000
Statement Prepared [1:1:2:4]	31250	31250	62500	1,25000	2,50000
Client Meeting [6p:10:11:20]	2,23,404	3,72,340	409,574	7,44,682	1750000
Profit =	15,461	323996	6,75,052	12,85,491	23,00,000

Overall Profit 2300000
Less:- Facility Cost 10,00,000
Net Profit ⟹ 1300000

II Proposal - I

Group-Y	Rate	Expected	Group-Z	Rate	Expected
2250	0.3	= 675	2500	0.2	400
2500	0.4	= 1000	2200	0.5	1100
2750	0.3	= 825	2500	0.3	750
		2500			2250

Net Benefits 843815 $\left[675052 \times \frac{2500}{2000}\right]$ $\left[\frac{1285491}{1800} \times 2250\right]$ 16,06,864

Total Benefits = 2450679
Less:- Facility Cost [1000000 × 1.1] 11 00 000
13,50,679

Proposal - II

	Y	Z
Present Customers.	2000	1800.
Increase in Proposal I.	500	450
Increase in Proposal II:	125	112.5.
	[500 - 75% of 500]	[450 - 75% of 450]
No. of Customers in Proposal	2125	1912.5

Benefit: x 323996
Y 717243: $\left[675052 \times \frac{2125}{2000}\right]$
Z 13,65,834 $\left[12,85\,491 \times \frac{1912.5}{1800}\right]$
24 07,073
Facility Cost (-). (0 80 000)
13 27,073

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Statement of Profit (Per Procedure)

	Hip	Knee	Shoulder
Revenue	8000	10000	6000
(-) Cost			
Cost of Medical supply	400	200	300.
Surgeon fees	1200	1800	1500
Follow up [8% of 300]	24 [8% of 300]	15 [300×5%]	30 [300×10%]
Support Cost.	5200 [8000×65%)	6500 (10000×65%)	3900 (6000×65%)
Profit ⇒	1176	1485	270

Working Hip = 8000×600 = 4800000

Knee = 10000×800 = 8000000

Shoulder = 6000×400 = 2400000

1,52,00000

% of Support Cost = $\frac{9880000}{15200000} \times 100 = 65\%$

Statement of Profit (ABC) [Per Procedure]

	Hip	Knee	Shoulder
Revenue	8000	10000	6000
Cost: Cost of Medical Supply	400	200	300
Surgeon fees	1200	1800	1500
Follow up.	24	15	30
Support Cost			
Theatre Preparation	$\frac{720\times 500}{600}$ = 360	$[\frac{720\times 800}{800}]$ = 720	$[\frac{720\times 100}{400}]$ = 180
Operating Theatre [1200: 960: 600]	$\frac{525\times 1200}{600}$ = 1050	$[\frac{525\times 960}{800}]$ = 630	$[\frac{525\times 600}{400}]$ = 787.5
Nursing & Ancillary service.	$[1428.42\times\frac{1600}{800}]$ = 2856.84	$1428.42\times\frac{1600}{800}$ = 2856.84	$[1428.42\times\frac{400}{400}]$ = 1428.42.
Administration	$[0.08\times\frac{48L}{600}]$ = 640.	$[0.08\times\frac{30L}{300}]$ = 800	$[0.08\times\frac{24L}{400}]$ = 480
Other.	512.78	512.78	512.78.
	(472.04)	2465.38	781.30.

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Cost Pool

Overhead	Amt	Activity	No. of Activity	Amt / Activity
Theatre Preparation	864000	No. of Theas Preparation	1200 $\left[\frac{600}{2}+\frac{800}{1}+\frac{400}{4}\right]$ $[300+800+100]$	720
Operating Theatre	14,49,000	Procedure Time	2760 Hr $[(600\times2)+(800\times1.2)+(400\times1.5)]$	525
Nursing & Ancillary	5428000	~~Sales Revenue~~ No. of Patient Days	3800 $(3\times600)+(2\times800)+(1\times400)$	1428.42
Administration	12,16,000	Sales Revenue	1,52,00,000 $[48L+80L+24L]$	0.08
Other overhead	923000	No. of Procedure	1800 $(600+800+400)$	512.78

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DATE

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Input : 100000 kg
loss (10%) 10000 kg

Output of Factory Process 90000
Normal loss (5%) 4500
Output 85500
Supplier 10000 kg
Customer 85500 kg.

Statement of Ranking

	x	y	z	z.
Qty	60000 kg	80000 kg	10000 kg	100000 kg
Purchase/kg	5	5.60	5.80	5.30
+ Transport	0.30	0.25	0.25	0.25
	5.30	5.85	6.05	5.55

Option-I
Total Cost if Purchase from 'Z'
= 5.55 X 100000 kg = 5,55000

Option-II
x = 60000 kg @ 5.30 = 318000
y = 40000 kg @ 5.85 = 2,34000
552000

Better to select - II. i.e. 552000

Statement of Comparative Results.

Re	A	B	C
	Per kg	Per kg	Per kg
Revenue	32.50	32.	30.90
Less:- Discount @ 2%	0.65	0.64	—
Less: Transport Cost	0.65	0.36	—
	31.20	31	30.90

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Option-I

C = 85500 kg x 30.9 = 26,41,950

Option-II

A = 40000 kg = 31.20 = 12,48000

B = 45500 kg = 31 = 14,10500

26,58,500

Less:- Transportation cost = 18000 [1500x12]

Net Revenue = 26,40,500

∴ Option-I is better.

Statement of Profit

Factory	Input	Cost (₹)
Raw Material.	100000	552000
wages.		600000
Overhead		2,28000
Transportation		100000
		1480000
Less:- Normal loss	10000	40000
Output =	90000.	1440000
II Finishing		
Input	90000	1440000
wages		550000
overhead		422900
	90000	24,12,900
(-) Normal loss	4500	36000
Output	85500	2376900
Sale	85500	2641,950
	Profit =	2,65,050

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Statement of Profit [Per Machine]

	Small	Medium	Large
Revenue	[60000X0.03]= 1800	[120000X0.04] = 4800	[180000X0.05] = 9000.
Less:- Labour Cost	60X(4+1)= 300	80X(6H) = 560	100X(12+2) = 1400
Cost of Part	100X5= 500	300X7= 2100	400X14= 5600
Support Cost [@17.97% of R]	323.46	862.56	1617.3.
	676.54	1277.44	382.7

Support Cost = 1596000

Revenue: Small - 1800X300 = 540000

Medium = 4800X800 = 3840000

Large = 9000X500 = 4500000

88,80000

Support Cost as % of Revenue = $\frac{1596000}{8880000} \times 100 = 17.97\%$..

Statement of Profit [ABC]

	Small	Medium	Large
Revenue	1800X300= 540000	4800X800 = 3840000	9000X500 = 4500000
Less:- Cost of Parts.	100X(4+1)X300= 150000	300X7X800 = 1680000	400X14X500 = 2800000
Labour Cost.	60X5X300= 90000	80X7X800 = 448000	100X14X500 = 700000.
Customer Account Handling	157.5X150= 23625	157.5X400 = 63000	157.5X250 = 39375
Planned Maintainance	40X1200= 48000	40X4800 = 192000	40X6000 = 240000
Unplanned Maintainance	70X300= 21000	70X800 = 56000	70X1000 = 70000
Spare Part Procurement	90X500= 45000	90X1200 = 108000	90X1000 = 90000
Other overhead.	375X300 = 112500	375X800 = 300000	375X500 = 187500.
Profit.	49875	993000	373125
No. of Machine	300	800	500.
Profit/Machine	166.25	1241.25	746.25.

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Cost Pool

Overhead	Amt	Activity	No. of Activity	Amt/Activity
Customer A/c Handling	126000	No. of Customers	800 [150+400+250]	157.5
Planned Maintenance	480000	No. of Planned Maintenance visit	12000 [(4×300)+(6×800)+(12×500)] 1200 + 4800 + 6000	40.
Unplanned Maintenance	147000	No. of Unplanned visit	2100 [(1×300)+(1×800)+(2×500)] [300 + 800 + 1000]	70.
Spare Part Procurement	243000	No. of Purchase orders.	2700 (500 + 1200 + 1000)	90.
Total other Overhead.	600000	No. of Machines.	1600 [300+800+500]	375

Developement in Business Environment

Chapter 10

DATE

(#) Just in Time
(#) Total Quantity Management (TQM)
(#) Target Costing
(#) Theory of Constraint

Just In Time (JIT) :- In Perfect Competetion, its not possible to control over selling Price. Hence in order to maintain adequate Profit, we should reduce our Non Value added Cost like Storage Cost, for this purpose, we should select the supplier who agrees to supply the material as & when required. In this system material received from Supplier should be directly transferred to Production Department i.e; No. requirement of Store.

In this system Inspection / Counting will be performed at Vendor's Premises.

There are some Losses / Benefits of applying this system.

⇒ **Loss**

(#) Purchase Cost ↑ ⇒ Non Availability of Bulk Discount

(#) Ordering Cost ↑ ⇒ Due to increase in No. of Order

(#) Stock out Cost ↑ ⇒

→ **Profit / Benefits**

(#) Storage Cost ↓.

(#) Interest on Working Capital released.

(#) In this system always we have a long Term agreement with Vendor to secure Price factor.

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Statement of Comparative Cost

Particular	Present	JIT
Purchase Cost	XXX	XXX ↑
Ordering Cost	XXX	XXX ↑
Stock out Cost	—	XXX ↑
Storage Cost	XXX	XXX ↓
Interest on Working Capital released (blocked in Avg. Stock)	XXX	XXX ↓
	XXXX	XXXX

Stock out Cost :- Contribution to be lost on Non fulfillment of order (Emergency order) due to Non Availability of Raw Material.

OR

Extra Cost to be paid to vendor to manage raw material to meet Rush order.

Average Stock :- ½ Order Size + Minimum Stock (if any)

DATE

(3) [Page-383]

Statement of Comparative Cost.

	Present	Just in Time
Purchase Cost	100X20000 = 2000000	110X20000 = 2200000
Ordering Cost	20 X 50 = 1000	200X50 = 10000
Storage Cost	500X45 = 22500	50X 45 = 2250.
Interest blocked on Working Capital [As opportunity cost on w.c blocked]	[50000X20%] = 10000	5500X20% = 1100.
Stock out Cost	—	100X30 = 3000.
Relevant Cost.	20,33,500	22,16,350.

Working

	Present	JIT
Annual Requirement	20000	20000
No. of orders	20	200
Order size	1000	100.
Average Stock	½ x order size = ½X1000 = 500 unit	½X 100 = 50 unit
Working Capital blocked	50000 [500X100]	5500. (50X110)

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Statement of Comparative Cost.

	Just in Time
Benefits	
Worker's salary. [2X3000X12]	72000
Interest on Released Working Capital [2000000X 20%]	400000.
Rental Saving	30000
Taxes & Insurance	20000
(A)	5,22,000.
Losses	
Stock out Cost	400000.
Cash Operating Cost	48000.
Interest on Capital expenditure blocked.	120000.
	568,000
Net Saving/(loss) in 1st Year.	(46000)

classmate but from 2nd Year. Net saving = 354000 [400000 - 46000]
because. Stock out Cost is only in 1st Year.

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We should introduce Just in Time system although Company will have to suffer loss in the 1st year only, in subsequent year the said loss will be recovered/covered. from every year benefit of 354000.

(4) Page-383 Mr. Smith is Correct in his view due to the following reasons.

1) The main requirement of application of JIT is "to procure the raw material in requisite ~~quantity~~ quantity & as and when required"

2) The Qty would be in smaller lot.

3) Delivery may be ~~in~~ so many times in a day/every day.

4) but existing supplier reluctant for this as they agree to provide material Qty on Monday, in thousand (not in smaller lot). Hence its very difficult to apply JIT in present scenario.

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Statement of stock [Plan-1]

Period	1	2	3	4
Opening stock	—	81500	8500	7500
Produce	17500	17500	17500	17500
Sale	9500	17000	18500	25000
Closing stock	8000	8500	7500	Nill
Holding Cost @ 6.5 of Avg stock	28000 $\left[6.5\times\left(\frac{0+8000}{2}\right)\right]$	53625 $\left[6.5\left(\frac{8000+8500}{2}\right)\right]$	52000 $\left[6.5\left(\frac{8500+7500}{2}\right)\right]$	24375 $\left[6.5\left(\frac{7500+0}{2}\right)\right]$
Variable Cost	5,25000 [17500x30]	5,25000 [17500x30]	588750 [17500x33.5]	612500 [17500x35]

Total Cost = Holding Cost = 156000

Variable Cost = 22,31,250

23,87,250

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Statement of Cost [Plan-II]
Just in Time

Period	1	2	3	4
Produce/sale	9500	17000	18500	25000
Variable Cost	285000	510000	601250	875000
Capacity	18000	18000	18000	18000
Over time Premium	—	—	4875	73500
			[500X32.5X30%]	[7000x35x30%]
Total Cost	285000	510000	606125	948500

Total Cost = 23,49,625 (Plan II)

Conclusion Total Cost is Plan-I = 23,87,250
Plan-II 23,49,625
Saving in JIT = 37,625

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	Y ltd (existing)	Y ltd (JIT)	Z ltd (JIT)
Qty	13000	13000	13000
PC	140	140.02	136
Return	15%	15%	
OC.	2/order.	2	
Carrying Cost	3.10 P.u. Per year	3.10 /unit/year	3.
Order size	1000	100	
No. of order	13.	130.	
Stock out Cost	—	50X4	360X8
Inspection		—	0.05/Package
Handling Cost			2% X13000X25.

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Statement of Comparative Cost

	Y ltd (Present)	Y ltd (JIT)	Z ltd (JIT)
Qty	13000	13000	13000
Purchase Cost/unit	140	140.02	136
Total Purchase Cost	1820000	18,20,260	1768000.
Ordering Cost[(2)×1500]	2×13=26	2×130=260	2×130=260
storage Cost.	1550 [3.10×1000/2]	155 [3.10×100/2]	150. [3.00×100/2]
Opportunity Cost on Working Capital blocked.	10500 [500×140×15%]	1050.15 [50×140.02×15%]	1020. [50×136×15%]
Inspection Cost	—	—	[0.05×13000]=650
Defective Cost			[13000×2%×25]=6500.
Stock out Cost	—	50×4=200	360×8=2880
Total Cost =	18,32,076.	18,21,925.15	17,79,460.

Conclusion = order place to Z & Co..

(b) [Page 384]

Contribution from Current system = Revenue − Variable Cost

200,00,000 − 12,00,0000 = 80,00,000.

Qty 500000

∴ Contribution per unit 16

Statement of Comparative Cost.

	Present	Just in Time
Overtime Premium	—	40000
Stock out Cost	—	20000×16=320000
Warehouse Rent 1	60,000	—
Warehouse Rent 2. (Benefit to be acheived)	—	12000×3/4×1.5=(13500)
Insurance & Property Tax	10,000	—
Opportunity Cost on Working Capital blocked.	1000000.×10%=100000	—
	1,70,000	~~3,48,500~~ 346,500.

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(9) [Page-386]

Statement of Present value of Cash Inflow.

	I	II	III
Revenue Increase	800000	880000	968000
Contribution(%)	50%	50%	50%
Contribution	400000	440000	484000
Saving in Warehouse	200000	200000	200000
(-) Ordering Cost	(20000)	(20000)	(20000)
Cash Inflow before Tax.	580000	620000	664000
Tax @ 50%	290000	310000	332000
Cash inflow after Tax.	2,90000	3,10,000	3,32000.
Tax Saving due to Depⁿ	150000	150000	150000.
Net Cash Inflow	4,40,000	4,60000	4,82000
PV. factor.	0.909	0.826	0.751
PV of Net Cash Inflow.	400000	3,80,165	362135

PV of Net Cash Inflow = 11,42,300

Statement of Present Value of Cash outflow.

I

Capital Cost 900000.

Cash Inflow of Capital Receipts. (18,783) [50000 × 50% × 0.751] or $\left[\frac{50000 \times 50\%}{(1.1)^3}\right]$

PV of ~~W~~Working Capital released [W.N] (23667)

Present Value Of Cash outflow. 857550

∴ Net Present Value = 11,42300 − 857550

= 284750

W.N Any Working Capital, should be Introduce at begining & released at the end of Project & vice versa.

As per Q. Working Capital released at the end of 1year. = 150000

& Re-Introduced at end of IIIrd year. 150000.

∴ Interest for the Period. =

Y_2: 150000 × 10% × 0.826 = 12397

Y_3: 150000 × 10% × 0.751 = 11270

23,667

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DATE

Just In Time

Raw Material

Purchase as and when required

⇓

Selection of supplier

⇓

Storage / Holding ⇒ Eliminate or Reduce

Work-In Progress

Output of I process becomes Input of other. ∴ Holding of WIP should be reduced / Eliminated.

⇓

[Page - 373 of book Refer]

Finished Goods

Holding of finished Goods ∴ Reduce / Eliminate

⇓

Sale = Production

We should Produce according to Demand

Statement of Comparative Cost

	Present	Just In Time
Stock Holding Cost		
Store: Raw Material.	xx	xx
Production: WIP.	xx	xx
Warehouse: Finished Goods.	xx	xx
Opportunity Cost on Working Capital Blocked	xx	xx.
	xxx	xxx.

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(8) [Page-38] Working Note

Annual Sales = 600 Lakh.
Material = ₹ 30% of 600L = 180 L
Conversion Cost = 25% of 600 L = 150 L.

	Stock	Present	Just in Time
(A)	Raw Material	18L	3.6L (18×20%)
(B)	WIP		
	Material (100%)	180L×15% = 27L	5.4L (27×20%)
	Conversion Cost (6:5) (60%)	$27 \times \frac{5}{6}$ = 22.5×60% = 13.5L	2.7 L (13.5×20%)
		40.5	8.1 L
(C)	Finished Goods		
	Material	180×12% = 21.6L	5.4L (21.6×25%)
	Conversion (6:5)	$\left(21.6 \times \frac{5}{6}\right)$ 18L	4.5L (18×25%)
		39.6L	9.9L
	Total Holding (A+B+C)	98.1L	21.6 L

Statement of Comparative Cost.

		Present	Just In Time
Stock of Holding Cost			
Raw Material =	Variable	18000 [18L×10%]	25,200 [360000×7%
	Fixed.	200000	40000 [200000×20%]
WIP	Variable	1,35000 [27L×5%]	16200. [540000×3%]
	Fixed	2,80000	112000 [280000×40%]
Finished Goods	Variable.	79200 (39.6L×2%)	
	Fixed.	3,60,000	1,44000. [360000×40%]
			9900 [990000×1%]
Opportunity Cost of Stock Held (Interest)		196200 [98.1L×20%]	432000 [21.6L×20%]
		31,96,200	7,79,300

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(#) **Total Quality Management** We should develope a system which ensures that "All losses would be reduced / eliminated by incurring extra cost.

All Losses = All Normal loss as well as Abnormal loss.

Losses eg:- 1) Storage loss due to Improper handling, Material received could not be entirely transferred to production Department.

2) Process loss :- Loss of input due to break Down policy

3) Loss of finished Goods : Due to break Down Policy

Extra Cost :- Preventive Maintainance Cost i.e All parts of Machine should be replaced at the expiry of their theoritical life even the said parts are working and giving production but not effectively & efficiently. i.e Instead of their break Down. Cost of such replacement parts will be known as "Preventive Maintain-ance Cost".

	[without TQM]	(TQM)
(eg) Input (Store)	100kg	70
(-) Normal Loss	10 kg	5 (50%)
In put to Production	90kg	65
(-) Process loss.	10kg	5 (50%
Effective Utilize	80kg	60 kg
ie. Out put finished Goods	8 unit	6 unit
Less:- Defective Down graded	2 unit	(At the time of sale Defective identified) ie before sale
Gross Delivery sold.	6 unit	1 unit
Less:- Specification Loss/ free Replacement	2 unit (Return due Defective).	1 unit
Net Delivery / Invoice / final sale.	4 unit	4 unit

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Total Quality Management :- All losses reduced 50%, if we produce on the basis of order / Demand limited due to reduction in cost.

Demand unlimited
(a) Output (final sale) would remain constant.
(b) Input would get reduced.

if we have unlimited Demand due to reduction in cost.

Demand Unlimited
(a) Input remain same
(b) output will get increased.

∴ Material Cost Saving due to TQM = 30 kg (100-70)
Extra Cost (Preventive Maintenance Cost) xx

~~Net benefit~~ ⟹ xxx

In evaluation of TQM, we should prepare the following statement (When Demand is limited).

1) Statement of Production Requirement.

	Present	After TQM
Production Units	xx	xx
(-) Defective units	(x)	(x)
Gross Delivery	xx	xx
(-) Specification loss. (Free Replacement)	(x)	(x)
Net Delivery	xx	xx

2) Statement of Material Requirement

	Present	After TQM
Raw Material Purchased	xxx	xxx.
(-) Storage loss (In store)	(xx)	(xx)
Transferred to Production	xxx	xxx
(-) Process loss	(xx)	(xx)
Effective Utilization.	xxx	xxx

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Statement of Production Requirement

	Present	After TQM
Production	11,053 $\left[\frac{10500}{95} \times 100\right]$	10,513
(-) Defective	553 [5% of 11053]	263
Gross Delivery	10,500	10,250 $\left[\frac{10250 \times 2.5}{97.5}\right]$
(-) Specification loss.	[5% of 10m] = 500	250 (10000×2.5%)
Net Delivery (Actually Delivers)	10000	10,000.

Statement of Material Requirement

	Present	After TQM.
Raw Material Purchased	1,29,275 $\left[110530 \times \frac{100}{85.5}\right]$	1,11,160 $\left[105130 \times \frac{100}{94.575}\right]$
(-) Storage loss	6,464 [5% of 129275]	3335 [1,11,160×3%]
Transferred to Production	1,22,811	107825
(-) Process loss	12,281 (10% of 122811)	2695 [107825×2.5%]
Effective Utilization	1,10,530 [11053×10kg]	1,05,130 (10513×10kg)

Working	Present	TQM
= Purchase (let)	100	100
(-) Storage loss (5%)	5	3
Transferred	95	97
(-) Process loss (10%)	9.5	2.425 (2.5%)
Effective Utilization	85.5	94.575

Statement of Machine Hours.

	Present	After TQM.
Gross Hours.	82898 $\left[66318 \times \frac{100}{80}\right]$	58405 $\left(52565 \times \frac{100}{90}\right]$
(-) Loss.	16580 $\left[66318 \times \frac{20}{80}\right]$	5,840 [58405×10%]
Effective utilization	66,318 (11053×6 Hr)	52,565 (10,513×5Hr)

Statement of Profit.

	Present	After TQM
Sales I	1,00,00,000 [10000 unit × 100₹]	1,00,00,000 [10000 unit × ₹100]
II	3,87,100 [553×700]	184100 [263 unit × ₹700]
(-) Material Cost	(51,71000) [129275kg × ₹40]	(44,46,400) [1,11,160kg × ₹40]
(-) Machine Cost	(33,15,920) [82898 Hr × ₹40/Hr]	(23,36,200) [58405Hr × ₹40/Hr]
(-) Storage cost	(129275) [129275 × ₹1]	(1,11,160) [1,11,160kg × ₹1/kg]
(-) Preventive Maintaince Cost	(100000)	(600000)
Profit	16,70,905	26,90,340.

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(16) [Page-393]

Working Notes

	Process-I Weaving		Process-II Printing
Input	10000	Input	9500
Less:- Loss (5%)	500	(-) loss (10%)	950
Output	9500	Output	8550

(1) Statement of Cost Benefit

			₹
Incremental Revenue [5000 Rolls − (5000×10%) loss] × 1250 =			56,25,000
~~Incremental Cost~~			
(−) Purchase Cost.	[5000 Rolls × ₹900/Rolls]	4500000	
Printing Cost	[5000 Rolls × ₹100/Rolls]	500000	50,00,000
Net Benefit ⇒			6,25,000

Better to purchase from Market @ 900/Rolls of Grey cloth due to following Reasons.
1) Spare Capacity exists in Printing Department
2) Incremental Benefits.

(2) Statement of Cost Benefits/−8550

Incremental Revenue [9500 − (9500×6%)] × 1250 = [{9500−(9500×6%)} − 8550] × 1250	4,75,000
Less:- Incremental Cost	3,50,000
Net Benefit ⟹	1,25,000

(3) Now

	Weaving		Printing
Input	10000	Input	9700
Loss (3%)	300	(−) Loss (10%)	970
Output	9700		8730

Statement of Cost Benefit

∴ Increment Revenue [9700 − 8730] × 1250 =	2,25,000
(−) Incremental Cost. [200 × 100] Printing	(20,000)
Extra Cost [9700−9500]	(17,500)
Net Benefit ⟹	30,000

(3). Better to implement change.

(#) Material Cost i.e. Purchase of Rolls has been already incurred before Printing i.e. Material की पूर्ति और Purchase अब से और Loss के बाद कम but अब Loss नहीं होगा।

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(18) [Page-395]

~~Statement of Net Benefits.~~

~~Preventive Maintainance~~ ~~Excess Prev. Mainten.~~ ~~Breakdown Maintainance Cost~~ ~~Contribution on Machine Hour saved.~~ ~~Saving in Breakdown~~

	Preventive Maintainace	(c). Excess Prev. Maint	Break Down Maintainance Cost	(b) Saving in Break down	(a) Contribution on Machine Hour Saved.	[a+b-c] Net (a+b-c)
1st	19200	—	1,92,000	—	—	—
2nd	38400	19200	153600	38400	(800×90)= 72000	91200.
3rd	76800	38400	115200	38400	[(1600-800)×90]=72000	72000.
4th	153600.	76800	76800	38400	([2400-1600]×90)=72000	33600.
5th	307200	153600	57600.	19200	[(3200-2400)×90]= 72000	(62400)
6th	614400	307200.	—	57600	[(4000-3200)×90]= 72000	(177600).

∴ Better to select upto 4th level i.e. upto, £153600 Preventive Maintainance

(20) [Page-397]

NO Inspection	P ltd	Q ltd
Input	10000.	10000
(-) Defective 3%/5%	300	500
(A) Good unit (Qty)	9700	9500
Purchase Cost	18600 $\left[\frac{180 \times 10000}{100}\right]$	17400. $\left[\frac{174 \times 10000}{100}\right]$
Damage	540 $\left[\frac{180}{100} \times 300\right]$	900 $\left[\frac{180}{100} \times 500\right]$
Inspection Cost.	—	—
Cost (B)	18540	18300.
Cost / Good unit	1.911	1.926.

Inspection	P ltd	Q ltd
Input	10,000	10,000
(-) Defective (3/5)%.	300	500
Good unit before	9700	9500.
(-) Detection of Defective unit. [90% of Defective]	270 (3%)	450 (5%)
Good unit.	9730	9500.
Purchase Cost.	17514 $\left[\frac{9730 \times 180}{100}\right]$	17100. $\left[\frac{9500 \times 180}{100}\right]$
Damage Cost	54 $\left(30 \times \frac{180}{100}\right)$	90 $\left(50 \times \frac{180}{100}\right)$
Inspection Cost.	2400 $\left[\frac{24}{100} \times 10000\right]$	2400 $\left[\frac{24}{100} \times 10000\right]$
	19,968	19,590
Cost / Good unit.	2.052	2.062

∴ It's better not to apply Inspection Activity and better to Purchase from P ltd.

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Total Quality Management has Four (4) types of Cost.

1) Preventive Maintainance Cost
2) Break Down Maintainance Cost / Appraisal Cost.
3) Internal Failure Cost
4) External Failure Cost.

Preventive Maintainance Cost	Break Down / Appraisal Maintainance Cost	Internal Failure Cost	External Failure Cost.
# Suppliers evaluation (Extra payment to suppliers) # Staff Training Cost # Designing Cost. # Extra Maintainance Cost i.e, in addition to Normal Maintainance Cost	# Normal Inspection of Material, Labour Product, Machine.	Cost of Defective / Downgraded unit Recover Cost	- Cost of Specification. Loss. / - Warrantee Repair. / - Repairs / - Product Liability Claims. - Transportation Cost of Receiving - Specification loss unit - Customer support.

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(19)

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Statement of Cost of Quality Report.

	2004	2005	
1) Revenue	10,000	12,500	
Preventive Maintainance			
Design	100	240	
Preventive Equipment Maintaince	35	90	
Training	45	120	
Supplier evaluation.	20	50.	
	200	500	
	2%	4%	2% ↑
2) **Break Down Maintainance Cost**			
Inspection of Production	110	85	
Product Testing Equipment	50	50	
Incoming Material Inspection	20	40	
break down Maintainace	90	40	
Product Testing labour.	220	75	
	490	290	
	4.9%	2.32%	2.58% ↓
3) **Internal failure Cost**			
Scrap.	250	200	
Rework Cost	160	135	
	410	335	
	4.1%	2.68%	1.42% ↓
4) **External Failure Cost**			
Cost of Return Goods.	60	145	
Customer Support	40	30.	
Product liability claims	200	100	
Warranty Repairs	300	200	
	600	475	
	6%	3.8%	2.2% ↓

Comment = Increase in Preventive Maintainance being down all all other Cost. Hence better to follow Present system.

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Statement of Cost of Quality Report

	2007	2008	
Sales.	6000	6000	
Preventive Maintainee Cost			
Quality Training	75	150	
	1.25%	2.5%	1.25% ↑
Break Down Maintainance Cost			
Production Inspection	200	240	
Material Inspection	80	60	
	280	300	
	4.67%	5	0.33% ↑
Internal Failure Cost			
Scrap	600	300	
Rework	500	400	
	1100	700	
	18.33%	11.66%	6.67% ↓
External Failure Cost			
Product Warranty	300	150	
	5%	2.5%	2.5% ↓

\# Non Confirmation Cost = Cost of those goods which have been delivered to Customer but Customer return such goods due to Non Specified (Not upto Mark) such goods have been delivered because we could not identified as defective (confirmed) in factory premises i.e, before delivery. In other words we can say "Cost of Specification loss unit".

\# Specification loss will be as % of Gross Delivery unless it is written as % of Invoice / Actually / Net

Gross Delivery	xxx
(−) Specification loss	(xx)
Invoice. / Net Delivery / Actually =	xxx

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(17) Page-399

Statement of Total Quality Cost

Preventive Maintenance Cost		
Supplier Evaluation		125000.
Break Down/Appraisal Maintenance		
Down Time		7,70000
Equipment Testing Cost	[1600 Hrs X ₹18/Hr]	28,800.
Internal Failure Cost		
Rework Cost	[3200 bikes X 228/Bike]	7,29,600
External Failure Cost		
Customer Support Centre Cost	[2000 Hrs X ₹35/Hr]	70000
Warranty Repair Cost	[2600 bikes X ₹1560/bike]	40,56,000.
Total Quality Cost ⇒		57,79,400

(24) Page-399 (i) **Non Confirmation Cost**

Own share = [30% of 100000] 30000.

Gross Delivery	100	30928	$\left(\frac{30000 \times 100}{97}\right)$
(-) Specification loss	3	928	(30928 X 3%)
Actual Delivery	97	30000	

Cost of Non Confirmation Cost = 928 bat X (1200+2000+800)
= 37,12,000.

(ii) Statement of change in Profit.

Increase in Contribution	[5000 Bats X ₹800/Bat]	40,00,000
(-) Specification Loss Cost	$\left[\frac{5000}{97} \times 3 \times 3200\right]$ i.e [155 X 3200]	(4,96,000)
Saving in Delivery Cost	[928 Bats X 800 Delivery charge]	7,42,400
Net change in ~~(Increase)~~ Profit due to Inspection		42,46,400

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(26) [Page-400]

(a) Statement of Production Unit [2009]

	Budgeted	Actual
Production [Let (1m)]	6005	6005
(−) Downgraded. (7.5%)	450	(505) ∴ breakup is Not given
Gross Delivery. [92.5%]	5,555	
(−) Free Replacement (1% of Invoice)	55	
Invoice	5500	5500

Actual loss in 2009 is (6005−5500) units ie 505 units which is as per Planned information (budgeted information) (450+55).

(b) Cost of Internal failure = $450 \underset{\text{unit}}{} \times [(5\times20)+(4\times10)+(5\times5)]$

$= 450 \text{ units} \times ₹165$

$= ₹74,250$

Cost of external failure = 55 units × ₹165

= ₹9075.

(c) Statement of Production Unit [2010]

Production	Budgeted	Actual	Difference
Production	7098 $\left(\frac{6565}{92.5\%}\right)$	7500	402 unit (A)
(−) Downgraded	533.	750 (b/f)	217 unit (A)
Gross Delivery	6565 (92.5%)	6750	
(−) Free Replacement	65 (1%)	250 (given)	185 unit (A)
Invoice	6500	6500	

Statement of Production unit [2011].

	Budgeted	Actual	Differences
Production	7098 (100%)	7000	98 (F
(−) Down graded.	533 (7.5%)	460 (b/f)	73 (F)
Gross Delivery	6565 (92.5%)	6540	
(−) Free Replacement	65 [1% of]	40 (given)	25 (F).
Invoice.	6500	6500	

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Actual Cost

Variable Cost. (1050000+187500) - 1237500

~~Fixed~~

Qty 7500

Contribution / unit 165.

(W) **2010**

	2010	2011
Prevention Cost		
Equipment Accuracy Check	10000	10000
Staff Training	5000	5000
Additional Planned Maintenance		3000
Appraisal Inspection Cost	—	15000.
Internal failure	1,23,750 [750 units X ₹165]	75,900 [460 unit X ₹165]
External failure	41,250 [250 unit X ₹165]	6,600. [40 units X ₹165]
	1,80,000	1,15,500.

(A)

(B)

(B)

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Target Costing : It is a system to reduce the Cost to ensure Rate of Return (Normal/High Profitability). It is also known as Cost Reducing Technique.

S.P. 100
Mini Return 15 (15% of S.P.)
Target Cost 85

Target Cost refer to Production Manager. Now Production Manager estimate current cost [Current Feasible Cost] with existing features for Example = Cost = 90 Current Feasible Cost if Current Feasible Cost is more than Target Cost, existing features should be revised. So that after revision of existing features, new feasible cost would become equal/closer to Target Cost.

Revision of existing feature should not be adversely effected to Market.

(28) [Page-401]

(a) Statement of Cost Reduction Target.

	₹
Selling Price	500
Minimum Return (20% of 500)	100
Target Cost	400

Current Feasible Cost $\frac{7,50,00,000}{50000 \text{ unit} \times 3 \text{ year}} = 500$ ₹

Cost Reduction Target/Unit [500-400] = ₹ 100

(b) Max Reduction in Cost - [500 × 20%] = ₹ 100.

∴ Maximum Reduction in Cost would be feasible/Possible because Cost of Reduction Target = Maximum Reduction in Cost. Hence Product would be feasible.

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(35) Page-407

(1) **Statement of Target Cost** ₹ in lakh

Own Sales office Target Cost (22% of 225 lakh) 49.5

Known Expenditure of own sales office.

(i)	Fixed Expenses.	18 Lakh	
(ii)	Salary (40 employee x ₹40000/employee)	16 Lakh.	
(iii)	Commission (5% of sales i.e. 225 Lakh)	11.25 lakh	45.25

Unknown expenditure (Car Allowance) [b/f] 4.25

Maximum Car Allowance Could be Allowed = 4,25000.

(Km x ₹1/Km) = 425000

$\therefore$ Total Kilometer = $\frac{425000}{₹1}$ = 425000 km.

$\therefore$ Km/Sales Man = $\frac{425000}{40}$ = 10,625 km/salesman.

(2) **Statement of sales Value.**

Sales (let the sales be x)	x.
Less:- Prime Cost $\left[\left[\frac{78.75}{225} \times 100\right] = 35\% \times \frac{x}{100}\right] =$	$0.35x$.
Fixed Overhead.	36.25
Sales office expenses.	2.00
Administrative Cost	30.00.
Own Sales office Expenses	18.00
Salary	16.00
Commission [5% of x]	$0.05x$.
Car Allowance. [14000 km x 40 x 1]	5.6

$x - 107.85 - 0.40x = 33.$

$0.6x = \cancel{\ } 140.85$

$x = 234.75$ lakh.

New sales required = 234.75 lakh.

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(3) Target Profit = 33 lakh X 1.16 = 38.28 lakh.

Profit Without Commission

Sales. [225 X 1.16]	261 lakh
(-) Prime Cost [261 X 35%]	(91.35) lakh
(-) Fixed overhead	(36.25) lakh
(-) Sales office expenses.	(2.00) lakh
(-) Administrative Cost	(30.00) lakh.
(-) own sales office exp.	(18.00) lakh
(-) Salary	(16.00) lakh
(-) Comm allowances. [16000 X 40 X E1]	(6.4) lakh
Profit Without Commission	61 lakh

Maximum Commission payable = [61 - 38.28] = 22.72 lakh.

Commission in % = $\frac{22.72}{261} \times 100 = 8.705\%$

(29)
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Statement of Target Mill Mfg Cost.

Target Price (1466 - 30 - 60)		1376
Less:- Return		120
Total Target Cost		1256
(-) Distribution channel cost		
Shipment	11	
Maintenance	25	
Return on Investment	58	94
Mill Mfg Target Cost		1162

(33) ~~Page-404~~

	Perfect Competition	Monopoly
Qty	6000	1200
Profit (₹)	1,06,000	1,06,000
Fixed Cost	74000	74000
Total Contribution	1,80,000	1,80,000
Contribution/unit	30	150

Now Contribution/unit is 3/4th of its Variable Cost in Monopoly.
i.e 150 = 3/4 of VC.
$VC = 150 \times \frac{4}{3} = 200$.

	Perfect Competition	Monopoly
Variable Cost (₹)	200	200
Contribution (₹)	30	150
Selling Price	230	350

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(#) Fixed Cost (Allocation / Apportionment / Absorption) always to be known as sunk Cost for the offer ase "Change in Apportionment / Allocation / Absorption may increase Fixed overhead for any product & but correspondingly always decrease from other, Total remain same". i.e change in Apportionment does not change in cash outflow.

(#) Tool Cost always to be charged from 1st order.

Statement of Target Cost.

Relevant Cost	Total	Per unit
Material.	90000	900
Labour.	32000	320
Tools & Consumables: $\left[\frac{16400-10000}{100}\right]$	6400	64
Other Variable O/H.	9600	96.
Special Packing	—	20.
Relevant Cost		1400

Relevant Cost + Inspection charges + Profit = sales.
~~1400×300 + x + [1400×300 / 9]~~ 1600×300

~~420000 + x + (420000+x)/9 = 480000~~.

Relevant Cost + Inspection charge =

Sale - Profit

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$\cancel{420000 + x + \frac{420000+x}{9}} = 480000$

$x + 420000 + x = 60000 \times 9$

$10x = 540000 - 420000$

~~x = 120000 12000~~

$1400 \times 300 + x = 1600 \times 300 - (1600 \times 300) \times 10\%$

$420000 + x = 480000 - 48000$

$x = 432000 - 420000$

$x = 12000$ Ans

(ii) Revised Relevant Cost — 1400
+ Margin (1/9) or (1/10 of SP) — 155

Minimum selling Price to be realised	1555	
Existing selling Price	1600	
∴ Maximum Discount to be offered	45	(1600-1555)

(32)
[404]

Statement of Reduction in Profit [Next Year]

		[₹ in Lakh]
1)	Reduction in Price [400000 x 200 x 5%]	10
2)	Excess Dep' [20-5] x10%	1.5
3)	Loss on exchange of Machine [5-2.70]	2.30
4)	Cost of Capital on Blocked Amt [(20-2.70) x 15%]	2.595
5)	Maintainance Cost Saved	(1.20)
	Total Cost to be Reduced ⇒	15.195

Statement of Target Cost

			[₹ in Lakh]
	Cost Reduction Target (₹ in Lakh)		15.195
1)	Saving in packing	1.5	
2)	Saving in Material Wastage	0.6 [60x1%]	
3)	Saving in Labour Cost	7.5 [$45 \times \frac{20}{120}$]	9.60
	Supervisor's Cost to be Reduced		5.595

∴ No. of Supervisor to be reduced = $\frac{595500}{150000}$ = 3.73 (rounded)

or 4 supervisor to be removed

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(31) [Page-403] W.N Total Capacity = 180,000 unit P.A.

= 1,80000 / 12 = 15000 unit P.M.

Production

1st 4 month =	4×15000×70%	=	42000.
2nd 6 month =	6×15000×80%	=	72000
Last 2 month =	2×15000×90%	=	27000
			1,41,000 [#1]

Revenue = 6400000.

Average Capacity = 1,41,000 / 180000 = 78.3%.

Semi variable O/H	₹ P.a.
upto 75%	75000
Above 70% but upto 80%	5000
	80000 [#2]

Labour	4 month	6 month	2 month
Minimum Amt	130000×4= 520000	130000×6= 780000	130000×2= 260000
Labour Cost.	504000 [42000×12]	8,64000 [72000×12]	3,24000. [27000×12]

∴ Labour Cost 520000 + 8,64000 + 324000 = 1708000 [#3]

Variable overhead: [141000×5] = 705000 [#4]

Statement of Revenue

	₹
Material (141000×15)	2115000
Labour. (#3)	1708000
Variable overhead. [#4]	705000.
Fixed overhead. [16000×12]	192000.
Semi Variable overhead [#2]	80000
Budgeted Cost	4800000
+ Return @27%	1296000
Target Revenue	6096000
Revenue offered	6400000.

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∴ Offer Should be accepted.

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Theory of Constraint / Throughput Accounting.

In the current situation, the nature of Labour is considered as fixed as the appointment of labour is done through Labour Agency (Normally)
Normally Labour agency has an agreement to appoint labour for Next period (atleast 1 year).

\# Existing Concept = $\boxed{\text{Sale - Material - Labour - Var. O/H - Fixed O/H = Profit}}$

\# In Throughput = $\underbrace{\text{Sale - Material - Var. O/H}}_{\text{Revised Contribution OR Throughput Contribution}}$ - $\underbrace{\text{Labour - Fixed O/H}}_{\text{Conversion Cost}}$ = Profit.
(Labour: Now, it becomes Fixed)

⇒ $\boxed{\therefore \text{Throughput Contribution - Conversion Cost = Profit}}$

eg \# If Conversion Cost becomes limiting factor:
Conversion Cost = ₹100000 (Labour)

Product	x	OR	y
Throughput Contribution	200000		300000.
Conversion Cost	100000		100000
∴ Throughput Contribution / Fof Conversion Cost =	2/-		3/-
Ranking	II		I

Throughput Accounting Ratio (TA Ratio) = $\frac{\text{Throughput Contribution Per Period.}}{\text{Conversion Cost Per Period.}}$

∴ Select the product having higher Throughput Accounting Ratio (T'A' Ratio)

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(40) (i) Statement of Profit [Per day].

~~404~~ Page 411

	Production (Qty)	Throughput Contribution/unit.	Throughput Contribution.
P	6000	80	480000
Q	4500	80	360000
R	1200	200	2,40,000
		Total Throughput Contribution =	10,80,000
		(–) Conversion Cost	720,000
		Profit	3,60,000

(ii) Statement of Efficiency.

Product	Budget Qty	Budget Hr	Budgeted for Actual Production Qty	Budgeted for Actual Production Hr
P	1200	1	6000	5
Q	1500	1	4500	3
R	600	1	1200	2
				10 Hr

$\frac{SH}{AH} \rightarrow \therefore$ Efficiency $= \frac{10\ Hr}{8\ Hr} \times 100 = 125\%$ i.e Increase in Efficiency = 25%.

(iii) Statement of Throughput Accounting Ratio.

	P	Q	R
Throughput Contribution/day	768000 [1200X8X80]	960000 [1500X8X80]	960000 [600X8X200]
Conversion Cost/days.	720000	720000	720000
Throughput Accounting Ratio	$1.0\dot{6}$	$1.\dot{3}\dot{3}$	1.33
(iv) Ranking	II	I	I

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(41) [Page - 410]

(1) Statement of Cost Benefits. in ($)

Incremental Revenue [$1 X 19500]	19500
Less:- Relevant Cost	
Material Cost [0.78/gram X 10000 gram]	7,800
Throughput Contribution.	11,700
Less:- Extra Cost paid to Vendor [0.12X19500]	2340
Net Benefit.	9360.

(2) We should not accept the offer of another Company. due to the following reasons.

(i) Already spare Capacity exists in Mining Department

(ii) Material Cost will have to occur even in self Manufacture or outsources.

(iii) Payment to outsider could not reduce existing fixed Cost.

(3) Statement of Cost Benefit

	$
Incremental Revenue [10000 X 1]	10000
(−) Extra Cost	7000
Net Benefit ⟹	3000

(4) Due to loss in Mining Department We should introduce 2,10,000 grams of Material so that after loss it comes to 2,00,000 grams.

Due to Loss, Extra Cost = 10000 X 0.78 = 7800.

This could be reduced by incurring extra Cost of $9000.

Saving	$ 7800
Extra Cost	$ 9000
Loss	$ 1200.

We shouldn't accept the offer

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Theory of Constraint

Limiting factor	Basis of Ranking
Conversion Cost	Throughput Contribution Per ₹ of Conversion Cost i.e Throughput Accounting Ratio.
Machine Hours	Throughput Contribution Per Machine Hours OR Return Per Hours/Minutes.
We have more than One Machine (Machines)	Throughput Contribution Per "Bottleneck" Activity (Machine)

(45) Page-AI

1) Return Per Minutes = Machine Hour is limiting factor (Throughput Contribution)

2) Throughput Accounting Ratio = Conversion Cost is limiting Factor.

Statement of Ranking

	Product	x	Y	Z
(a)	Return (Throughput Contribution/unit)	42	45	50
(b)	Time/unit (Limiting factor)	15	15	20.
c.	Return Per Minute (a/b)	2.8	3	2.5
	Ranking	II	I	III.

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Statement of Throughput Activity Ratio.

	x	y	z
Throughput Contribution/unit	42	45	50
Minutes/unit	15	15	20
Throughput Contribution/minute (A)	2.8	3	2.5
Conversion Cost/Minutes (B) $\left[\frac{221600}{75120}\right]$	2.949	2.949	2.949
Throughput Accounting Ratio (TA Ratio) (A/B)	0.94	1.01	0.84
Ranking	II	I	III

(44) [Page 412]

Limiting factor = Machine Hour = 30000 MHr.

Statement of Ranking

	A	B
Contribution/unit	200	240
	[400-160-40]	[560-200-120]
Machine Hour/Unit	0.32	0.4
	[1÷3.125]	$\left[\frac{1}{2.5}\right]$
Contribution/Machine Hour	625	600
Ranking	I	II

Statement of Optimal Product Mix.

Product	Hr/Unit	Qty	Hours	Contribution/unit	Contribution
A	0.32	75000	24000	200	1,50,00,000
B	0.40	15000	6000	240	36,00,000
					1,86,00,000
Machines Hr.		30000		(-) Fixed Cost	8400000
				Profit ..	1,02,00,000

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(ii) Conversion Cost

Fixed	8400 000	
Other (Variable) Now fixed	48,00,000.	[(40x7500) + (120 x 15000)]
Total Conversion Cost=	1,32,00,000	

Statement of TA Ratio

		A	B
Throughput Contribution / unit:		400-160 = 240	500-200 = 360.
Hr / Per unit.		0.32	0.4
Throughput Contribution / Hr.	(A)	750	900.
Conversion Cost / Hour. $\left[\frac{132L}{3000}\right]$	(B)	440	440
T. A. Ratio.		1.70	2.04
Ranking		II	I

Statement of Product Mix

Product	Qty	Hr/unit	Hours	Cont/unit	Contribution
A	50000	0.32	16000	240	1,20,00,000
B	35000	0.4	14000	360.	1,26,00,000
		Total Machine Hours =	30,000		2,46,00,000
				(-) Conversion Cost	1,32,00,000
				Profit ⟹	1,14,00,000

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(#) Concept of Bottleneck Activity (Machine).

If we have different Machines (Machin > 1) & different Product. and Its not possible to produce all products (with Max Demand) on such Machines (Process) then in order to Maximize overall Contribution, we should select the machine which will produce the least possible unit (As such possible unit could be produced from other Machine) i.e the Machine having Higher shortage of resources called "Bottleneck Machine".

Basis of Ranking ⇒ Throughput Contribution / Machine Hours of Bottleneck for every product. (In Concept of Throughput Accounting : Labour Fixed)

However in Marginal = Contribution / Hours of Bottleneck Activity is the base [Labour : Variable].

(43) [Page-411]

Statement of Bottleneck Activity.

Machines	M_1	M_2	M_3
Requirement			
W	10×200 = 2000	10×200 = 2000	10×200 = 2000
x	6×200 = 1200	9×200 = 1800	3×200 = 600
y	2×200 = 400	3×200 = 600	1×200 = 200
Z.	1×200 = 200	1.5×200 = 300	0.5×200 = 100
(a)	3800	4700	2900
Available (b)	3000	3000	3000
Shortage / (Surplus)	800	1700	(100)
Bottleneck Activity	—	M_2	—
OR, Utilization Ratio ↳ [Requirement / Available] (A/B)	126.67%	156.67%	96.67%

Higher Utilization Ratio is known as basis for Bottleneck Activity. i.e M_2 is our Bottleneck Activity.

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Statement of Ranking

	W	X	Y	Z
Throughput Contribution/unit	1500	1200	1000	600.
Machine Hours Per unit of M_2.	10	9	3	1.5.
Throughput Contribution/M Hr of M_2.	150	133.33	333.3	400.
Ranking	III.	IV	II	I

Statement of Allocation of Machine Hours

Product	Z	Y	W	X.	Hours
Ranking	I	II	III	IV.	
Machine					
M_1	200 [200x1 Hr]	400 [200x2]	2000 [200x10]	400 (b/f) [400x6] i.e. 66.66	3000.
M_2	300 [200x1.5]	600 [200x3]	2000 [200x10]	100 (b/f) [11x9]	3000
M_3	100. [200x0.5]	200. [200x1]	2000. [200x10]	700. (b/f) [233.33x3]	3000.
Possible units	200	200	200	11 unit.	

[Q42] [Page-411] On the basis of Highest Utilization Ratio i.e M_2, We Can say that M_2 is our Bottleneck Machine.

Statement of Ranking

	P	Q	R
Throughput Contribution/unit.	30	25	15.
Machine Hrs Per unit (M_2)	15	3	6
Throughput Contribution/M Hr of M_2	2	8.33	2.5
Ranking	III	I	II

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Statement of Product Mix

	Q	R	P	Machine Hrs
Ranking	I	II	III.	
Machine-1.	1000 [500x2]	2000 [500x4]	3000 (b/f) [300x10]	6000 Hr.
Machine-2	1500 [500x3]	3000 [500x6]	1500 (b/f) [100x15]	6000 Hr
Machine-3	500 [500x1]	1000 [500x2]	4500 (b/f) [900x5]	6000 Hr
Final Possible Unit.	500	500	100 unit.	

(48) [Page-414]

Statement of Bottleneck Activity (Process).

	Process	x	Y
	Available Time (Hrs)	15	15
	Down Time (Hrs)	1.5	1
(A)	Productive Time (Hrs)	13.5 Hr	14 Hr
	Requirements		
	S [50 units]	$\left[\frac{50\times5}{60}\right]$ = 4.16 Hr	$\left[\frac{50\times18}{60}\right]$ = 15 Hr
	T [80 units]	$\left[\frac{80\times7.5}{60}\right]$ = 10 Hr.	$\left[\frac{80\times12}{60}\right]$ = 16 Hr.
(B)	∴ Total Hrs required.	14.16 Hr	31 Hr
	Shortage of Hrs. (B-A)	0.66 Hr	17 Hr.
	Utilization Rate.	104.94% $\left[\frac{14.16}{13.5}\times100\right]$	221.4% $\left[\frac{31}{14}\times100\right]$

Y is the bottleneck Activity

Statement of Ranking

		S	T.
(a)	Throughput Contribution/unit	95-20-4= 71	85-20-4= 61.
(b)	~~Hour~~ Mint/unit of Y.	18 mint.	12 mint.
	Throughput Contribution/Mint(%)	3.94	5.083
	Ranking	II.	I

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Statement of Product Mix

	T	S	Hours
Ranking	I	II.	
Process x.	10 Hr	X	
	[800 X 7.5 / 60]		13.5 Hrx
	14 Hr	X.	
Progess Y	[70 X 12 / 60]		14 Hrx
Possible unit	70 unit		

[#] S product could not be processed because, product s can't be produced in Process Y due to non availability of Machine Hours in Process y. Hence if Product S is not possible to produce in process Y then why should we produce product S in process x which is useless.

Self Note

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Tariff				Sale -	xxx
				(-) V.C	xx
Rent for services.	xxx	1000		Contribution	xx
+ Tax to be paid to Govt.	xx	200		(-) S.V.C. (TYPE-II)	xx
(eg Service Tax / GST)				SFC	xxx
Tariff	xxx	1200		Avoidable F.C	xx
↳ Final Amt to be charged from Customer.			base (for taking Decision) ⇐	Benefit	xxx
				(-) Un Avoidable F.C	xx
				Profit	xxx

Service Sector

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(#) **Manufacturing Co.** Goods produced & sold. Hence Calculate Cost per unit of product

(#) **Service Industry** :- In such type of Industry no goods are being produced, only services are provided like Hospital, School, Canteen, Electricity, Transport. Cost per unit of service ?

(#) **Cost Per unit of Services** :-

→ **Transport Industry** :- Cost Per Tonne Per km.
OR
Cost Per Passenger Per km.

$$= \frac{\text{Total Cost}}{\text{Passenger km}} \text{ OR } \frac{\text{Total Cost}}{\text{Tonne km.}}$$

Passenger km = No. of Passenger X No of km.

→ **Hospital** :- Cost Per Patient Per Day

$$= \frac{\text{Total Cost}}{\text{Patient Day}}, \quad \text{Patient Day} = \text{No. of Patient} \times \text{No. of Days.}$$

→ **Hotel Industry** :- Cost Per Room Per Day = $\frac{\text{Total Cost}}{\text{Room Days}}$

Room Days (Occupancy) = No. of Rooms Available X No. of Days operated.

(eg) A Hotel has 100 Room Operated 365 days at 80% Capacity

Room Days = 100 Rooms X 365 days X 80% =
= 100 X 292 days = 29200 Room days Occupied.

100 Room remains Vacant for Repair / Renovation / white wash etc. activity for 73 days. [It's not possible to let out any Rooms for 365 days]