



CA Final Old Course Costing & OR

Paper-5

Advance Management Accounting

RTP NOV -18 In DKC Format



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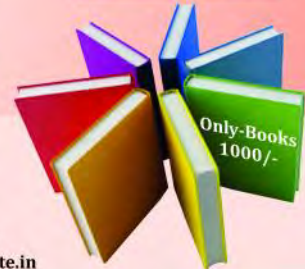
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PAPER - 5 : ADVANCED MANAGEMENT ACCOUNTING

Value Added/ Non -Value Added Activities

1. Queensland Furniture (QF) manufactures high-quality wooden doors within the forests of Queensland since 1919. Management is having emphasize on creativity, engineering, innovation and experience to provide customers with the door they desire, whether it is a standard design or a one-of-a-kind custom door. The following information pertains to operations during Jan:

Processing time	9.0 hrs.*	Waiting time	6.0 hrs.*
Inspection time	1.5 hr.*	Move time	7.5 hrs.*
Units per batch	60 units		

(*) average time per batch

Required

Compute the following operational measures:

- (i) Average non-value-added time per batch
- (ii) Average value added time per batch
- (iii) Manufacturing cycle efficiency
- (iv) Manufacturing cycle time

AVG NON-VALUE ADDED TIME PER BATCH

$$\begin{aligned} \text{INSPECTION TIME} &= 1.5 \text{ hr} \\ \text{WAITING TIME} &= 6.00 \text{ hr} \\ \text{MOVE TIME} &= 7.5 \text{ hr} \\ &= \underline{15.00 \text{ hr}} \end{aligned}$$

AVG-VALUE ADDED TIME PER BATCH

$$\text{PROCESSING TIME} = 9 \text{ hrs}$$

MANUFACTURING CYCLE EFFICIENCY

PROCESSING TIME

$$\frac{\text{PROCESSING TIME}}{\text{PROCESSING TIME} + \text{INSPECTION TIME} + \text{WAITING TIME} + \text{MOVE TIME}}$$

$$\left(\frac{9}{9 + 1.5 + 6 + 7.5} \right) \times 100 = 37.5\%$$

(IV) MAN-CYCLE TIME

$$\frac{\text{TOTAL PRODUCTION TIME}}{\text{UNITS PER BATCH}} = \frac{24}{60} = .40 \quad \textcircled{1}$$

Life Cycle Costing and Pricing Strategy

2. OR International Ltd. (ORIL) has developed a new product 'α³' which is about to be launched into the market. Company has spent ₹ 30,00,000 on R&D of product 'α³'. It has also bought a machine to produce the product 'α³' costing ₹ 11,25,000 with a capacity of producing 1,100 units per week. Machine has no residual value.

The company has decided to charge price that will change with the cumulative numbers of units sold:

Cumulative Sales (units)	Selling Price ₹ per unit
0 to 2,200	750
2,201 to 7,700	600
7,701 to 15,950	525
15,951 to 59,950	450
59,951 and above	300

Based on these selling prices, it is expected that sales demand will be as shown below:

Weeks	Sales Demand per week (units)
1-10	220
11-20	550
21-30	825
31-70	1,100
71-80	880
81-90	660
91-100	440
101-110	220
Thereafter	NIL

Unit variable costs are expected to be as follows:

	₹ per unit
First 2,200 units	375
Next 13,750 units	300
Next 22,000 units	225
Next 22,000 units	188
Thereafter	225

ORIL uses just-in-time production system. Following is the total contribution statement of the product 'α³' for its Introduction and Growth phase:

Weeks	Introduction	Growth	
	1 - 10	11 - 30	
Number of units Produced and Sold	2,200	5,500	8,250
Selling Price per unit (₹)	750	600	525
Variable Cost per unit (₹)	375	300	300
Contribution per unit (₹)	375	300	225
Total Contribution (₹)	8,25,000	16,50,000	18,56,250

Required

- (i) Prepare the total contribution statement for each of the remaining two phases of the product's life cycle.
- (ii) Discuss Pricing Strategy of the product 'α³'.
- (iii) Find possible reasons for the changes in cost during the life cycle of the product 'α³'.

Note: Ignore the time value of money.

③

GIVEN

~~(22000)~~

2200
INTRODUCTION
 1-10

SPEC UNITS
 = (2200 x 10)
 = 22000
 COST = 375

NEXT = 13750
GROWTH
 11-30

11-20 21-30
 10 x 550 10 x 825
 = 5500 8250
 @ 300 @ 300

MATURITY
 31-70

31-50 (51-70)
 (20 x 1100) (20 x 1100)
 = 22000 = 22000
 V.COST 225 @ 188

DECLINE
 71-110

71-80 (880 x 10) = 8800
 81-90 (660 x 10) = 6600
 91-100 (440 x 10) = 4400
 10-1-210 (220 x 10) = 2200
 220000
 V.COST = 225

STATEMENT SHOWING TOTAL CONTRIBUTION FOR REMAINING TWO STAGES

	MATURITY		DECLINE
Weeks.	31-50	51-70	71-110
UNITS	22000	22000	22000
S.P (P.U)	450	450	300
V.P (U)	(225)	(188)	(225)
	225	262	75
TOTAL CONT	4950000	5764000	1650000

④

(ii) Pricing Strategy for Product α^3

PGIL is following the skimming price strategy that's why it has planned to launch the product α^3 initially with high price tag.

A skimming strategy may be recommended when a firm has incurred large sums of money on research and development for a new product.

In the problem, PGIL has incurred a huge amount on research and development. Also, it is very difficult to start with a low price and then raise the price. Raising a low price may annoy potential customers.

Price of the product α^3 is decreasing gradually stage by stage. This is happening because PGIL wants to tap the mass market by lowering the price.

(iii) Possible Reasons for the changes in cost during the life cycle of the product ' α^3 '

Product life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their entire life cycle. Possible reasons for the changes in cost during the life cycle of the product are as follows:

PGIL is expecting reduction in unit cost of the product α^3 over the life of product as a consequence of economies of scale and learning / experience curves.

Learning effect may be the possible reason for reduction in per unit cost if the process is labour intensive. When a new product or process is started, performance of worker is not at its best and learning phenomenon takes place. As the experience is gained, the performance of worker improves, time taken per unit reduces and thus his productivity goes up. The amount of improvement or experience gained is reflected in a decrease in cost.

Till the stage of maturity, PGIL is in the expansion mode. The PGIL may be able to take advantages of quantity discount offered by suppliers or may negotiate the price with suppliers.

Product α^3 has the least variable cost ₹188 in last phase of maturity stage; this is because a product which is in the mature stage may require less marketing support than a product which is in the growth stage so, there is a saving of marketing cost per unit.

Again the cost per unit of the product α^3 jumps to ₹225 in decline stage. As soon as the product reaches its decline stage, the need or demand for the product disappear and quantity discount may not be available. Even PGIL may have to incur heavy marketing expenses for stock clearance.





Value Chain Analysis – Primary Activity

3. Sinopec Ltd. is engaged in business of manufacturing branded readymade garments. It has a single manufacturing facility at Surat. Raw material is supplied by various suppliers. Majority of its revenue comes from export to Euro Zone and US. To strengthen its position further in the Global Market, it is planning to enhance quality and provide assurance through long term warranty.

For the coming years company has set objective to reduce the quality costs in each of the primary activities in its value chain.

Required

State the primary activities as per Porter's Value Chain Analysis in the value chain of Sinopec Ltd with brief description.

- (i) **Inbound Logistics:** These activities are related to the material handling and warehousing. It also covers transporting raw material from the supplier to the place of processing inside the factory.
- (ii) **Operations:** These activities are directly responsible for the transformation of raw material into final product for the delivery to the consumers.
- (iii) **Outbound Logistics:** These activities are involved in movement of finished goods to the point of sales. Order processing and distribution are major part of these activities.
- (iv) **Marketing and Sales:** These activities are performed for demand creation and customer solicitation. Communication, pricing and channel management are major part of these activities.
- (v) **Service:** These activities are performed after selling the goods to the consumers. Installation, repair and parts replacement are some examples of these activities.

6

Just in Time

4. YP Ltd. (YPL) manufactures and sells one product called "YEIA". Managing Director is not happy with its current purchasing and production system. There has been considerable discussion at the corporate level as to use of 'Just in Time' system for "YEIA". As per the opinion of managing director of YPL Ltd. - *"Just-in-time system is a pull system, which responds to demand, in contrast to a push system, in which stocks act as buffers between the different elements of the system such as purchasing, production and sales. By using Just in Time system, it is possible to reduce carrying cost as well as other overheads"*.

YPL is dependent on contractual labour which has efficiency of 95%, for its production. The labour has to be paid for minimum of 4,000 hours per month to which they produce 3,800 standard hours.

For availing services of labour above 4,000 hours in a month, YPL has to pay overtime rate which is 45% premium to the normal hourly rate of ₹110 per hour. For avoiding this overtime payment, YPL in its current production and purchase plan utilizes full available normal working hours so that the higher inventory levels in the month of lower demand would be able to meet sales of month with higher demand level. YPL has determined that the cost of holding inventory is ₹70 per month for each standard hour of output that is held in inventory.

YPL has forecast the demand for its products for the first six months of year 2017 as follows:

Month	Demand (Standard Hrs)
Jan'17	3,150
Feb'17	3,760
Mar'17	4,060
Apr'17	3,350
May'17	3,650
Jun'17	4,830

Following other information is given:

- All other production costs are either fixed or are not driven by labour hours worked.
- Production and sales occur evenly during each month and at present there is no stock at the end of Dec'16.
- The labour are to be paid for their minimum contracted hours in each month irrespective of any purchase and production system.

Required

As a chief accountant, you are requested to comment on managing director's view.

7

STATEMENT SHOWING 'INVENTORY' HOLDING COST UNDER CURRENT SYSTEM

PARTICULARS	(HRS) JAN	(HRS) FEB	(HRS) MARCH	(HRS) APRIL	(HRS) MAY	(HRS) JUNE
OPENING INVENTORY	-	650	690	430	880	1030
(+) PRODUCTION	3800	3800	3800	3800	3800	3800
DEMAND	(3150)	(3760)	(4060)	(3350)	(3650)	(4830)
CLOSING INVENTORY	650	690	430	880	1030	-
AVG-INVENTORY	= 325	= 670	= 560	655	955	515
(OPENING + CLOSING) INVENTORY INVENTORY 2	$\frac{0 + 650}{2}$	$\frac{650 + 690}{2}$	$\frac{690 + 430}{2}$	$\frac{430 + 880}{2}$	$\frac{880 + 1030}{2}$	$\frac{1030 + 0}{2}$

STATEMENT SHOWING INVENTORY HOLDING COST FOR SIX MONTHS

MONTH	AVG INVENTORY	X 70 =	TOTAL (Rs)
JAN	325	X 70	22750
FEB	670	X 70	46900
MARCH	560	X 70	39200
APRIL	655	X 70	45850
MAY	955	X 70	66850
JUNE	515	X 70	36050
			257600

STATEMENT SHOWING RELEVANT OVERTIME COST AS PER J.I.T- SYSTEM.

PARTICULARS	JAN	FEB	MARCH	APRIL	MAY	JUNE
DEMAND (HRS)	3150	3760	4060	3350	3650	4830
PRODUCTION (J.I.T)	3150	3760	4060	3350	3650	4830
NORMAL STANDARD HRS (AVAILABLE)	3800	3800	3800	3800	3800	3800
SHORTAGE	-	-	=260 (4060-3800)	-	-	=1030 (4830-3800)

STATEMENT SHOWING OVERTIME COST

OVERTIME HRS	GROSS-hr.
MARCH 260	$\left(\frac{260 \times 100}{95}\right) = 273.68 \times 159.50$ $(110 + *49.50)$ $* (45/110)$
JUNE 1030	$\left(\frac{1030 \times 100}{95}\right) = 1084.21 \times 159.50$

$$(273.68 \times 159.50) + (1084.21 \times 159.50) = 216583$$

STATEMENT SHOWING COMPARATIVE COST

COST	AS PER TRADITIONAL	AS PER J.I.T.
COST	257600	216583
SAVING AS PER J.I.T.		$(216583 - 257600)$ = 41017

Though YPL is saving ₹41,017 by changing its production system to Just-in-time but it has to consider other factors as well before taking any final call which are as follows:-

- (i) YPL has to ensure that it receives materials from its suppliers on the exact date and at the exact time when they are needed. Credentials and reliability of supplier must be thoroughly checked.
- (ii) To remove any quality issues, the engineering staff must visit supplier's sites and examine their processes, not only to see if they can reliably ship high-quality parts but also to provide them with engineering assistance to bring them up to a higher standard of product.
- (iii) YPL should also aim to improve quality at its process and design levels with the purpose of achieving "Zero Defects" in the production process.
- (iv) YPL should also keep in mind the efficiency of its work force. YPL must ensure that labour's learning curve has reached at steady rate so that they are capable of

performing a variety of operations at effective and efficient manner. The workforce must be completely retrained and focused on a wide range of activities.

(10)

5. Z Ltd. is a leading Home Appliances manufacturer. The company uses just-in-time manufacturing process, thereby having no inventory. Manufacturing is done in batch size of 100 units which cannot be altered without significant cost implications. Although the products are manufactured in batches of 100 units, they are sold as single units at the market price. Due to fierce competition in the market, the company is forced to follow market price of each product. The following table provides the financial results of its four unique products:

	Alpha	Beta	Gamma	Theta	Total
Sales (units)	2,00,000	2,60,000	1,60,000	3,00,000	
	(₹)	(₹)	(₹)	(₹)	(₹)
Revenue	26,00,000	45,20,000	42,40,000	32,00,000	145,60,000
Less: Material Cost	6,00,000	18,20,000	18,80,000	10,00,000	53,00,000
Less: Labour Cost	8,00,000	20,80,000	12,80,000	12,00,000	53,60,000
Less: Overheads	8,00,000	7,80,000	3,20,000	12,00,000	31,00,000
Profit / (Loss)	4,00,000	(1,60,000)	7,60,000	(2,00,000)	8,00,000

Since, company is concerned about loss in manufacturing and selling of two products so, it has approached you to clear picture on its products and costs. You have conducted a detailed investigation whose findings are below:

The overhead absorption rate of ₹ 2 per machine hour has been used to allocate overheads into the above product costs. Further analysis of the overhead cost shows that some of it is caused by the number of machine hours used, some is caused by the number of batches produced and some are product specific fixed overheads that would be avoided if the product were discontinued. Other general fixed overhead costs would be avoided only by the closure of the factory. Further details are summarized below:

Machine hour related.....	₹ 40,00,000	6,20,000
Batch related.....		4,60,000
Product specific fixed overhead:		
Alpha.....	10,00,000	
Beta.....	1,00,000	
Gamma.....	2,00,000	
Theta.....	1,00,000	14,00,000
General fixed overheads.....		6,20,000
		<u>31,00,000</u>

The other information is as follows:-

	Alpha	Beta	Gamma	Theta	Total
Machine Hours	4,00,000	3,90,000	1,60,000	6,00,000	15,50,000
Labour Hours	1,00,000	2,60,000	1,60,000	1,50,000	6,70,000

Required

- Prepare a profitability statement that is more useful for decision making than the profit statement prepared by Z Ltd.
- Calculate the break-even volume in batches and also in approximate units for Product 'Alpha'.

Slp No (1)

STATEMENT SHOWING COST DRIVER RATIO

ACTIVITY

COST DRIVER USED

(ACTIVITY COST)
COST DRIVER USED

= COST DRIVER RATIO.

(1) MACHINE HR - RELATED

NO OF M-HR

$\left(\frac{620000}{1550000} \right)$

= .40

(2) BATCH PRODUCTION

NO OF BATCH

$(920000 \div 100) = 9200$

$\left(\frac{460000}{9200} \right)$

= 50

Slp No (2) STATEMENT SHOWING COST TO PRODUCT COST DRIVER

PRODUCT	MACHINE-HR	X	RATIO	= TOTAL
MACHINE ALPHA	400000	X	.40	= 160000
HR BETA	390000	X	.40	= 156000
RELATED GAMMA	160000	X	.40	= 64000
THETA	600000	X	.40	= 240000
				<u>620000</u>

BATCH RELATED	ALPHA	BETA	GAMMA	THETA
	$(200000 \div 100) \times 50 = 100000$	$(260000 \div 100) \times 50 = 130000$	$(160000 \div 100) \times 50 = 80000$	$(300000 \div 100) \times 50 = 150000$
				<u>460000</u>

(3)

STATEMENT SHOWING B.E.P FOR PRODUCT ALPHA:-

SP = 13.00

$(2600000 \div 200000)$

V.COST
 $(2600000 - 940000) \div 200000$
 = 8.30

CONT
 $(940000 \div 200000)$
 = 4.70

FIXED COST
 1000000

SPECIFIC COST

PT
 0

B.E.P IN - UNITS = $\left(\frac{1000000}{4.70} \right) = 212765.95$

PRODUCTION IN - BATCHES OF 100 UNITS

IT - MEANS PRODUCTION OF = 212800 UNITS

$(212800 - 212765.95) = 34$ UNITS EXTRA

SO - EXTRA VARIABLE COST = $(34 \times 8.30) = 282.20$

EXTRA SALES $(282.20 \div 13) = 21.70$ SALES 22 UNITS

SALES = ~~212766~~ $(212766 + 22) = 212788$ UNITS

VERIFICATION

SALES (212788×13)	2766244
V.COST (212800×8.30)	<u>(1766240)</u>
CONTRIBUTION	1000004
FIXED COST	<u>1000000</u>
NO P/L NO L/U	

Determination of Production Mix/ Production Planning

6. A company is producing three products P, Q & R. Relevant information is given below:

Product	P	Q	R
Raw material per unit (kg)	20	12	30
Machine hours per unit (hours)	3	5	4
Selling price per unit (₹)	500	400	800
Maximum limit of production Unit	1,500	1,500	750

Only 9,200 hours are available for production at a cost of ₹20 per hour and maximum 50,000 kgs. of material @ ₹ 20 per kg., can be obtained.

(Only product mix quantities are to be shown, calculation of total profit at that product mix not required to be shown)

Required

On the basis of the above information determine the product-mix to give the highest profit if at least two products are produced.

(14)

SOLO (1) STATEMENT SHOWING CONTRIBUTION Per

	P	Q	R
S.P (P.U)	500	400	800
V.P (1)			
R. Mat	(400) (20 X 20)	(240) (12 X 20)	(600) (30 X 20)
MACHINE COST	(60) (3 hr X 20)	(100) (5 hr X 20)	(80) (4 hr X 20)
CONT (P.U)	40	60	120
	TT	TT	T

STATEMENT SHOWING RANK FOR PRODUCTION

IF - RAW-MATERIAL IS KEY-FACTOR

	<u>P</u>	<u>Q</u>	<u>R</u>
CONTR-(P.U)	40	60	120
kg-(P.U)	÷ 20	÷ 12	÷ 30
CONTR/PKkg =	2	5	4.00
RANK	III	I	II

IF - HRS IS KEY-FACTOR

	<u>P</u>	<u>Q</u>	<u>R</u>
CONTR-(P.U)	40	60	120
÷ HRS	÷ 3	÷ 5	÷ 4
CONTR-P.H	13.33	12	30
	II	III	I

It is clear from the above ranking(s):-

- I. Contribution per Unit is maximum in case of product Q & R.
- II. Contribution per Kg. of Raw Material also maximum in case of product Q & R.
- III. Contribution per Machine Hour is maximum in case of product P & R.

So product R is common in all cases and priority shall be given for production of 'R'.
Balance resources should be divided between other two products P & Q.

STATEMENT SHOWING BALANCE RESOURCE

MATERIAL 50000kg	CONSUMPTION 'R' = 22500 (750 Umb X 30)	Balance, (50000 - 22500) = 27500kg
9200hd	(750 Umb X 4) = 3000	(9200 - 3000) = 6200

APPLICATION OF L.P.P. IN DECISION MAKING FOR TWO (P & Q) PRODUCTS

Soln (1) Tabular form

	P	Q	Maximum
MATERIAL	20 kg	12 kg	27500
HRS	3hd	5hd	6200
CONTR (P.U)	40	60	

Maximise $Z = 40X_1 + 60X_2$

st

~~20X₁~~ $20X_1 + 12X_2 \leq 27500$

$3X_1 + 5X_2 \leq 6200$

$X_1, X_2 \geq 0$

SOLUTION

$$\begin{aligned} 20x_1 + 12x_2 &= 27500 && (\times 1.5) \\ 3x_1 + 5x_2 &= 6200 && (\times 10) \end{aligned}$$

Revised

$$\begin{aligned} 30x_1 + 18x_2 &= 41250 \\ 30x_1 + 50x_2 &= 62000 \end{aligned}$$

$$32x_2 = 20750$$

$$x_2 = 648.43 \text{ say } \underline{648}$$

$$30x_1 + (18 \times 648) = 41250$$

$$30x_1 = 29586$$

$$x_1 = \underline{986.2} \text{ unit} \quad \underline{986}$$

STATEMENT SHOWING MAXIMUM PROFIT

PRODUCTS	UNITS	CONTR. P.U	= TOTAL CONTRIBUTION
P	986		
Q	648		
R	750		
	<hr/>		
		(17)	

Pareto Analysis

7. Generation 2050 Technologies Ltd. develops cutting-edge innovations that are powering the next revolution in mobility and has nine tablet smart phone models currently in the market whose previous year financial data is given below:

Model	Sales (₹'000)	Profit-Volume (PV) Ratio
Tab - A001	5,100	3.53%
Tab - B002	3,000	23.00%
Tab - C003	2,100	14.29%
Tab - D004	1,800	14.17%
Tab - E005	1,050	41.43%
Tab - F006	750	26.00%
Tab - G007	450	26.67%
Tab - H008	225	6.67%
Tab - I009	75	60.00%

Using the financial data, carry out a Pareto analysis (80/20 rule) of Sales and Contribution. Discuss your findings with appropriate recommendations.

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STATEMENT SHOWING PARETO ANALYSIS

ANALYSIS OF SALES

MODEL	SALES ('000)	% ($\frac{\text{SALES}}{\text{TOTAL SALES}} \times 100$)	CUMMUCATIVE TOTAL
(TAB)			
A-001	5100	= 35.05% $(\frac{5100 \times 100}{14550})$	35.05%
B-002	3000	= 20.62% $(\frac{3000 \times 100}{14550})$	55.67%
C-003	2100	= 14.43% $(\frac{2100 \times 100}{14550})$	70.1%
D-004	1800	= 12.37% $(\frac{1800 \times 100}{14550})$	82.47%
E-005	1050	= 7.22% $(\frac{1050 \times 100}{14550})$	89.69%
F-006	750	= 5.15% $(\frac{750 \times 100}{14550})$	94.84%
G-007	450	= 3.09% $(\frac{450 \times 100}{14550})$	97.93%
H-008	225	= 1.55% $(\frac{225 \times 100}{14550})$	99.48%
I-009	75	= .52% $(\frac{75 \times 100}{14550})$	100%
	14550	100%	

~~10~~

STATEMENT SHOWING ANALYSIS OF CONTRIBUTION

MODEL (TAB)	(CONTRIBUTION = SALES X P.V. RATIO)	ROUNDING-OFF	
		'000	RANK
A-001	$(5100 \times 3.53\%) =$ 1800	180	(6)
B-002	$(3000 \times 23\%) =$	690	(1)
C-003	$(2100 \times 14.29\%) =$	300	(3)
D-004	$(1800 \times 14.17\%) =$	255	(4)
E-005	$(1050 \times 41.43\%) =$	435	(2)
F-006	$(750 \times 26.00\%) =$	195	(5)
G-007	$(450 \times 26.67\%) =$	120	(7)
H-008	$(225 \times 6.67\%) =$	15	(9)
I-009	$(75 \times 60\%) =$	45	(8)
		<u>2235</u>	
	QTP	CONTINUE.....	
			(20)

CONTINUE ---

STATEMENT SHOWING CONTRIBUTION ANALYSIS
(PARETO)

MODEL	MODEL	CONTRIBUTION	(CONTRIBUTION TOTAL) X100% (%)	CUMULATIVE
		000		
(1)	B-002	690	$(\frac{690}{2235} \times 100) = 30.87\%$	30.87%
(2)	E-005	435	$(\frac{435}{2235} \times 100) = 19.47\%$	50.44%
(3)	C-003	300	$(\frac{300}{2235} \times 100) = 13.42\%$	63.76%
(4)	D-004	255	$(\frac{255}{2235} \times 100) = 11.41\%$	75.17%
(5)	F-006	195	$(\frac{195}{2235} \times 100) = 8.73\%$	83.90%
(6)	A-001	180	$(\frac{180}{2235} \times 100) = 8.05\%$	91.95%
(7)	G-007	120	$(\frac{120}{2235} \times 100) = 5.36\%$	97.32%
(8)	I-009	45	$(\frac{45}{2235} \times 100) = 2.01\%$	99.33%
(9)	H-008	15	$(\frac{15}{2235} \times 100) = .67\%$	100%
		2235		

~~4-12~~

Budget and Budgetary Control

8. KLM Ltd manufactures and sells a single product and has estimated sales revenue of ₹397.80 lacs during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material W and 3 kg of material X and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹ 6 per unit sold and fixed selling & distribution overheads are estimated to be ₹7,20,000.

The other relevant details are as under:

Purchase Price	Material W	₹16 per kg	
	Materials X	₹10 per kg	
Labour Rate	Machine Shop	₹14 per hour	
	Assembly Shop	₹7 per hour	
	Finished Stock	Material W	Material X
Opening Stock	25,000 units	75,000 kg	40,000 kg
Closing Stock	30,000 units	80,000 kg	55,000 kg

Required

Calculate

- (i) Number of units of product proposed to be sold and selling price per unit.
- (ii) Production budget in units.
- (iii) Material purchase budget in units.

22

ANSNO(i)

STATEMENT SHOWING TOTAL VARIABLE COST FOR THE YEAR

ESTIMATED SALES = ₹ 397,80,000

<p>↓</p> <p>DESIRED PROFIT MARGIN ON SALES (20% X 397,80,000) = 79,56,000</p>	<p>↓</p> <p>ESTIMATED TOTAL COST 31,82,40,000</p>
<p>↓</p> <p>FIXED SELLING AND DISTRIBUTION OVERHEADS 7,20,000</p>	<p>↓</p> <p>TOTAL VARIABLE COST 31,10,40,000</p>

STATEMENT SHOWING VARIABLE COST (P.U) &

DREG- MATERIAL		
W (6Kg X 16)	=	96
X (3Kg X 10)	=	30
Labour Cost		
MACHINE SHOP (4hr X 14)	=	56
Ass- SHOP. (2hr X 7)	=	14
FACTORY OVERHEADS	=	14
(56 + 14) X 20%		
V.O. SELLING & DISTRIBUTION	=	6
		216

(23)

MARUTI
NO.
DATE

STATEMENT SHOWING NUMBER OF UNITS SOLD.

$$(31104000 \div 216) = 144000 \text{ units.}$$

$$\begin{aligned} \text{STANDARD PRICE (P.U)} &= \frac{(39780000)}{144000} \\ &= 276.25 \text{ (P.U)} \end{aligned}$$

(II) STATEMENT SHOWING PRODUCTION BUDGET

	UNITS.
BUDGETED	144000
CLOSING STOCK	30000
OPENING STOCK	(25000)
PRODUCTION	= 149000

ANSWER (iii) STATEMENT SHOWING PURCHASE BUDGET

	MATERIAL - W	MATERIAL X
<u>CONSUMPTION</u>	= 894000 (149000 UNITS X 6 KG)	= 447000 (149000 X 3)
CLOSING STOCK	80000	55000
OPENING STOCK	(75000)	(40000)
	899000	462000

Standard Costing – Reconciliation of Budgeted and Actual Profit

9. KYC Toys Ltd. manufactures a single product and the standard cost system is followed. Standard cost per unit is worked out as follows:

	₹
Materials (10 Kgs. @ ₹4 per Kg)	40
Labour (8 hours @ ₹8 per hour)	64
Variable overheads (8 hours @ ₹3 per hour)	24
Fixed overheads (8 hours @ ₹3 per hour)	24
Standard Profit	56

Overheads are allocated on the basis of direct labour hours. In the month of April 2018, there was no difference between the budgeted and actual selling price and there were no opening or closing stock during the period.

The other details for the month of April 2018 are as under

	Budgeted	Actual
Production and Sales	2,000 Units	1,800 Units
Direct Materials	20,000 Kgs. @ ₹ 4 per kg	20,000 Kgs. @ ₹ 4 per kg
Direct Labour	16,000 Hrs. @ ₹ 8 per Hr.	14,800 Hrs. @ ₹ 8 per Hr.
Variable Overheads	₹ 48,000	₹ 44,400
Fixed Overheads	₹ 48,000	₹ 48,000

Required

Reconcile the budgeted and actual profit with the help of variances according to each of the following method:

- (i) The conventional method
- (ii) The relevant cost method assuming that
 - (a) Materials are scarce and are restricted to supply of 20,000 Kgs. for the period.
 - (b) Labour hours are limited and available hours are only 16,000 hours for the period.
 - (c) There are no scarce inputs.

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THE - CONVENTIONAL METHOD

MARUTI

NO.

DATE

STEP NO (1) STATEMENT SHOWING COST SHEET

		BUD - PURCH = 2000000	
		TOTAL	P.U.
Mat		(20000 X 4) = 80000	40
Lab		(16000 X 8) = 128000	64
V.O		48000	24
F.O.		48000	24
TOTAL COST		304000	152
PL		112000	56
SAP		416000	208

STEP NO (2)

PROFIT & LOSS AC

(20000 X 4) TO Mat Acc	80000	BY SALES	374400
(16000 X 8) TO Lab Acc	128000	(1800 X 208)	
TO V.O. Acc	48000		
TO F.O. Acc	48000		
TO Net PL	<u>83600</u>		
	<u>374400</u>		<u>374400</u>

SALES - MARGIN VARIANCE

<u>UNITS</u>	<u>Rate</u>	<u>AMT</u>	<u>UNITS</u>	<u>Rate</u>	<u>AMT</u>
2000	56	112000	1800	56	100800

NO.	1581
DATE	10/8/00

Actual P.U. :-

$$\text{Actual S.P (P.U)} = 208$$

$$\text{Bud-Cost (P.U)} = (152)$$

$$\text{Mat Cost Variance} = (72000 - \frac{56}{80000}) = 8000(A)$$

$\begin{aligned} \text{Mat Usage Variance} \\ (2000 - 1800) \times 56 = 11200(F) \\ (1800 - 2000) \times 4 = 8000(A) \end{aligned}$	$\begin{aligned} \text{Mat-Inv Var} \\ (4 - 4) \times 20000 \\ = 0 \end{aligned}$
-------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------

$$\text{Labour Cost Variance} (115200 - 118400) = 3200(A)$$

$$\begin{aligned} \text{Labour Eff Variance} \\ (14400 - 14800) \times P \\ = 3200(A) \end{aligned}$$

$$\begin{aligned} \text{Labour Rate Variance} \\ (8 - 8) \times 14800 \\ = 0 \end{aligned}$$

$$\text{V.O. Cost Variance} (43200 - 44400) = 1200(A)$$

$$\begin{aligned} \text{V.O. Eff Var} \\ (14400 - 14800) \times 3 \\ = 1200(A) \end{aligned}$$

$$\begin{aligned} \text{V.O. Exp Prog Var} \\ (3 - 3) \times 14800 \\ = 0 \end{aligned}$$

F.O. Acc

	48000	By 1500	43200
		(1800 x 24)	(4800)

$$\begin{aligned} \text{F.O. Cost Var} \\ (43200 - 48000) \\ = 4800(A) \end{aligned}$$

F.O. Exp Var

$$(48000 - 48000) = 0$$

F.O. Volume V.

$$(2000 - 1800) \times 24 = 4800$$

(27)

SALES MARGIN VARIANCE
 $(112000 - 100800) = 11200 (A)$

Sales Margin
Volume var

$$(2000 - 1800) \times 56 = 11200 (A)$$

Sales Margin
Price var

$$(56 - 56) \times 1800 = 0$$

(28)

Step No (3)

STATEMENT SHOWING RECONCILIATION :-

	₹
PROFIT - COST - STATE	112000
DUE TO MATERIAL Usage VAR	(8000)
MATERIAL Rate VARIANCE	-
Labour Eff VARIANCE	(3200)
Labour Rate VARIANCE	-
V.O. Eff VARIANCE	(1200)
V.O. Exp/Rate Var	-
F.O. Exp VARIANCE	-
F.O. Volume VARIANCE	(4800)
SPECS MALEIN WUMU	(11200)
SPECS MALEIN Rate	-
	83600

MATERIAL VARIANCE - 1800 UNITS

STANDARD

ACTUAL

<u>Kg</u>	<u>Rate</u>	<u>₹ Amt</u>	<u>Kg</u>	<u>Rate</u>	<u>₹ Amt</u>
18000	X 4	72000	20000	4	80000
(18000 X 4)					
18000	X 4	72000			
(1800 X 10)					

Labour VARIANCE

<u>Hrs</u>	<u>Rate</u>	<u>₹ Amt</u>	<u>Wp</u>	<u>Rate</u>	<u>₹ Amt</u>
14400	X 8	1,15,200	14800	8	1,18,400
(1800 X 8 Hrs)					

V.O. VARIANCE

<u>Hrs</u>	<u>Rate</u>	<u>₹ Amt</u>	<u>Wp</u>	<u>Rate</u>	<u>₹ Amt</u>
14400	X 3	43200	14800	3	44400
(800 X 8)					

BUDGET

F.O

ACTUAL

<u>UNITS</u>	<u>R.R</u>	<u>Exp</u>		<u>UNITS</u>	<u>Exp</u>
2000	24	48000	(29)	1800	48000

Excess usage of 400 hrs. leads to loss of contribution from 50 units i.e. ₹4,000 (50 units × ₹80). It is not the function of the sales manager to use labour hours efficiently. Hence, loss of contribution from 50 units should be excluded while computing sales contribution volume Variance.

(\$) →

Therefore, sales contribution volume variance, when labour hours are Scarce will be ₹12,000 (A) i.e. ₹16,000 (A) - ₹4,000 (A).

Fixed Overhead Volume Variance

(#) →

The fixed overhead volume variance does not arise in marginal costing system. In absorption costing system, it represents the value of the under or over absorbed fixed overheads due to change in production volume. When marginal costing is in use there is no overhead volume variance, because marginal costing does not absorb fixed overheads.

(20)

Problem 10

X Division and Y Division are two divisions in the XY group of companies. X Division manufactures one type of component which it sells to external customers and also to Y Division.

Details of X Division are as follows:

Market price per component.....	₹300
Variable cost per component.....	₹157
Fixed costs.....	₹20,62,000 per period
Demand from Y Division.....	20,000 components per period
Capacity.....	35,000 components per period

Y Division assembles one type of product which it sells to external customer. Each unit of that product requires two of the components that are manufactured by X Division.

Details of Y Division are as follows:

Selling price per unit..... ₹1,200

Variable cost per unit:

- (i) Two components from X..... 2 @ transfer price
- (ii) Other variable costs per unit..... ₹375

Fixed costs..... ₹13,50,000 per period

Demand..... 10,000 units per period

Capacity..... 10,000 units per period

Group Transfer Pricing Policy

Transfers must be at opportunity cost.

Y must buy the components from X.

X must satisfy demand from Y before making external sales.

Required

- (1) Calculate the profit for each division if the external demand per period for the components that are made by X Division is:
 - (i) 15,000 components
 - (ii) 19,000 components
 - (iii) 35,000 components
- (2) Calculate the financial impact on the Group if Y Division ignored the transfer pricing policy and purchased all of the 20,000 components that it needs from an external supplier for ₹255 each. Your answer must consider the impact at each of the three levels of demand (15,000, 19,000 and 35,000 components) from external customers for the component manufactured by X Division.

ANSNO(1)

IF EXTERNAL DEMAND = 15000

CAPACITY = 35000 (X)

TRANSFER (Y)
20000

EXTERNAL
15000

NO-OPP-COST

T.P = 157.50 (V.COST)

ANSNO IF DEMAND = 19000 UNITS

TRANSFER (Y)
20000

EXTERNAL
19000

OPP-COST = 572000
V.COST = = 3140000
(20000 X 157)
3712000
÷ 20000

T.P = 185.60

~~OPP-COST~~

CUTDOWN
4000
OPP-COST!

S.P = 300

V.P = (157)

CONTR = 143 X 4000 = 572000

X-Y- GROUP - COMPANIES

DIVISION-X

CAPACITY = 35000 NOS

↓
OUTPUT- (COMPONENT)
SELLS

EXTERNAL
CUSTOMER

DIVISION
Y

DEMAND = 20000 NOS

S.P = 1200 (P.U)

V.P = (T.P)

MKT- PRICE = 300.00

V.P = 375 (P.U)

VARIABLE COST₂ = 157.00

FIXED COST = 1350000

FIXED COST₂ = 20620000

DEMAND = 10000

CAPACITY = 10000

(X-MUST-SATISFY DEMAND FROM Y- BEFORE MAKING EXTERNAL SALES)

GROUP-TRANSFER PRICE
POLICY

T.P = OPP-COST

[Y-MUST-BUY COMPONENTS FROM X]

STATEMENT SHOWING ANALYSIS OF PLUN

IF EXTERNAL DEMAND	15000 Nos	19000 Nos	35000
<u>DIVISION-X</u>	₹	₹	₹
SALES	= 4500000 (15000 X 300)	= 4500000 (15000 X (15000 X 300))	= 4500000 (15000 X (15000 X 300))
DIVISION 'Y'	3140000 1500000 (20000 X 200 157)	3712000 1500000 (20000 X 200 185.6)	6000000 1500000 (20000 X 300)
V. COST	(5495000) (35000 X 157)	(5495000) (35000 X 157)	(5495000) (35000 X 157)
FIXED COST (A) PLUN	(2062000) 83000	(2062000) 655000	(2062000) 294300
<u>DIVISION-Y</u>			
SALES	= 12000000 (10000 X 1200)	= 12000000 (10000 X 1200)	= 12000000 (10000 X 1200)
V. COST	(3750000) (10000 X 375)	(3750000) (10000 X 375)	(3750000) (10000 X 375)
FCOST	(1350000)	(1350000)	(1350000)
T.P	(3140000) 1500000	(3712000)	(6000000) 1500000
(B) PLUN	3760000	3188000	900000
A+B = PLUN	3843000	3843000	3843000
	(34)		

ANSWER 2)

STATEMENT SHOWING FINANCIAL IMPACT
ON THE GROUP IF Y DIVISION JUNE
THE TRANSFER PRICE POLICY

DIVISION 'X'	15000000	19000000	35000000
Sales	= 4500000 (15000 X 300)	= 5700000 (19000 X 300)	= 10500000 (35000 X 300)
V.P. V.P.	(2355000) (15000 X 157)	(2983000) (19000 X 157)	(5495000) (35000 X 157)
FCOST	(2062000)	(2062000)	(2062000)
(A) P/L	83000	655000	2943000
DIVISION 'Y'			
Sales	12000000 (10000 X 1200)	12000000 (10000 X 1200)	12000000 (10000 X 1200)
V. COST (PURCHASE)	(5100000) (20000 X 255)	(5100000) (20000 X 255)	(5100000) (20000 X 255)
OTHERS V. COST	(3750000) (10000 X 375)	(3750000) (10000 X 375)	(3750000) (10000 X 375)
FIXED COST	(1350000)	(1350000)	(1350000)
(B) P/L	1883000 1800000	1800000	1800000
A+B P/L	1883000	2455000	4743000
P/L ANS (i)	3843000	3843000	3843000
NET TRANSFER	(1960000)	(1380000)	900000

Transportation Problem - Degeneracy

11. A project consists of four (4) major jobs, for which four (4) contractors have submitted tenders. The tender amounts, in thousands of rupees, are given in the each cell. The initial solution of the problem obtained by using Vogel's Approximation Method is given in the Table below:

Contractors	Job P	Jch Q	Job R	Job S
A	112.50	100.00	127.50	167.50 1
B	142.50	105.00 1	157.50	137.50
C	122.50	130.00	120.00 1	160.00
D	102.50 1	112.50	150.00	137.50

Find the assignment, which minimizes the total cost of the project. Each contractor has to be awarded one job only.

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$$R+C-1 = \text{ALLOCATION}$$

$$(4+4) - 1 = 7$$

(Q No-11)

MARUTI
NO.
DATE

	JOB-P	Q	R	S	U _i
A	112.50 (e)	100 (e) +10	127.50 17.5	167.50 (1) -2	0
B	142.50 25	105 -2 (1)	157.50 42.5	137.50 +2 -35	5
C	122.50 (e)	130 20	120 (1)	160 17.5	10
D	102.50 (1)	112.50 22.5	150 50	137.50 -20	-10
	112.50	100	110	167.50	

	P	Q	R	S	U _i
A	112.50 (e)	100 (1)	127.50 17.5	167.50 35	0
B	142.50 25	105 (e)	157.50 42.50	137.50 (1)	5
C	122.50 (e)	130 20	120 (1)	160 17.5	10
D	102.50 (1)	112.50 22.50	150 50	137.50 15	-10
	112.50	100	110	132.50	

(37)

Critical Path Analysis – Missing Figures and Network

12. The number of days of total float (TF), earliest start times (EST) and duration in days are given for some of the following activities.

Activity	TF	EST	Duration
1-2	0	0	???
1-3	2	???	???
1-4	5	???	???
2-4	0	4	???
2-5	1	???	5
3-6	2	12	???
4-6	0	12	???
5-7	1	???	???
6-7	???	23	???
6-8	2	???	???
7-8	0	23	???
8-9	???	30	6

- (i) Find??? Figures.
(ii) Draw the network.
(iii) List the paths with their corresponding durations and state when the project can be completed.

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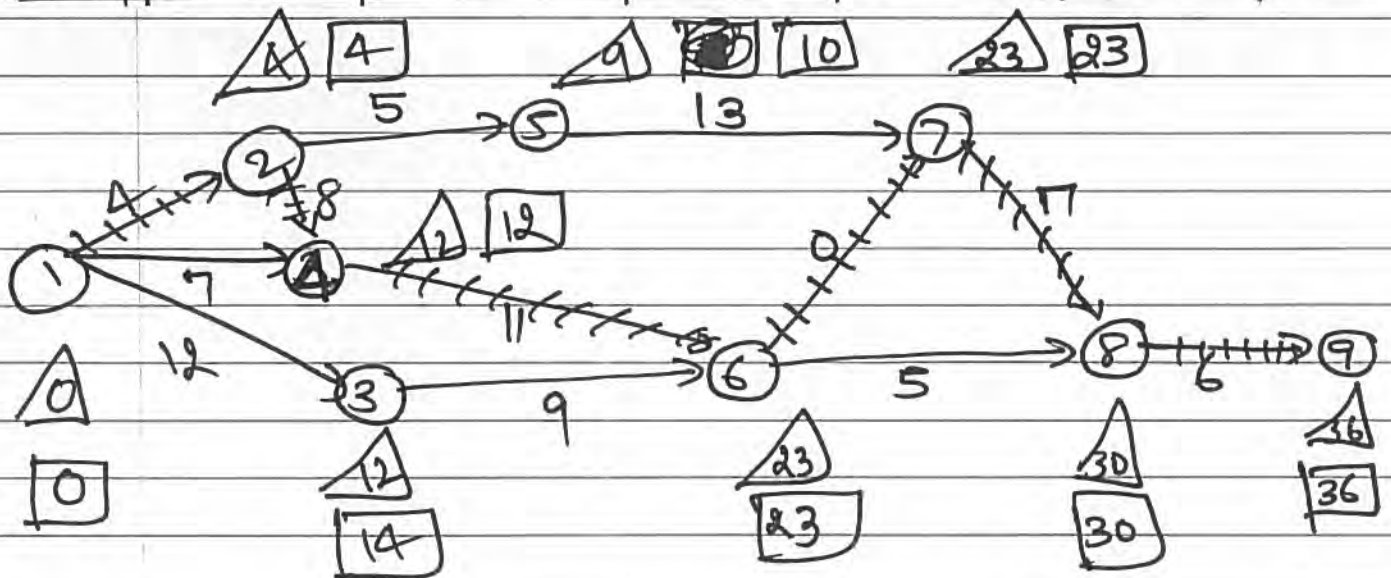
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NO.
DATE

STATEMENT SHOWING MINIMUM COST

<u>CONTRATOR</u>	<u>JOB</u>	<u>COST OF PROJECT</u> ₹
A	Q	100
B	S	137.50
C	R	120.00
D	P	<u>102.50</u>
		<u>460</u>

(38)

ACTIVITY	DURATION = D	E.S.T △	E.S.T + D = E.F.T	L.S.T = (L.F.T - D)	L.F.T = □	TOTAL FLOAT (L.S.T - E.S.T)
1-2	4	0	4	0	4	0 ✓
1-3	12	0	12	2	14	2
1-4	7	0	7	5	12	5
2-4	8	4	12	8	12	0 ✓
2-5	5	4	9	5	10	1
3-6	9	12	21	14	23	2
4-6	11	12	23	12	23	0 ✓
5-7	13	9	22	10	23	1
6-7	0	23	23	23	23	0 ✓
6-8	5	23	28	25	30	2
7-8	7	23	30	23	30	0 ✓
8-9	6	30	36	30	36	0 ✓



Critical Path : 1-2-4-6-7-8-9

(iii) Paths with their corresponding durations

The Various Paths in the Network are:

1-2-4-6-7-8-9 with Duration 36 Days

1-2-5-7-8-9 with Duration 35 Days

1-3-6-7-8-9 with Duration 34 Days

1-2-4-6-8-9 with Duration 34 Days

1-3-6-8-9 with Duration 32 Days

1-4-6-7-8-9 with Duration 31 Days

1-4-6-8-9 with Duration 29 Days

The Critical Path is 1-2-4-6-7-8-9 with Duration 36 Days.

PERT and CPM – Basic Concepts

13. State the validity of following statements along with the reasons:

- (i) Two activities have common predecessor and successor activities. So, they can have common initial and final nodes.
- (ii) In respect of any activity whether real or dummy, the terminal node should bear a number higher than the initial node number.
- (iii) The difference between the latest event time and the earliest event time is termed as free float.
- (iv) For every critical activity in a network, the earliest start and the earliest finish time as well as the latest finish time and the latest start time are the same.
- (v) The optimal duration of a project is the minimum time in which it can be completed.
- (vi) Resource leveling aims at smoothening of the resource usage rate without changing the project duration.

13. (i) **Invalid**

Reason: As per the rules of network construction, parallel activities between two events, without intervening events, are prohibited. Dummy activities are needed when two or more activities have same initial and terminal events. Dummy activities do not consume time or resources.

(ii) **Valid**

Reason: As per the conventions adopted in drawing networks, the head event or terminal node always has a number higher than that of initial node or tail event.

(iii) **Invalid**

Reason: The difference between the latest event time and the earliest event time is termed as slack of an event. Free float is determined by subtracting head event slack from the total float of an activity.

(iv) **Invalid**

Reason: For every critical activity in a network, the earliest start time and the latest start time is same and also the earliest finish time and the latest finish time is same.

(v) **Invalid**

Reason: The optimum duration is the time period in which the total cost of the project is minimum.

(vi) **Valid**

Reason: Resource leveling is a network technique used for reducing the requirement of a particular resource due to its paucity or insufficiency within a constraint on the project duration. The process of resource leveling utilize the large floats available on non-critical activities of the project and cuts down the demand of the resource

Simulation

14. An Investment Corporation wants to study the investment projects based on four factors: market demand in units, contribution per unit, advertising cost and the investment required. These factors are felt to be independent of each other. In analyzing a new consumer product, the corporation estimates the following probability distributions:

Demand (units)		Contribution per unit		Advertising Cost	
No.	Probability	₹	Probability	₹	Probability
10,000	0.20	25	0.25	50,000	0.22
20,000	0.25	35	0.30	60,000	0.33
30,000	0.30	45	0.35	70,000	0.44
40,000	0.25	55	0.10	80,000	0.01

The data for proposed investments are as follows:

Investment (₹)	50,00,000	55,00,000	60,00,000	65,00,000
Probability	0.10	0.30	0.45	0.15

Using simulation process, repeat the trials 5 times, compute the Return on Investment (ROI) for each trial and find the highest likely return.

Using the sequence (First 4 random numbers for the first trial, etc.)

09 24 85 07 84 38 16 48 41 73 54 57 92 07 99
64 65 04 78 72

Scop No (1)

STATEMENT SHOWING Tag Nos

<u>DEMAND</u> UNIT	<u>PROB</u>	<u>Cumulative</u> <u>PROBABILITY</u>	<u>Tag Nos</u>
10000	.20	.20	00-19
20000	.25	.45	20-44
30000	.30	.75	45-74
40000	.25	1.00	75-99

CONTRIBUTION - PU

<u>x</u>				
25	.25	.25	.25	00-24
35	.30	.65	.65	25-64
45	.35	.90	.90	65-89
55	.10	1.00	1.00	90-99

ADVERTISEMENT COST

50000	.22	.22	.22	00-21
60000	.33	.55	.55	22-54
70000	.44	.99	.99	55-98
80000	.01	1.00	1.00	99-99

INVESTMENT

5000000	.10	.10	.10	00-09
5500000	.30	.40	.40	10-39
6000000	.45	.85	.85	40-84
6500000	.15	1.00	1.00	85-99

STATEMENT SHOWING ANALYSIS

RNOs	DEMAND (UNITS)	RNOs	CONT. (P.U)	RNOs	ADV-COST	RNOs	INVESTMENT	R.O.I. (NO/NOI)
09	10000	24	25	85	70000	07	5000000	3.6%
84	40000	38	35	16	50000	48	6000000	22.5%
41	20000	73	45	54	60000	57	6000000	14%
92	40000	07	25	99	80000	64	6000000	
15	30000	04	25	78	70000	72	6000000	

NO/NOI

HIGHEST RETURN IS 22.50%

TRIAL-2

(DEMAND X CONT P.U) = TOTAL CONTRIBUTION	- ADV-COST	$\frac{\text{PROFIT} \times 100}{\text{INVESTMENT}}$ = R.O.I.
(1) (10000 X 25)	(70000)	$= \left(\frac{180000 \times 100}{5000000} \right)$ = 3.6%
(2) (40000 X 35)	(50000)	$= \left(\frac{1350000 \times 100}{6000000} \right)$ = 22.5%
(3) (20000 X 45)	(60000)	$= \left(\frac{840000 \times 100}{6000000} \right)$ = 14%
(4) (40000 X 25)	(80000)	$= \left(\frac{920000 \times 100}{6000000} \right)$ = 15.33%
(5) 30000 X 25 (43)	(70000)	$= \left(\frac{680000 \times 100}{6000000} \right)$ = 11.33%

Application of Learning Curve in Standard Costing

15. Aldi International Co. is a multiproduct firm and operates standard costing and budgetary control system. During the month of June firm launched a new product. An extract from performance report prepared by Sr. Accountant is as follows:

Particulars	Budget	Actual
Output	30 units	25 units
Direct Labour Hours	180.74 hrs.	118.08 hrs.
Direct Labour Cost	₹ 1,19,288	₹ 79,704

Sr. Accountant prepared performance report for new product on certain assumptions but later on he realized that this new product has similarities with other existing product of the company. Accordingly, the rate of learning should be 80% and that the learning would cease after 15 units. Other budget assumptions for the new product remain valid.

The original budget figures are based on the assumption that the labour has learning rate of 90% and learning will cease after 20 units, and thereafter the time per unit will be the same as the time of the final unit during the learning period, i.e. the 20th unit. The time taken for 1st unit is 10 hours.

Show the variances that reconcile the actual labour figures with revised budgeted figures in as much detail as possible.

Note:

The learning index values for a 90% and a 80% learning curve are -0.152 and -0.322 respectively.

[log 2 = 0.3010, log 3 = 0.47712, log 5 = 0.69897, log 7 = 0.8451, antilog of 0.6213 = 4.181, antilog of 0.63096 = 4.275]

The usual learning curve model is

I.C.A.I - METHOD

$$y = ax^b$$

Where

y = Average time per unit for x units

a = Time required for first unit

x = Cumulative number of units produced

b = Learning coefficient

W.N.1

Time required for first 15 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

$$y = 10 \times (15)^{-0.322}$$

$$\log y = \log 10 - 0.322 \times \log 15$$

$$\log y = \log 10 - 0.322 \times \log (5 \times 3)$$

$$\log y = \log 10 - 0.322 \times [\log 5 + \log 3]$$

$$\log y = 1 - 0.322 \times [0.69897 + 0.47712]$$

$$\log y = 0.6213$$

$$y = \text{antilog of } 0.6213$$

$$y = 4.181 \text{ hours}$$

$$\text{Total time for 15 units} = 15 \text{ units} \times 4.181 \text{ hours}$$

$$= 62.72 \text{ hours}$$

Time required for first 14 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

$$y = 10 \times (14)^{-0.322}$$

$$\log y = \log 10 - 0.322 \times \log 14$$

$$\log y = \log 10 - 0.322 \times \log (2 \times 7)$$

$$\log y = \log 10 - 0.322 \times [\log 2 + \log 7]$$

$$\log y = 1 - 0.322 \times [0.3010 + 0.8451]$$

$$\log y = 0.63096$$

$$y = \text{antilog of } 0.63096$$

$$y = 4.275 \text{ hrs}$$

$$\text{Total time for 14 units} = 14 \text{ units} \times 4.275 \text{ hrs}$$

$$= 59.85 \text{ hrs}$$

Time required for 25 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

$$\text{Total time for first 15 units} = 62.72 \text{ hrs}$$

$$\text{Total time for next 10 units} = 28.70 \text{ hrs } [(62.72 - 59.85) \text{ hours} \times 10 \text{ units}]$$

$$\text{Total time for 25 units} = 62.72 \text{ hrs} + 28.70 \text{ hrs}$$

$$= 91.42 \text{ hrs}$$

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W.N.2

Computation of Standard and Actual Rate

$$\begin{aligned} \text{Standard Rate} &= \frac{\text{₹1,19,288}}{180.74 \text{ hrs.}} \\ &= \text{₹ 660.00 per hr.} \\ \text{Actual Rate} &= \frac{\text{₹79,704}}{118.08 \text{ hrs.}} \\ &= \text{₹ 675.00 per hr.} \end{aligned}$$

W.N.3

Computation of Variances

$$\begin{aligned} \text{Labour Rate Variance} &= \text{Actual Hrs} \times (\text{Std. Rate} - \text{Actual Rate}) \\ &= 118.08 \text{ hrs} \times (\text{₹660.00} - \text{₹675.00}) \\ &= \text{₹1,771.20 (A)} \\ \text{Labour Efficiency Variance} &= \text{Std. Rate} \times (\text{Std. Hrs} - \text{Actual Hrs}) \\ &= \text{₹660} \times (91.42 \text{ hrs} - 118.08 \text{ hrs}) \\ &= \text{₹17,595.60 (A)} \end{aligned}$$

Statement of Reconciliation (Actual Figures Vs Budgeted Figures)

Actual Cost	79,704.00
Less: Labour Rate Variance (Adverse)	1,771.20
Less: Labour Efficiency Variance (Adverse)	17,595.60
Budgeted Labour Cost (Revised)*	60,337.20

$$\begin{aligned} \text{Budgeted Labour Cost (Revised)*} &= \text{Std. Hrs.} \times \text{Std. Rate} \\ &= 91.42 \text{ hrs.} \times \text{₹660} \\ &= \text{₹ 60,337.20} \end{aligned}$$

Relevant Cost Approach to Variance Analysis

Traditional approach to variance analysis is to compute variances based on total actual cost for production inputs and total standard cost applied to the production output. This is ambiguous, when inputs are limited. Failure to use limited inputs properly leads not only to increased acquisition cost but also to a lost contribution. Therefore, it is necessary to consider the lost contribution in variance analysis. When this approach is used, price or expenditure variances are not affected.

D.K.C. - METHOD

INITIAL BATCH
1 UNITS

HRS PER-BATCH
10 HRS

LOG RATIO
80%

IF PRODUCTION = 15 UNITS

$$\text{HRS PER-BATCH} = \log k + \left(\frac{\log \text{LOG RATIO}}{2} \right) \times \log(x)$$

$$= \log 10 + \left(\frac{\log 80}{\log 2} \right) \times (\log 15)$$

$$= 1.0000 + \left(\frac{-1 + .9031}{0.3010} \right) \times (1.1761)$$

12.7

$$4.178 = .6213 \text{ [ANTILOG]} = \underline{4.178}$$

(46)

ILL- ~~1000~~

IF PRODUCTION = 14 UNITS

$$= \text{Log} 10 + \left(\frac{\text{Log} .80}{\text{Log} 2} \right) \times (\text{Log} 14)$$

$$= 1.0000 + \left(\frac{-1 + .9031}{0.3010} \right) \times (1.1461)$$

$$= .6310 \quad (\text{ANTILOG})$$

4.276

TOTAL HRS - READ = (4.276 x 14 UNITS)

= 59.86 hrs

TIME-READ FOR 25 UNITS BASED ON REVISED CURVE OF 80%.

TOTAL TIME 15 UNITS = 62.72

TOTAL TIME 14 " = (59.86)

2.86

15 UNITS =

62.72 hrs.

10 UNITS =

(10 x 2.86)

28.60 "

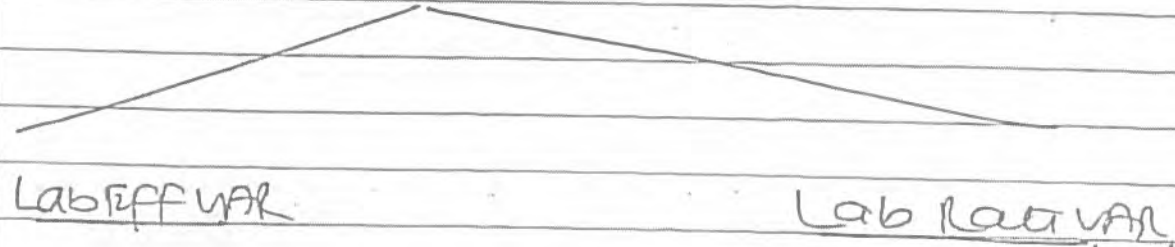
91.32 "

Labour VARIANCE - ACTUAL PRODUCTION = 25 UNITS

HR	Rate	AMT	HR	Rate	AMT
91.32	8000	60271.20	118.08	675	79704
118.08	660				

LABOUR COST VARIANCE.

$$(60271.20 - 79704) = 19432.80 (A)$$



Lab Eff Var
 $(11.32 - 118.08) 660$
 $17661.6 (A)$

Lab Rate Var
 $(660 - 675) \times 118.08$
 $= 1771.2 (A)$

STATEMENT SHOWING RECONCILIATION

STANDARD COST	60271.20
Lab Eff Var	17661.60
Lab Rate Var	1771.20
	<u>79704</u>

DKC

~~22~~ 48

STATEMENT SHOWING ANALYSIS BUDGET & REVISED

	ORIGINAL BUDGET	REVISED BUDGET
MKT-SALE QTY	1200000	= 1416000 (1200000 X 118%)
COMPNY'S SHARE	= 120000 UNITS (1200000 X 10%)	155760 UNITS (1416000 X 11%)
<u>SALE QTY</u>		
LARGE	= 60000 UNITS (50% X 120000)	= 62304 UNITS (40% X 155760)
MEDIUM	= 60000 " (50% X 120000)	= 93456 " (60% X 155760)
<u>CONTRIBUTION:-</u>		
LARGE	= 480000 (60000 X 8)	= 535814.40 (62304 X 8.60)
MEDIUM	600000 (60000 X 10)	= 990633.60 (93456 X 10.60)
<u>EFFECT OF EX</u>		
SALES PLANNING	-	(78000)
INTEREST	-	9000
REVISED CONTRIBUTION	1080000	1457448
OVERALL INCREASE IN P/	(50)	= 377448

16.

Statement Showing Change in Profit

Particulars	Large (₹)	Medium (₹)	Total (₹)
I. Effect of Product Mix Changes			
Revised Estimated Sales Quantity (Ratio 40:60)	62,304	93,456	1,55,760
Revised Estimated Sales Quantity (Ratio 50:50)	77,880	77,880	1,55,760
Difference in Sales Quantity	(15,576)	15,576	NIL
Contribution Effect Thereon @ ₹8.60 and ₹10.60	(1,33,953.60)	1,65,105.60	31,152
II Effect of Volume Change			
Revised Estimate of Sales Quantity (50:50)	77,880	77,880	
Original Estimate of Sales Quantity (50:50)	60,000	60,000	
Difference in Sales Quantity	17,880	17,880	35,760
Contribution Effect Thereon @ ₹8 and ₹10	1,43,040	1,78,800	3,21,840
III. Effect of Price Change			
Revised Estimate of Sales Quantity (Ratio 40:60)	62,304	93,456	1,55,760
Difference in Price p.u.	0.60	0.60	0.60
Contribution Effect	37,382.40	56,073.60	93,456
IV. Effect of Expenses			
Sales Promotion Expenses			(78,000)
Savings in Interest			9,000
Overall Increase in Profit			3,77,448

Total Improvement in Profit ₹3,77,448 (11.51%).

DKC
M-20

Prof. Manish Ramuka

Topics For Old Syllabus

Highly Recommended by Prof. Dani Khandelwal (DKC)



CA FINAL SFM DVD'S

Notes

Topics	Parts	No.of DVD's	Rs.	Books Name	Rs.
Foreign Exchange	4	1	200	Foreign Exchange	350
Bond Markets & Valuation	2	1	200	Bond Market & Valuation	200
Portfolio Management	2	1	200	Portfolio Management	200
Swaps Interest Rate Derivatives	1	5	1000	Swaps Interest Rate Derivatives	125
Options	1	5	1000	Options	180
Futures Forwards	1	5	1000	Futures Forwards	130
Dividend Decisions	4	3	600	Dividend Decisions	110
leasing	2	1	200	leasing	205
Mutual Fund	3	1	200	Mutual Fund	300
Equity Fund	3	1	200	Equity Fund	150
Capital Budgeting	4	1	200	Capital Budgeting	200
Total	41	25	5000	Total	2150
Duration			70 Hours		
Validity			Unlimited		
Views			Unlimited		
Application			May-18, Nov-18		
Last Recorded			Jan-2017		

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- Case Study on Cost Management for Specific Sector cost (Operating Costing)
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- Case Study on Pricing decisions & Divisional Transfer Pricing
- Case Study on Budgetary Control & Performance Measurement & Evaluation
- Case Study on Strategic Analysis of Operating Income
- Case Study on Standard Costing
- Case Study on Learning Curve
- Case Study on Linear Programming Performance
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Process Costing- Concept of Equivalent Production
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Standard Costing
Marginal Costing
Budgeting Control
Cost sheet (Unit Costing)
Reconciliation Of Cost & Financial Accounts
Marginal & Absorption Costing
Overheads
Activity Based Costing
Material
Labour
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Contract Costing
Operating Costing

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- Standard Costing
- Marginal Costing
- Budgeting Control
- Cost sheet (Unit Costing)
- Reconciliation Of Cost & Financial Accounts
- Marginal & Absorption Costing
- Overheads
- Activity Based Costing
- Material
- Labour
- Cost Control Accounts Integrated & Non Integrated Accounts
- Contract Costing
- Operating Costing

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Pricing Decision & Transfer Pricing
Budget & Budgetary Control
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16	Alternate Minimum Tax (AMT)
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18	Search Seizure & Survey Proceedings
19	Assessment Procedure, Rectification, Liability in Special Cases
20	Appeals
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22	Income Tax Settlement Commission (ITSC)
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31	Recovery Proceedings
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