Q.24. The following particulars are obtained from costing records of a factory :

	Product 'A' Per Unit (₹)	*Product 'B'* Per Unit (₹)
Selling Price	440	1,000
Material (₹ 40 per litre)	80	320
Labour (₹ 20 per hour)	100	200
Variable overhead	40	80

Comment on the profitability of each product when :

1. Raw Material is in short supply.
2. Labour hours are limited
3. Sales quantity is limited
4. Sales value is limited.

Q.25. From the following data, recommend the most profitable product mix, presuming that direct labour hours available are only 700.

	Product	
	A	*B*
Contribution per unit	₹ 30	₹ 20
Direct labour per hour per unit	10 hrs.	5 hours

The maximum production possible for each of the products A and B is 100 units.

Q.26. A farmer ask your recommendation for optimal mix of production for the coming year. The current data is given below :

	ITEMS PRODUCED			
	A	B	C	D
Area occupied (acres)	25	20	30	25
Yield per acre (tonnes)	10	8	9	12
Sale price per tonne (₹)	1,000	1,250	1,500	1,350
Variable cost per acre				
Material (₹)	700	600	950	900
Labour (₹)	2,000	2,500	3,000	3,700
Variable overhead (₹)	2,000	2,000	2,000	2,000
Fixed Overhead	₹			
Cultivation and growing	1,00,000			
Harvesting and transport	2,40,000			
Land revenue	90,000			
Administration	1,10,000			
	5,40,000			

The land which is being used for producing items A and B can be used for either items but not for items C and D. The land which is being used for producing items C and D can be used for either items but not for items A and B.

In order to provide adequate market service, the farmer must produce each year at least 40 tonnes each of A and B and 36 tonnes each of C and D.

You are required to calculate the following :

a) The profit during the year before your recommendation; and

b) The profit during the year after your recommendation

Q.27 Auto Parts Ltd. has an annual production of 90,000 units for a motor component. The component's cost structure is as given below:

Materials	₹ 270 per unit
Labour (25% fixed)	180 per unit
Expenses:	
Variable	90 per unit
Fixed	135 per unit
	Total 675 per unit

(a) The Purchase Manager has an offer from a supplier who is willing to supply the component at ₹ 540. Should the component be purchased and production stopped?

(b) Assume the resources now used for this component's manufacture are to be used to produce another new product for which the selling price is ₹ 485.

In the latter case material price will be ₹ 200 per unit. 90,000 units of this product can be produced, at the same cost basis as above for labour and expenses. Discuss whether it would be advisable to divert the resources to manufacture that new product, on the following that the component presently being produced would, instead of being produced be purchased from the market.

Q.28. A British Company is planning to establish a subsidiary company in India to produce mineral water.

Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Indian subsidiary :

	Total Annual Cost (₹)	Per Cent of Total Annual Cost that is variable
Material	1,93,600	100 %
Labour	90,000	70 %
Overhead	80,000	64 %
Administration	30,000	30 %

The Indian production will be sold by manufacturer's representatives who will receive a commission of 8 per cent of the sale price.

It is required to :

(i) Compute the sale price per bottle to enable management to realize an estimated 10 per cent profit on sale proceeds in India, and

(ii) Calculate the break even point in rupee sales for the Indian subsidiary on the assumption that the sale price is ₹ 11 per bottle.

Q.29. Flex Ltd. has been offered a choice to buy Machine A or Machine B. The relevant data are given below:

	Machine A	Machine B
Annual output (in units)	20,000	20,000
Fixed cost	₹ 30,000	₹ 16,000
Profit at the above level of production	₹ 90,000	₹ 64,000

Sales price of the product is expected to be ₹ 10 per unit.

You are required to compute.

1. Break-even quantity for each of the two machines.
2. Level of sales at which both the machines earn equal profit.
3. Range of sales at which Machine B is more profitable.
4. The level of sales above which Machine A is more profitable

Q.30 A Company has compiled the following data for preparation of budget for 2012 :

	Product		
	A	*B*	C
	8,000	4 000	6,000
Sales Per Month (Units)	₹ / Unit	₹ / Unit	₹ / Unit
	40	80	100
Selling Price	20	48	40
Direct Materials			
Direct Labour:			
Dept.	Rate / Hour		
1	5.00	5	10	20
2	4.00	8	4	12
		3	3	7
Variable Overheads				

Fixed Overheads ₹ 1,50,000 per month.

After the budgeted was discussed the following action plan was approved for improving the profitability of the company:

(i) Direct labour in department 1 which is in short supply is available to the maximum extent of 55,000 hours.

(ii) To boost sales, an advertisement programme should be launched at a cost of ₹ 18,000 per month.

(iii) The selling prices should be reduced by; A : 2 ½ %; B : 8 ¾ %; C : 1%

(iv) The sales targets have been increased and the sales department has confirmed that the company will be able to achieve the following quantities of sales.

A : 12,000 units B : 6,000 units C : 10,000 units

Required:

(i) Compute original monthly budgeted profit.

(ii) Set an optimal product mix after taking action plan into consideration and determine its monthly profit.

(iii) In case the requirement of direct labour hours of department 2 in excess of 40,000 hours is to be met by overtime working involving double the normal rate, what will be the effect of so working overtime of the optimum profit calculated by you in (ii) above.

Q.31 The Chief Cost Accountant of Vikas Limited found to his surprise that the actual profit for the period ending 30th June, 2013 was the same as budgeted inspite of realizing 10% more than the budgeted selling price. The following were the results:

Particulars	***Budget***	**Actuals**
Sales	5,00,000	8,25,000
Variable costs of sales	3,00,000	5,75,000
Fixed Costs	1,00,000	1,50,000
Profit	1,00,000	1,00,000

You are required to assist the Chief Cost Accountant in preparing the necessary explanations as to why the profit remained the same despite an increase in sales.

Q.32 A company currently operating at 80% capacity has the following particulars:

Sales	32,00,000
Direct Materials	10,00,000
Direct Labour	4,00,000
Variable Overheads	2,00,000
Fixed Overheads	13,00,000

An export order has been received that would utilise half the total capacity of the Factory, the order cannot be split, *i.e.*, it has either to be taken in full and executed at 10% below the normal domestic prices, or rejected totally.

The alternative available to the Management are:

1. Reject the order and continue with the domestic sales only; (as at present), or
2. Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand, or
3. Increase capacity so as to accept the export order and maintain the present domestic sales by –
   (a) Buying an equipment that will increase capacity by 10%. This will result in an increase of ₹ 1,00,000 in fixed costs, and
   (b) Work overtime to meet balance of required capacity. In that case labour will be paid at one and half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.

Q.33. A company owns following three plants

a) **Plant A** – It produces a product that sells at ₹ 40 per unit, it costs ₹ 42.50 per unit when 15,000 units are produced. At a production level of 20,000 units, the cost per unit is ₹ 38.125. What is the break-even point in rupees and in units.

b) **Plant B** – Its budgeted income and cost estimates are as follows :

Sales		₹ 10,00,000
Fixed cost	4,00,000	
Variable cost	3,00,000	
Head Office allocated	3,50,000	10,50,000
Loss		50,000

Sales of Plant B is under consideration. What is your recommendation based on the data given ?

c) **Plant C** – It produces one product : the budgeted income and cost estimates are as follows :

	₹	₹
Sales (Annual) 10,000 units @ ₹ 200/unit		20,00,000
Cost :		
Fixed	7,47,500	
Variable	13,50,000	
Head Office allocated	5,02,500	26,00,000
Loss		6,00,000

How many additional units must be manufactured in the Plant in order to break-even ?

Q.34. X Ltd. is having an installed capacity of 1,00,000 units of a product. It is currently operating at 70% capacity utilization. The capacity utilization and cost per unit is mentioned below :

Capacity Utilisation	*Cost per unit*
70 %	₹ 97
80 %	₹ 92
90 %	₹ 87
100 %	₹ 82

The company has received three offers from different sources as under :

Source A	–	5,000 units at ₹ 55 per unit
Source B	–	10,000 units at ₹ 52 per unit
Source C	–	10,000 units at ₹ 51 per unit

Advise the company as to whether any or all the export orders should be accepted or not.

Q.35 There are two similar plants under the same management. The management desires to merge these two plants. The following particulars are available

	Factory I	*Factory II*
Capacity Operation	100%	60%
Sales	₹ 300 lacs	₹ 120 lacs
Variable Costs	₹ 220 lacs	₹ 90 lacs
Fixed Costs	₹ 40 lacs	₹ 20 lacs

You are required to calculate (a) composite B.E.P.; and (b) what would be the profit of working at 75% of the merged capacity.

Q.36 ABC Ltd., which produces three products, furnishes the following data for the year 2011:

		Product		
	₹	**Alfa**	**Beta**	**Gama**
Selling Price per unit		100	75	50
Profit/Volume Ratio		10%	20%	40%
Maximum Sales Potential (units)		40,000	25,000	10,000
Raw Material as % of Variable Cost		50%	50%	50%

The company uses the same raw material for all the three products. Raw material is in short supply and the company has a quota for supply of raw material of the value of ₹ 18,00,000 for the year 2011 for manufacture of its products to meet its sales. Total fixed cost is ₹ 6,80,000.

You are required to :
(a) Determine a sales mix which will give the maximum overall profit keeping in view the short supply of raw material.
(b) Compute that maximum profit.

Q.37 The cost data are as under:

		A	*B*	*C*
Direct Materials	₹	64	152	117
Direct Labor				
Dept.	Rate per hour	Hrs.	Hrs.	Hrs.
1	5	18	10	20
2	6	5	4	7
3	4	10	5	20
Variable Overheads		₹ 16	9	21
Fixed Overheads		₹ 4,00,000 per annum		

The budget was prepared\at a time, when the market was sluggish. The budgeted quantities and selling prices are as under:

Product	*Budgeted Qty.*	Selling Price (₹)/ unit
A	9,750	270
B	7,800	280
C	7,800	400

Latter the market improved and the sales quantities could be increased by 20% for product A and 25% each for products B and C. The sales manager confirmed that the increased quantities could be achieved at the prices originally budgeted. The production manager stated that the output cannot be increased beyond the budgeted level due to limitation of direct labour hours in Department 2.

Required:

(i) Present a statement of budgeted profitability.
(ii) Set optimal product mix and calculate the optimal profit

Ans. to Q. 37

	A	B	C
D. Materials per unit	64	152	117
D. Labour per unit			
Deptt. 1	90	50	100
Deptt. 2	30	24	42
Deptt. 3	40	20	80
V. Overheads per unit	16	9	21
Variable cost per unit	240	255	360
Selling price per unit	270	280	400
Contribution per unit	30	25	40

(i) Statement of Budgeted Profitability

Product	Units	Contribution Per unit	Contribution Total
A	9,750	30	2,92,500
B	7,800	25	1,95,000
C	7,800	40	3,12,000
			7,99,500
		(–) Fixed Cost	4,00,000
		Profit	3,99,500

(ii) Budgeted labour hours of Deptt. 2

Product	Units	Labour hrs. (Deptt. 2) Per unit	Labour hrs. (Deptt. 2) Total
A	9,750	5	48,750
B	7,800	4	31,200
C	7,800	7	54,600
			1,34,550

Contribution per labour hr. in Deptt. 2

	A	B	C
Contribution per unit	30	25	40
Labour hrs. per unit in Deptt. 2	5	4	7
Contribution per labour hr. in Deptt. 2	6	6.25	5.71
Ranking	II	I	III

Revised estimation of maximum production

A = 9750 plus 20%	=	11,700 units
B = 7,800 plus 25%	=	9,750 units
C = 7,800 plus 25%	=	9,750 units

Most profitable product-mix

Product	Units	Labour hrs. (Deptt. 2) Per unit	Labour hrs. (Deptt. 2) Total
A	11,700 (Max.)	5	58,500
B	9,750 (Max.)	4	39,000
C	5,293	7	37,050 (Balance)
			1,34,550

Computation of maximum profit contribution

Product	Units	Per unit	Total
A	11,700	30	3,51,000
B	9,750	25	2,43,750
C	5,293	40	2,11,720
			8,06,470
		(–) Fixed Cost	4,00,000
		Profit	4,06,470

Q.38 PQR Ltd. Has furnished the following data for the two years.

	2006-07	2007-08
Sales	₹ 8,00,000	?
P/V Ratio	50%	37.5%
M.S. Ratio	40%	21.875%

There has been substantial saving in fixed costs in the year 2007-08 due to restructuring process. The company could maintain its sales quantity level of 2006-07 in 2007-08 by reducing the selling price.

Calculate :

(i) Sales for 2007-08

(ii) BEP for 2007-08

(iii) Fixed cost for 2007-08

Q.39 Super Products Ltd. prepares monthly income statements. Data relating to the months of March and April, 2012 are given below:

	March	April
Opening Inventory	Nil	150 units
Production	500 units	400 unis
Sales	350 units	520 units
Variable Cost data:		
Manufacturing cost per unit produced	₹ 10,000	₹ 10,000
Selling cost per unit Sold	₹ 3,000	₹ 3,000
Fixed Cost Data:		
Manufacturing Costs	₹ 20,00,000	₹ 20,00,000
Selling Costs	₹ 6,00,000	₹ 6,00,000

Selling Price per unit ₹ 24,000

Stocks are valued on FIFO basis

Prepare:

1. Income statements for March and April under Marginal Costing;
2. Income statements for March and April under Absorption Costing.

Q.40 You are given the following information relating to the years 2010–11 and 2011–12:

	2010-11	2011-12
Opening stock (units)	—	300
Production (units)	1,200	1,400
Fixed cost	₹ 2,00,000	₹ 1,20,000
Variable cost	₹ 1,50,000	₹ 2,80,000
Sales (units)	900	1,100
Selling price (₹ / per unit)	400	500
Closing stock (units)	300	600

Compute profit using FIFO under marginal costing and under absorption costing.

Q.41. A company has standard annual production capacity of 1,00,000 units. Normal capacity utilization is 90%. Variable production cost is ₹ 12 per unit. Annual fixed production costs are ₹ 2,70,000. Variable selling costs are ₹ 2 per unit and fixed selling costs are ₹ 1,35,000 per annum. Selling price per unit is ₹ 25. During the year 80,000 units were produced and 70,000 units were sold. Closing stock was 15,000 units.

Prepare income statement using (a) marginal costing, and (b) absorption costing

IMPORTANT THEORETICAL QUESTION

Q.1. Short Notes on:

1. Marginal Cost
2. Marginal costing
3. Contribution
4. Differential Cost
5. CVP Analysis
6. P/V Ratio
7. B.E.P.
8. Margin of Safety
9. Angle of incidence.

Ans.: 1. **Marginal Cost** : It means total variable cost comprising prime cost and variable overheads. According to the Institute of Cost and Management Accountants, London, Marginal Cost is "The amount at any given volume of output by which aggregate costs change if the volume of output is increased or decreased by one unit".

2. **Marginal Costing** : In marginal costing, total cost is segregated into variable cost and fixed cost. First of all, contribution is calculated with the help of following equations :

Contribution = Selling Price – Variable Cost

After calculating contribution, we can calculate profit as follows :

Profit = Contribution – Fixed Cost.

Marginal Costing assumes that only variable cost is the production cost and fixed cost is the period cost which has to be incurred regardless of the volume of output.

3. **Contribution** : The difference between the selling price and the variable cost is contribution. *For example*, if S.P. per unit is ₹ 18 and V.C. per unit is ₹ 12, we get contribution per unit of ₹ (18 – 12) = ₹ 6.

The knowledge of contribution per unit is a valuable information to the management for decision making in following ways :

a) While considering the acceptance or rejection of a new order, the course of action which yields greatest contribution will be most profitable.

b) In the selection of a product mix, the products which give maximum contribution margin should be preferred.

c) While choosing from among alternative methods of production, the method which yields the greatest contribution is to be adopted keeping in mind various other key factors.

4. **Differential Cost** : It means the increase or decrease in total cost that results from adoption of an alternative course of action. This type of cost can either be the incremental cost or decremental cost. Incremental cost means the increase in costs due to increase in level of production and decremental cost means the decrease in costs due to decrease in level of production.

5. **CVP Analysis** : Profits of an undertaking depends on a large number. of factors. Following three factors are considered to be the most important factors

(i) Cost of Manufacture
(ii) Volume of Sales
(iii) Profit

These three factors are inter-connected and dependent on one another. The analysis of cost, volume and profit is important for profit planning, cost control and decision-making. This analysis is also of special help in the preparation of flexicle budget which indicates cost and profit at various levels of activity.

6. **P/V Ratio** : It is an useful guide in determining the profitability of business. This ratio shows the relationship between contribution and sales and is expressed in percentage.

P/V Ratio is calculated as follows :

$$\frac{\text{Contribution}}{\text{Sales}} \times 100$$

Where contribution = (sales – variable cost) or (fixed cost + profit)

7. **B.E.P. (Break Even Point)** : It refers to that point where total cost is equal to Total Revenue, *i.e.* it is a point of no profit no loss. This is the minimum point of production where total costs are recovered. It is calculated as follows :

$$\text{In Units} = \frac{\text{Total Fixed Cost}}{\text{Contribution per unit}}$$

$$\text{In Value} = \frac{\text{Total Fixed Cost}}{\text{P/V Ratio}}$$

8. **Margin of Safety** : It is the difference between actual sales and sales at break-even point. A company whose sales volume is just equal to the break-even point is making no profit, no loss. Therefore, margin of safety at B.E.P. is nil.

   The amount of Margin of Safety indicates the soundness of business. If the margin of safety is high. It shows the B.E.P. is much below the actual sales so that even if there is a fall in sales, there will still be a profit. If the margin of safety is small, any fall in sales may be of serious matter.

9. **Angle of Incidence** : On the break even chart, where total sales line cuts the total cost line, an angle is formed. This angle provides useful information about the rate at which profits are being made. The large angle of incidence together with a high margin of safety indicates an extremely favourable situation.

Q.2. Distinguish between Absorption Costing and Marginal Costing.

Ans. 1. Absorption Costing is a total cost technique, whereas in Marginal Costing, only variable costs are charged to products.

2. In Absorption Costing, the stock valuation is done on total cost basis which includes both variable and fixed cost. In marginal costing, the stock valuation is done at variable cost only. This results in the higher valuation of stocks in absorption costing.

3. In Marginal Costing, since fixed overheads are not included in the cost of production, any under-recovery or over-recovery of overheads does not arise.

   In Absorption Costing there is every possibility of under-recovery or over-recovery of overheads.

4. In Absorption Costing the decisions are taken on the basis of profit, whereas, in marginal costing, the decisions are taken on the basis of contribution.

Q.3. Explain the similarities and differences between Marginal Costing and Differential Costing.

Ans.: Similarities :

1. Both are based on classification of total cost into fixed and variable cost. When fixed costs do not change, both differential cost and marginal cost are same.
2. Both are the techniques of cost analysis and presentation and are used by management in formulating policies and making decision.

Differences :

1. Entire fixed cost are excluded from marginal costing whereas relevant fixed cost is included in differential cost analysis.
2. In marginal costing, decisions are taken normally on the basis of P/V Ratio and Contribution. In differential costing, the comparison is made between the differential cost and differential revenue for decision-making.

Q.4. What is "*Product* Cost" and "*Period Costs*" ? How are they treated in absorption costing and marginal costing ?

Ans.: Product costs are those costs which are necessary for production and which will not be incurred if there is no production. These consists of Direct Material, Direct Labour and Variable Overheads. In absorption costing both period cost and product cost are included in cost of production and as stock valuation is made on the basis of total cost. In marginal costing, only product cost (variable cost) are treated as cost of products while period cost (fixed cost) is not included, hence, stock valuation is made at variable cost only.

Q.5. What are the various ways in which marginal costing can help management ?

Ans. ; Marginal costing is a very useful technique of decision-making for the management. The following are few of the managerial problems which are simplified by the use of marginal costing technique:

1. **Pricing of Product :**
   Under normal circumstances, the price of a product must be above total cost so that profit may be earned. But under certain circumstances, price can be fixed at below total cost but above marginal (variable) cost. This is so because fixed costs has to be incurred irrespective of whether production continues or not.
2. **Make or buy decisions :**
   This decision is taken by comparing the supplier's price with the variable cost of production. Fixed costs is sunk cost and is not important for decision making. However, this decision is influenced by the fact whether or not the capacity released by non-manufacture of the part can be used profitably somewhere else.
3. **Suitable Product Mix :**
   Normally a product which yields the maximum contribution is considered to be most profitable. However, if any key factor or limiting factor is prevailing, the product which yields the highest contribution per unit of key factor is considered the most profitable.
4. **Alternative Methods of Production :**
   If a new product have been developed and the management is faced with the problem of employing a machine or to manufacture it entirely by manual labour. The management should select that method which yields the greatest contribution, keeping in view, the other key factors.
5. **Shut down or compose the business :**
   A firm can continue working till the sales revenue is sufficient to cover following two types of cost :
   a) Variable Cost
   b) Excess of fixed costs over shut-down costs.

Shut down costs are those costs which a firm is bound to incur even if plant is closed down.

6. How can marginal costing be helpful in cost control ?

ns.: Marginal costing is very useful for controlling costs. In this technique, total cost is divided into fixed cost and variable cost. This classification enables the management to know the behaviour of costs. Such behaviour of cost is compared with the past data. This comparison enable the management to control actual costs if they are found to be at variance with the past data of costs. If actual cost is more than the budgeted cost, the management can analyse the situation to find out the reasons of variation and take appropriate measures to control these costs. Thus, marginal costing provides an effective tool in the hands of management to control costs.

Q.7. What are the advantages and limitations of marginal costing ?

Ans.: Advantages :

1. It is simple to understand and easy to operate along with standard costing and budgetary control.
2. It is best suited to the needs of management because it helps in many ways in taking decisions.
3. Since fixed costs are charged against contribution, there is no problem of under recovery of over-recovery of overheads.
4. It facilities control over costs, particularly variable costs, by avoiding arbitrary apportionment or allocation of fixed costs.
5. Marginal costing establishes the fact that profit is a function of sale and not of production because profit depends on sale and not on production.

Limitations :

1. It assumes that all costs can be classified into variable costs and fixed costs, which may not be possible in some cases.
2. It ignores time factor and investments, *e.g.* the marginal of two jobs may be same but the time taken in their completion and investments in machinery may differ.
3. It assumes that fixed cost cannot be controlled, however, there are some cases when fixed cash can be controlled to some extent
4. Marginal costing does not provide any standard for evaluation of performance. The system of budgetary control and standard costing gives more effective control than marginal costing.

Q.8 What are the uses of P/V Ratio?

Ans.: P/V Ratio has the following uses:

1. It helps in calculating the break-even point.
2. It helps in calculating profit when margin of safety is given.
3. With the help of P/V ratio, profit at given level of sales can be calculated.
4. P/V ratio helps in calculating sales when a desired level of profit is given.

Q.9 Define Management Accounting and what are its objectives

Ans.: Management Accounting is a system which helps management to plan, take better decisions and control, thereby enhancing, effectiveness of the organization.
Management Accounting is a system of collection and prsentation of relevant economic information relating to an enterprise for planning, controlling and decision-making."

Objectives of Management Accounting

1. ***Planning*** – Management accounting helps to forecast and prepare plans for future activities of the business.
2. ***Coordination*** – Planning helps in coordinating various business functions, such as sales, purchase, production etc.
3. ***Control*** – For control of business operations, techniques like standard costing, budgetary control etc. are employed.
4. ***Decision support*** – Management accounting provides relevant data for taking decisions on exports, bulk orders, sales mix, etc.

REVESIONERY PROBLEMS

Q.1. A company has earned contribution of ₹ 2,00,000 and net profit of ₹ 1,50,000 on sales of ₹ 8,00,000. What is its margin of safety. **[Ans.: ₹ 6,00,000]**

Q.2. Margin of Safety is ₹ 2,40,000 which is 40% of sales and P/V Ratio is 30%. Calculate BEP and profit on sales of ₹ 9,00,000. **[Ans.: ₹ 3,60,000 and ₹ 1,62,000]**

Q.3. P/V Ratio is 50% and MS Ratio is 40%. Compute net profit if sales is ₹ 1,00,000. **[Ans.: ₹ 20,000]**

Q.4. Find the overall break-even point and overall P/V Ratio for the following three products :

Product	**X**	**Y**	**Z**
Sales Value Mix Ratio	20%	30%	50%
Variable Cost to Sale Ratio	50%	30%	20%
Total Fixed Costs ₹ 35,500			

[Ans.: ₹ 50,000]

Q.5. A Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cot is ₹ 16 per unit. Fixed costs are ₹ 4,80,000 p.a. and the annual sales are at 60% margin of safety, calculate the ratio of net return on sales assuming income tax @ 40%. **[Ans.: 21.6%]**

Q.6. A Company has a P/V Ratio of 28% Fixed Costs during the quarter II of the financial year 2009 – 10 will be ₹ 2,80,000. Calculate the sales revenue required to achieve a quarterly profit of ₹ 70,000. **[Ans. ₹ 12,50,000]**

Q.7. The fixed cost for the production of a particular item is ₹ 200 per month. Its variable cost being ₹ 3 per unit and its sale price being ₹ 7 per unit, determine its break-even volume. What would be the profit if 2,000 such units were sold in a month ? How many such units should be sold to earn a profit of ₹ 3,000 per month ? **[Ans. 50 units; ₹ 7,800 & 800 units]**

Q.8. A Company has a margin of safety at 20% and earns a profit of ₹ 4 lakhs. If its P/V ratio is 40%, calculate its current sales and fixed costs. **[Ans. ₹ 50,00,000 and ₹ 16,00,000]**

Q.9. A Company has fixed cost of ₹ 90,000, Sales ₹ 3,00,000 and profit of ₹ 60,000

Required :

(i) Sales volume if in the next period, the company suffered a loss of ₹ 30,000.

(ii) What is the margin of safety for a profit of ₹ 90,000 ?

Q.10. A Company as a P/V Ratio of 40%. It maintains a margin of safety of 20%. If its annual fixed costs amount to ₹ 24 lakhs, calculate its –

(i) Break-even sales: **[Ans. ₹ 60,00,000]**

(ii) Margin of safety **[Ans. ₹ 15,00,000]**

(iii) Total sales **[Ans. ₹ 75,00,000]**

(iv) Total variable costs; and **[Ans. ₹ 45,00,000]**

(v) Profit. **[Ans. ₹ 60,00,000]**

Q.11. A Company sells two products, J and K. The sales mix is 4 units of J and 3 units of K. The contribution margins per unit are ₹ 40 for J and ₹ 20 for K. Fixed costs are ₹ 6,16,000 per month. Compute the break-even point. **[Ans. 19,600 units]**

Q.12. From the following data, you are required to calculate the break-even point and net sales value at that point :

Direct materials cost per unit ₹ 8

Direct labour cost per unit ₹ 5

Fixed Overheads ₹ 24,000

Selling price per unit ₹ 25

Trade discount 4%

Variable overheads @ 60% on direct-labour.

If sales are 15% and 20% above the break-even volume, determine the net profits.

Q.13. Last year, a company earned 20% profit on a sales turnover of ₹ 100 lakhs. To improve its profitability and competitieness, the management has decided to reduce selling price by 10% and increase output and sales by 20%. Cuts are proposed to be effected on variable and fixed costs at 5% and 20% respectively. What effect will these steps have on the company's profit this year ? The company was having a fixed cost of ₹ 25 lakhs per annum last year. **[The profit will get increased by ₹ 5.3 lakhs]**

Q.14. A Company, having annual sales of ₹ 10 crores, is earning 12% profit before depreciation. Depreciation amount to ₹ 100 lakhs. If the P/V Ratio of the company is 40%, calculate its Break-even sales. **[Ans. ₹ 9,50,00,000]**

Q.15. PQ Ltd. reports the following cost structure at two capacity levels :

	2,000 Units	1,500 Units
Production Overhead I	₹ 3 per unit	₹ 4 per unit
Production Overhead II	₹ 2 per unit	₹ 2 per unit

If the selling price, reduced by direct material and labour, is ₹ 8 per unit, what would be its break-even point ? **[Ans. 1,000 units]**

Q.16. A manufacturing company, currently marketing 15,000 units of a product @ ₹ 120 per unit indicates the following cost structure :

Variable Cost : Material - ₹ 56 per unit
Labour - ₹ 10 per unit
Expenses - ₹ 6 per unit.

Next year's budget has been based on Material Price increase by 6%, labour cost increase by 8% due to new wage settlement and variable expenses increase by 3%. Fixed expenses are expected to go up by 5%. Current Fixed Cost = ₹ 1,00,000.

You are required to present before the management for decision :

(a) a statement showing profit in the next year's budget;
(b) the new selling price, if the current profit volume ratio is to be maintained; and
(c) the quantity to be sold during next year to achieve the same quantum of profit without price increase.

Q.17. Your Company, manufacturing1,00,000 units p.a., sells it at a price of ₹ 80 per unit. The variable cost per unit is ₹ 48 and the annual fixed cost amounts to ₹ 18 lakhs. Based on these data, you are required to work out the following :

(i) Present P/V Ratio and break-even sales. **[Ans. 40% and ₹ 45,00,000]**
(ii) Increase in the volume of sales required if the profit is sought to be increased by ₹ 3.6 lakhs. **[Ans. ₹ 9,00,000]**
(iii) Percentage increase / decrease in sales quantity to offset an increase of ₹ 7 per unit in variable cost. **[Ans. 28%]**

Q.18. The variable cost structure of M/s. XYZ & Co. is as follows :

	₹/Unit
Materials	40
Labour	10
Overhead	04
Selling price	90

Sales and fixed overhead during the current year are expected to be ₹ 13,50,000 and ₹ 1,40,000 respectively.

Under a new wage agreement, an increase of 10% in wage is payable to all the direct workers from the beginning of forthcoming year, while the materials cost, variable overhead and fixed overhead are expected to increase by 7.5%, 5% and 3% respectively.

You are required to work out :

(i) the new selling price, if the current P/V ratio is maintained, and **[Ans. ₹ 97]**

(ii) the quantity to be sold during the forthcoming year to yield the same amount of profit as in the current year, assuming that the selling price per unit will remain same. **[Ans. 17,113 units]**

Q.19. A Company earned a profit of ₹ 2,00,000 on a sale volume of ₹ 14,00,000 during the first half of a year, the fixed cost being ₹ 5,00,000. However, during the second half of the year, it incurred a loss of ₹ 1,00,000 although unit variable cost, selling price and fixed cost remained the same.

Required :

(i) Profit-volume Ratio, Break-even point and Margin of safety for the first half of the year; **[Ans. 50%; ₹ 10,00,000 and ₹ 4,00,000]**

(ii) Sales volume for the second half; **[Ans. ₹ 8,00,000]**

(iii) Breakeven point and Margin of safety for the whole year. **[Ans. ₹20,00,000 & ₹2,00,000]**

Q.20. The ratio of variable cost to sales is 60%. The break-even point occurs at 80% of sales. Fixed costs are ₹ 2,00,000.

(a) Find the sales capacity. **[Ans. ₹ 6,25,000]**

(b) Also determine profit at 90% sales capacity. **[Ans. ₹ 25,000]**

Q.21. A Company manufactures three products. The budget quantity, selling prices and unit costs are as under :

	A	B	C
	₹	₹	₹
Raw Materials @ (₹ 20 per kg.)	80	40	20
Direct Wages @ (₹ 5 per hour)	5	15	10
Variable Overheads	10	30	20
Budgeted production in units	6,400	3,200	2,400
Selling price epr unit in ₹	140	120	90

Required :

(i) Present a statement of budgeted profit if Total Fixed Cost is ₹ 1,71,200 **[Ans. ₹3,24,800]**

(ii) Set optimal product-mix and determine the profit, if the supply of raw materials is restricted to 18,400 kgs. **[Ans. ₹ 1,44,800]**

Q.22. A Company manufactures and sells two standard products X and Y using the same raw material, labour and identical machines. Further particulars are given below

	X	Y
Selling price / unit	₹ 80	₹ 100
	Per Unit	
Direct Material @ ₹ 20 / kg.	₹ 20	₹ 30
Direct Labour @ ₹ 15 / hr.	₹ 15	₹ 15
Variable Overheads	₹ 15	₹ 15
Machine hours required	½ hr.	¾ hr.
	Per annum	
Maximum Demand (Units)	18,000	15,000
Current Production (Units)	15,000	12,000

Labour and mateials are available according to requirements. But, machine capacity cannot be increased immediately and the available capacity has been fully utilized by the current production plan. Total Fixed Cost is ₹ 3,96,000.

Required :

(i) Current contribution analysis;
(ii) Profit currently earned by the company; **[Ans. ₹ 5,34,000]**
(iii) Alternative production plan, if any, more profitable to the company;
(iv) Profit expected to be earned under the sugtgested plan. **[Ans. ₹ 5,44,000]**

Q.23. Novelty Ltd. produces a varity of products each having a number of component parts. Product P takes 5 hours to produce on Machine No. 20 working to full capacity. The selling price and marginal cost of Product P are ₹ 100 and ₹ 60 respectively. A component part B-15 could be made in the same amchine in 2 hours for a marginal cost of ₹ 10 per unit. The supplier's price is ₹ 25 per unit.

You are required to advise whether the company should make or buy the component B-15. (Assume that machine-hours is the limiting factor).

Q.24. Bindu Ltd. pesents the following information for a year :

	₹	
Material	1,20,000	
Wages	2,40,000	
Fixed expenses	1,20,000	
Variable overheads	60,000	
Selling price per unit	50	
Output	12,000	units

The available capacity is 20,000 units of production in a year. The company has an offer to sell 5,000 additional units at ₹ 40 each in a foreign market. It is anticipated, that, by accepting this offer there will be a sving of ₹ 1 per unit in material cost on all the units manufactured but fixed expenses will increase by ₹ 30,000 and an overall efficiency will drop by 2% on all production. Whether this offer be accepted and why ?

[Ans. The offer will increase profit by ₹ 5,200]

Q.25.

Fixed expenses	₹ 1,500	
Fixed expenses when the factory is shut down	₹ 1,000	
Additional expense in closing down	₹ 100	
Production	500	units
Contribution per unit	₹ 1	

As a Cost Accountant, what are your comments on the above data ?

[Ans. The factory should run]

Q.26. A factory engaged in manufacturing plastic buckets is working at 40% capacity and produces 10,000 buckets per annum. The present cost break up for one bucket is as under.

Material	₹ 10
Labour	₹ 3
Overheads	₹ 5 (60% fixed)

The selling price is ₹ 20 per bucket.
In case it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity the selling price falls by 5% accompanied by a similar fall in the price of material.
Calculate the profit at 50% and 90% capacities and also the break-even points for the same capacities.
[Ans. Profit ₹ 25,000 (50% capacity) ₹ 71,250 (90% capacity) BEP 6,818 units at 50% capacity and 6,667 units at 90% capacity]

Q.27. Super India Ltd. is producing three products X, Y and Z. The data for the three products is given below:

	X	Y	Z
Maximum capacity	5,000 units	2,000 units	3,000 units
Direct material @ ₹ 10 per kg.	₹ 40	₹ 10	₹ 30
Other variable costs	₹ 36	₹ 25	₹ 10
Selling price	₹ 100	₹ 50	₹ 60
Fixed cost (unavoidable)	₹ 20,000	₹ 15,000	₹ 10,000

Calculate the best product-mix in each of the following three independent cases:
1. Total availability of raw materials is limited to 18,000 kg.
2. Under a trade agremetn the firm cannot produce more than 7,500 unis of the three products taken together.
3. Total sales value of the three products cannot exceed ₹ 6,50,000.

Give complete workings showing contribution and total profit.
[Ans.
1. 1,750 units of X, 2,000 units of Y and 3,000 units of Z producing total profit of ₹ 87,000.
2. 5,000 units of X and 2,500 units of Z producing total profit of ₹ 1,25,000.
3. 3,700 units of X, 2,000 units of Y and 3,000 units of Z producing total profit of ₹ 1,33,800.]

Q.28. Flex Ltd. has been offered a choice to buy Machine A or Machine B. The relevant data are given below:

	Machine A	Machine B
Annual output (in units)	10,000	10,000
Fixed cost	₹ 30,000	₹ 16,000
Profit at the above level of production	₹ 30,000	₹ 24,000

Market price of the product is expected to be ₹ 10 per unit.
You are required to compute:
1. Break-even point for each of the two machines. **[Ans. 5,000 units and 4,000 units)**
2. Level of sales at which both the machines earn equal profit. **[Ans. 7,000 units]**
3. Range of sales at which Machine B is more profitable. **[Ans. 4,000 to 7,000 units]**
4. The level of sales above which Machine A is more profitable. **[More than 7,000 units)**

Q.29. Workwell Ltd. is a single product producer with P/V ratio of 40% for the product during the current year. Due to increasing competition it is believed that the price will have to be reduced by 10% in the next year. By what percentage sales quantity should increase so that Workwell Ltd. earns same profit in the next year also. **[Ans. 33.33%]**

Q.30. Attempt the following (working notes should form part of the answer):

1. Total fixed cost ₹ 12,000; Contribution ₹ 20,000. No. of units sold 10,000; Variable cost is 60% of sales. Determine selling price per unit and also the total profit/ loss. **[Ans. ₹ 5 and ₹ 8,000]**
2. Total fixed cost ₹ 12,000, Actual sales ₹ 48,000, Margin of safety ₹ 8,000. Determine the P/V ratio. **[Ans. 30%]**
3. When output is 3,000 units, the average cost per unit is ₹ 4. When output is increased to 4,000 units, the average cost is ₹ 3.50 per unit. The break-even point is 5,000 units. Find the P/V ratio. **[Ans. 37.5%]**

Q.31. Smart Exports Ltd. is producing and selling 20,000 units of its product in the home market at a price of ₹ 60 per unit. The per unit cost is as follows:

Direct Material	₹ 10 per unit
Direct labour	₹ 7 per unit
Factory Expenses:	
Fixed	₹ 12 per unit
Variable	₹ 4 per unit
Office and Selling Expenses:	
Fixed	₹ 6 per unit
Variable	₹ 3 per unit

An importer from Australia placed an order for 6,000 units at a price of ₹ 30 per unit. Execution of Australian order will result in an additional total cost of ₹ 10,000 over and above the variable cost. Should the Australian order be accepted?
[Ans. The offer should be accepted as it produces profit of ₹ 26,000]

Q.32. Given below are the sales and proits of the two halves of the year:

	1st half	2nd half
Sales	₹ 1,00,000	₹ 1,20,000
Profit	₹ 30,000	₹ 38,000

Fixed cost during the first half is equal to that during the second half. Selling price and per unit Variable Cost remain unchanged.
Calculate the following:

1. P/V ratio **[Ans. 40%]**
2. Fixed cost for each half and for the year. **[Ans. ₹ 10,000]**
3. BEP for each half and for the year. **[Ans. ₹ 25,000 and ₹ 50,000]**
4. Half-yearly sale to earn half-yearly profit of ₹ 40,000. **[Ans. ₹ 1,25,000]**
5. Annual sale to earn annal profit of ₹ 90,000. **[Ans ₹ 2,75,000]**

Q.33. A retail dealer in garments is currently selling 24,000 shirts annually. He supplies the following details for the year ended 31st December, 2006:

Selling price per shirt	40
Variable cost per shirt	25
Fixed cost:	
Staff salaries for the year	1,20,000
General office costs for the year	80,000
Advertising costs for the year	40,000

As a cost accountant of the firm you are required to answer the following each part independently:

1. Calculate the break-even point and margin of safety in sales revenue. **[Ans. ₹6,40,000 and ₹ 3,20,000]**
2. Assume that 20,000 shirts were sold in a year. Find out the net profit of the firm. **[Ans. ₹ 60,000]**
3. If it is decided to introduce selling commission of ₹ 3 per shirt, how many shirts would require to be sold in a year to earn a net income of ₹ 15,000. **[Ans. 21,250 shirts]**
4. Assuming that for the year 2007 an additional staff salary of ₹ 33,000 and increase in selling price by 15% is anticipated, what should be the beak-even point in number of shirts and sales revenue? **[Ans. 13,000 shirts and ₹ 5,98,000]**

Q.34. From the following data calculate the break-even point:

Direct material per unit	₹ 3
Direct labour per unit	₹ 2
Fixed overhead (Total)	₹ 10,000
Variable overhead	100% on direct labour
Selling price per unit	₹ 10
Trade discount	5%

Also determine the net profits, if sales are 10% above the break-even point **[Ans. 4,000 units & ₹ 1,000]**

Q.35. Electro Company sold 10,000 units last year at a price of ₹ 500 each. The cost structure per unit is as follows:

		₹
Materials	...	100
Labour	...	50
Variable overheads	...	25
Variable cost	...	175
Fixed overheads	...	200
Total cost	...	375

Due to competition, the price has to be reduced to ₹ 425 for the coming year. Assuming that there will be no change in costs, find out how many units shall be sold to ensure the same amount of total profit as last year. **[Ans. 13,000 units]**

Q.36. The following data is given:

	₹
Selling price	20 per unit
Variable manufacturing costs	11 per unit
Variable selling costs	3 per unit
Fixed factory overheads	5,40,000 per year
Fixed selling costs	2,52,000 per year

You are required to compute:

(i) Break-even point expressed in amount of sales in rupees; **[Ans. ₹ 26,40,000]**

(ii) Number of units that must be sold to earn a profit of ₹ 60,000 per year. **[Ans. 1,42,000 units]**

(iii) How many units must be sold to earn a net income of 10% of sales? **[Ans. 1,98,000 units]**

Q.37. Sultan Plastic Company makes plastic buckets. An analysis of their accounting reveals:

Variable cost per bucket	₹ 20
Fixed cost	₹ 50,000 for the year
Selling price per bucket	₹ 70

Required:

(i) Find the break-even point. **[Ans. 1,000 units]**

(ii) Find the number of buckets to be sold to get a profit of ₹ 30,000. **[Ans. 1,600 unis]**

(iii) If the company can manufacture 600 buckets more per year with an additional fixed cost of ₹ 2,000, what should be the selling price to maintain the profit per bucket as at (ii) above. **[Ans. ₹ 62.39]**

Q.38. A company sold in two successive periods 7,000 units and 9,000 units and has incurred a loss of ₹ 10,000 and earned ₹ 10,000 as profit respectively. The selling price per unit can be assumed at ₹ 100.

You are required to calculate:

(a) The amount of fixed cost **[₹ 80,000]**

(b) The amount of sales to break-even **[₹ 8,00,000]**

(c) The amount of sales to earn a profit of ₹ 40,000. **[₹ 12,00,000]**

Q.39. A company has annual fixed costs of ₹ 14,00,000. In 2004 sales amounted to ₹ 60,00,000 as compared with ₹ 45,00,000 in 2003 and profit in 2004 was ₹ 4,20,000 higher than in 2003.

(i) At what level of sales does the company break-even? **[Ans. ₹ 50,00,000]**

(ii) Determine profit of loss on a precast sales volume of ₹ 80,00,000. **[Ans. ₹ 8,40,000]**

(iii) If there is a reduction in selling price in 2005 by 10% and the company desires to earn the same profit as in 2004, what would be the required sales volume? **[Ans. ₹ 84,00,000]**

Q.40. A company manufactures a single product having a marginal cost of ₹ 0.75 a unit. Fixed costs are ₹ 12,000. The market is such that up to 40,000 units can be sold at ₹ 1.50 a unit, but any additional sales must be made at ₹ 1.00 a unit. There is a planned profit of ₹ 20,000. How many units must be made and sold? **[Ans. 48,000 units]**

Q.41. In a purely competitive market, 10,000 pocket transistors can be manufactured and sold and a certain profit is generated. It is estimated that 2,000 pocket transistors need be manufactured and sold in a monopoly market to earn the same profit.
Profit under both the conditions is targeted at ₹ 2,00,000. The variable cost per transistors is ₹ 100 and the total fixed cost is ₹ 37,000.
You are required to find out the unit selling prices both under monopoly and competitive conditions. **[Ans. ₹ 218.50 and ₹ 123.70]**

Q.42. A company sells its product at ₹ 15 per unit. In a period if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000, it earns a profit of ₹ 4 per unit.
Calculate the break-even point. **[Ans. ₹ 1,80,000]**

Q.43. Into-British Company has a capacity to produce 5,000 articles but actually produces only 2,000 articles for home market at the following costs.

		₹
Materials		40,000
Wages		36,000
Factory Overheads	Fixed	12,000
	Variable	20,000
Administration overhead	Fixed	18,000
Selling and distribution overheads	Fixed	10,000
	Variable	16,000
	Total Cost	1,52,000

The home market can consume only 2,000 articles at a selling price of ₹ 80 per article. An additional order for the supply of 3,000 articles is received from a foreign country at ₹ 65 article. Should this order be accepted or not, if execution of this order entails an additional packing cost of ₹ 3,000. **[Ans. Profit of ₹ 24,000]**

Q.44 A radio manufacturing co. finds that while it costs ₹ 6.25 to make component R-518, the same is available in the market at ₹ 5.75 each, with an assurance of continued supply. The break-down of the cost is:

	₹
Materials	2.75 each
Labour	1.75 each
Other variables	0.50 each
Depreciation and other fixed costs	1.25 each
	6.25

(a) Should you make or buy? **[Ans. Make]**
(b) What would be your decision, if the supplier offered the component at ₹ 4.85 each? **[Ans. Buy]**

Q.45 A company manufactures three products. The budged quantity, selling prices and unit costs are as under:

	A	B	C
	₹	₹	₹
Raw materials (@ ₹ 20 per kg.)	80	40	20
Direct wages (@ ₹ 5 per hour)	5	15	10
Variable overheads	10	30	20
Fixed overheads	9	22	18
Budgeted production (in units)	6,400	3,200	2,400
Selling price per unit (in ₹)	140	120-	90

Required:

(a) Present a statement of budgeted profit. **[Ans. Profit ₹ 3,24,800]**

(b) Set optimal product-mix and determine the profit, if the supply of raw materials is restricted to 18,400 kg. **[Ans. Profit ₹ 1,44,800]**

Q.46. An umbrella manufacturer makes an average profit of ₹ 2.50 per unit on a selling price of ₹ 14.30 by producing and selling 60,000 units at 60 per cent of potential capacity. His cost of sales per unit is as follows:

Direct materials	₹ 3.50
Direct wages	₹ 1.25
Factory overhead	₹ 6.25 (50% fixed)
Sales overhead	₹ 0.80 (25% variable)

During the current year, he intends to produce the same number but estimates that his fixed cost would go up by 10 per cent while the rates of direct wages and direct materials will increase by 8% and 6% respectively. However, the selling price cannot be changed.

Under this situation, he obtains an offer for a further 20% of his potential capacity.

What minimum price would you recommend for acceptance of the offer to ensure the manufacturer and overall profit of ₹ 1,67,300? **[Ans. ₹ 11.30]**

Q.47. Product X takes 20 hours to process on machine 99. It has a selling price of ₹ 100 and marginal cost of ₹ 60. Y (a component part used in production) could be made on machine 99 in 3 hours for a marginal cost of ₹ 5. The supplier's price is ₹ 10. Should one make or buy Y? discuss in both situations (i) when machine 99 is working at full capacity and (ii) when there is idle capacity. **[Ans. (i) Buy; (ii) Make]**

Q.48. A multi-product company provides the following costs and output data for the last year:

	Products			
	X	*Y*	*Z*	
Sales mix	*40%*	*35%*	*25%*	
	₹	₹	₹	
Selling price	20	25	30	
Variable cost per unit	10	15	18	
Total fixed cost				₹ 1,50,000
Total sales				₹ 5,00,000

The company proposes to replace Product Z by Product S. Estimated cost and output data are:

	X	*Y*	*S*	
Sales mix	*50%*	*30%*	*20%*	
	₹	₹	₹	
Selling price	20	25	28	
Variable cost per unit	10	15	14	
Total fixed cost				₹ 1,50,000
Total sales				₹ 5,00,000

Analyses the proposed change and suggest what decision the company should take.

Q.49. A company can produce three different products from the same raw material using same production facilities. The requisite labour is available in plenty at ₹ 8 per hour for all products. The supply of raw material, which is imported at ₹ 8 per kg. Is limited to 10,400 kg. for the budget period. The variable overheads are ₹ 5.60 per hour. The fixed overheads are ₹ 50,000. The selling commission is 10% on sales.

(a) From the following information, you are required to suggest the most suitable sales mix, which will maximize the company's profit. Also, determine the profit that will be earned at that level.

Product	*Market demand units*	*Selling price per unit* ₹	*Labour hours per unit*	*Raw material required per unit (kg.)*
X	8,000	30	1	0.7
Y	6,000	40	2	0.4
Z	5,000	50	1.5	1.5

(b) Assume, in above situation, if additional 4,500 kg. of raw material is made available for production, should the company go in for further production, if it will result in additional fixed overheads of ₹ 20,000 and 25% increase in the rates per hour for labour and variable overheads.

Q.50. A single product company sells its products at ₹ 60 per unit. In 1996, the company operated at a margin of safety of 40%. The fixed costs amounted to ₹ 3,60,000 and the variable cost ratio to sales was 80%.

In 1997, it is estimated that the variable cost will go up by 10% and the fixed costs will increase by 5%.

Find the selling price required to be fixed in 1997 to earn the same P/V ratio as in 1996.

Assuming the same selling price of ₹ 60 per unit in 1997, find the number of units required to be produced and sold to earn the same profit as in 1996.
[Ans.: ₹ 66 and 85,833 units]

Q.51. Indian Plastics made plastic buckets. An analysis of their accounting reveals :

Variable cost per bucket	₹ 20
Fixed cost	₹ 50,000 for the year
Capacity	2,000 buckets per year
Selling price per bucket	₹ 70.

Required :

i. Find the break-even point. **[Ans.: 1,000 buckets]**
ii. Find the number of buckets to be sold to get a profit of ₹ 30,000. **[Ans.: 1,600 buckets]**
iii. If the company can manufacture 600 buckets more per year in addition to buckets as in (ii) above with an additional fixed cost of ₹ 2,000, what should be the selling price to maintain the profit per bucket as at (ii) above ? **[Ans. ₹ 62.39 per bucket]**

Q.52. A retail dealer in garments is currently selling 24,000 shirts annually. He supplies the following details for the year ended 31st December, 2001.

	₹
Selling price per shirt	40
Variable cost per shirt	25
Fixed Cost : Staff salaries for the year	1,20,000
General office costs for the year	80,000
Advertising costs for the year	40,000

i. Calculate the break-even point and margin of safety in sales revenue and number of shirts sold. **[Ans.: ₹ 6,40,000 and ₹ 3,20,000]**
ii. Assume that 20,000 shirts were sold in a year. Find out the net profit of the firm. **[Ans.: ₹ 60,000]**
iii. If it is decided to introduce selling commission of ₹ 3 per shirt, how many shirts would require to be sold in a year to earn a net income of ₹ 15,000. **[Ans.:21,250 units]**

Q.53. Quality Product Limited has drawn up the following budget for the year 1998 – 99 :

	₹
Raw Materials	20,00,000
Labour, stores, power and other variable costs	6,00,000
Fixed Manufacturing Overheads	7,00,000
Packing and variable distribution cost	4,00,000
Fixed general overheads including selling	3,00,000
Sales Revenue @ ₹ 50 per unit	40,00,000
Budgeted Profit	50,00,000
	₹ 10,00,000

The General Manager suggests to reduce selling prices by 5% and expects to achieve an additional volume of 5%. The more intensive manufacturing programme will involve

additional costs of ₹ 15,000 for production planning. It will also be necessary to open an additional sales office at the cost of ₹ 1,00,000 per annum.

The Sales Manager, on the other hand, suggests to increase selling price by 10% which it is estimated will reduce sales volume by 10%. At the same time a saving in manufacturing overheads and general overheads of ₹ 50,000 and ₹ 1,00,000 per annum respectively is expected on this reduced volume.

Which of these two proposals would you accept and why ? Show complete working. **[Ans.: Profit as per proposal of General Manager ₹ 7,22,500 and as per proposal of Sales Manager ₹ 14,00,000]**

Q.54. M/s. Natraj Stationers manufactures plastic files for office use. The break-up of its cost and sales is as follows :

Variable cost per file	:	₹ 40
Fixed Cost	:	₹ 60,000 per year
Selling Price	:	₹ 100 per file

You are required to compute the following :

(i) Break-even point; **[Ans.: 1,000 files]**

(ii) Number of files to be sold to earn a net profit of ₹ 30,000. **[Ans.: 1,500 files]**

(iii) If the firm manufactures and sells 500 files more per year with an additional fixed cost of ₹ 2,000, what should be the selling price to earn the same amount of profit per file as in (ii) above ? **[₹ 91]**

Q.55. The Laila Shoe Company sells five different styles of Ladies chappals with identical purchase cost and selling prices. The company is trying to find out the profitability of opening another sfore, which will have the following expenses and revenues :

	Per Pair ₹
Selling Price	30.00
Variable Cost	19.50
Salesmen's Commission	1.50
Total Variable cost	21.00
	₹
Annual fixed expenses are :	
Rent	60,000
Salaries	2,00,000
Advertising	80,000
Other Fixed Expenses	20,000
	3,60,000

Required:

(a) Calculate the annual break-even point in units and in value. Also determine the profit or loss if 35,000 pairs of chappals are sold. **[Ans.: 40,000 units, ₹ 12,00,000 and ₹ 45,000 loss]**

(b) The sales commissions are proposed to be discontinued, but instead a fixed amount of ₹ 90,000 is to be incurred in fixed salaries. A reduction in selling price of 5% is also proposed. What will be the break-even point in units? **[Ans.50,000 units]**

(c) It is proposed to pay the store manager 50 paise per pair as further commission. The selling price is also proposed to be increased by 5%. What would be the break-even point in units ? **[Ans. 36,000 units]**

Q.56. The following data relate to a manufacturing company :
Plant capacity : 4,00,000 units per annum
Present utilization : 40%

Actuals for the year were :

Selling Price	₹ 50 per unit
Materials Cost	₹ 20 per unit
Variable Manufacturing Cost	₹ 15 per unit
Fixed Costs	₹ 27 lakhs

In order to improve capacity utilization the following proposals are considered :
(iii) Reduce Selling Price by 10%
(iv) Spend additionally ₹ 3 lakhs on Sales Promotion
How many units should be made and sold to earn a profit of ₹ 5 lakhs per year in both the proposals. **[Ans. (i) 3,20,000 units; (ii) 2,33,333 units]**

Q.57. The variable cost structure of a product manufactured by a company during the current year is as under :

	₹ Per unit
Material	120
Labour	30
Overheads	12

The selling price per unit is ₹ 270 and the fixed cost and sales during the current year are ₹ 14 lakhs and ₹ 40.5 lakhs respectively.

During the forthcoming year the direct workers will be entitled to a wage increase of 10% from the beginning of the year and the material cost, variable overhead and fixed overhead are expected to increase by 7.5%, 5% and 3% respectively.

The following are required to be computed :

(d) New sale price in the forthcoming year if the current P/V ratio is to be maintained.

(e) Number of units that would require to be sold during the forthcoming year so as to yield the same amount of profit in the current year, assuming that selling price per unit will not be increased.

Q.58. Quality Products Ltd. manufactures and markets a single product. The following data are available

	₹ Per unit
Materials	16
Conversion costs (variable)	12
Dealer's margin (10% of selling price)	4
Selling Price	40
Fixed Cost : ₹ 5 lakhs	
Present sales 90,000 units	
Capacity utilization : 60 per cent	

There is acute competition. Extra efforts are necessary to sell. Suggestions have been made for increasing sales :

(a) By reducing selling price by 5 per cent.

(b) By increasing dealer's margin by 25 per cent over the existing rate.

Compute units to be sold in both the suggestions if the company desires to maintain the present profit ? Give reasons. **[Ans.: (a) 1,16,129 units; (b) 1,02,857 units]**

Q.59. A company produces single product which sells for ₹ 20 per unit. Variable cost is ₹ 15 per unit and Fixed overhead for the year is ₹ 6,30,000.

Required :

(a) Calculate sales quantity needed to earn profit of 10% on sales. **[Ans.: 2,10,000 units]**

(b) Calculate sales price per unit to bring BEP down to 1,20,000 units. **[Ans. ₹ 20.25]**

(c) Calculate margin of safety sales if profit is ₹ 60,000. **[Ans.: ₹ 2,40,000]**

SOLUTIONS TO REVISIONARY PROBLEMS

Ans. to Q.1.

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{₹\ 2,00,000}{₹\ 8,00,000} \times 100 = 25\%$$

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}} = \frac{₹\ 1,50,000}{25\%} = ₹\ 6,00,000$$

Ans. to Q.2. $\text{Break-even sales} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{₹\ 1,08,000}{30\%} = ₹\ 3,60,000$

Profit = Sales x P/V Ratio – Fixed Cost

$= 9,00,000 \times \frac{30}{100} - 1,08,000 = ₹\ 1,62,000$

Computation of Fixed Cost :

A. $\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$

Profit = Margin of Safety x P/V Ratio

$= 2,40,000 \times \frac{30}{100} = ₹\ 72,000$

B. $\text{MS Ratio} = \frac{\text{Margin of Safety}}{\text{Sales}} \times 100$

$\frac{40}{100} = \frac{₹\ 2,40,000}{\text{Sales}}$

Sales = ₹ 6,00,000

C. Profit = Sales x P/V Ratio – Fixed Cost

₹ 72,000 = ₹ 6,00,000 x 30/100 – Fixed Cost

Fixed Cost = ₹ 1,08,000

Ans. to Q.3. Margin of Safety = Sales x M.S. Ratio

= ₹ 1,00,000 x 40% = ₹ 40,000.

Profit = Margin of safety x P/V Ratio = ₹ 40,000 x 50%

= ₹ 20,000.

Ans. to Q.4. $\text{Overall BEP} = \frac{\text{Overall Fixed Cost}}{\text{Overall P/V Ratio}} = \frac{₹\ 35,000}{71\%} = ₹\ 50,000$

Computation of Overall P/V Ratio Assuming that total sales value is ₹ 100, overall P/V Ratio is computed below :

	X	Y	Z	Total
Sales	₹ 20	₹ 30	₹ 50	₹ 100
(-) Variable Cost	₹ 10	₹ 9	₹ 10	₹ 29
Contribution	₹ 10	₹ 21	₹ 40	₹ 71

$\text{Overall P/V Ratio} = \frac{\text{Overall Contribution}}{\text{Overall Sales}} \times 100$

$= \frac{₹\ 71}{₹\ 100} \times 100 = 71\%$

Ans. to Q.5. B.E.P. (₹) $= \frac{\text{Fixede Costs}}{\text{P/V Ratio}} = \frac{₹\ 4,80,000}{60\%} = ₹8,00,000$

$$\text{Margin of Safety} = \frac{\text{Actual Sales} - \text{B.E.P.}}{\text{Actual Sales}}$$

$$60\% = \frac{\text{Actual Sales} - ₹\ 8,00,000}{\text{Actual Sales}}$$

Actual Sales = ₹ 20,00,000	
Contribution (60% of ₹ 20,00,000)	₹ 12,00,000
Less : Fixed Costs	4,80,000
Profit (before tax)	₹ 7,20,000
Less : Tax @ 40%	2,88,000
Profit After Tax	4,32,000

$$\text{Net Return on Sales} = \frac{\text{Profit After Tax}}{\text{Sales}} \times 100 = \frac{₹\ 4,32,000}{₹\ 20,00,000} \times 100 = 21.6\%$$

Ans. to Q. No.6.

Quarterlay Sales for desired quarterly profit of ₹ 70,000

$$= \frac{\text{Quarterly Fixed Cost} + \text{Quarterly Desired Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\ 2,80,000 + ₹\ 70,000}{28\%}$$

$$= ₹\ 12,50,000$$

Ans. to Q. No. 7.

$$\text{BEP (in units)} = \frac{\text{Fixed Cost}}{\text{SP/Unit} - \text{VC/Unit}}$$

$$= \frac{₹\ 200}{₹\ 7 - ₹\ 3} = 50 \text{ units}$$

If 2,000 units are sold,

Profit = (Total Units) (Contribution/Unit) – Fixed Cost.

= (2,000 units) (₹ 4/Unit) – ₹ 200

= ₹ 7,800

$$\text{Units to be sold for profit of ₹ 3,000} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution / Unit}}$$

$$= \frac{₹\ 200 + ₹\ 3,000}{₹\ 4/\text{Unit}}$$

= 800 units.

Ans. to Q. No. 8.

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\ 4,00,000}{0.40}$$

$$= ₹\ 10,00,000$$

Also

$$\text{M.S. Rato} = \frac{\text{Margin of Safety}}{\text{Sales}} \times 100$$

$$\frac{20}{100} = \frac{₹\ 10,00,000}{\text{Sales}}$$

$$\text{Hence, Sales} = ₹\ 50,00,000$$

Also, Sales – Margin of Safety

BEP = ₹ 40,00,000

We know that

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$\text{Fixed Cost} = \text{BEP} \times \text{P/V Ratio}$$

$$= ₹\ 40,00,000 \times 0.40$$

$$= ₹\ 16,00,000$$

Ans. to Q. No. 9.

(i) Sales for loss of ₹ 30,000

$$= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\ 90,000 + (-30,000)}{50\%}$$

$$= ₹\ 1,20,000$$

$$\text{P/V Ratio} = \frac{\text{FC} + \text{Profit}}{\text{Sales}} \times 100$$

$$= \frac{₹\ 90,000 + ₹\ 60,000}{₹\ 3,00,000} \times 100$$

$$= 50\%$$

(ii) Margin of Safety $= \frac{\text{Profit}}{\text{P/V Ratio}}$

$$= \frac{₹\ 90,000}{50\%}$$

$$= ₹\ 1,80,000$$

Ans. to Q. No.10.

(i) Break-even Sales $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$$= \frac{₹\ 24,00,000}{40\%}$$

$$= ₹\ 60,00,000$$

(ii) Margin of Safety = Sales – BEP

$$= ₹\ 75,00,000 - ₹\ 60,00,000$$

$$= ₹\ 15,00,000$$

(iii) M.S. Ratio $= \frac{\text{Sales} - \text{BEP}}{\text{Sales}} \times 100$

$$\frac{20}{100} = \frac{\text{Sales} - 60,00,000}{\text{Sales}}$$

Hence, Sales = ₹ 75,00,000

(iv) Since P/V Ratio is 40%, Variable Cost must have been 60% of Sales i.e. 60% of 75,00,000 = ₹ 45,00,000

(v) Profit = Sales x P/V Ratio – Fixed Cost

$$= \left(75,00,000 \times \frac{40}{100}\right) - 24,00,000$$

$$= ₹\ 60,00,000$$

Ans. to Q. No. 11.

Composite BEP (in units)

$$= \frac{\text{Composite Fixed Cost}}{\text{Composite Contribution/Unit}}$$

$$= \frac{₹\ 6,16,000}{₹\ 31.42857 \text{ per unit}}$$

= 19,600 units.

Composte Contribution per unit

$$= \frac{(4 \text{ units of J})(₹\ 40/\text{unit}) + (3 \text{ units of K})(₹\ 20 \text{ p.u.})}{7 \text{ units}}$$

= ₹ 31.42857

Ans. to Q. No. 12.

Computation of Contribution / Unit

SP/Unit (₹ 25 less 4% Trade Discount)		₹ 24
(–) **Variable Cost/Unit**		
Materials	8	
Labour	5	
V. Overheads (60% of Labour)	3	
	—	₹ 16
Contribution / Unit		₹ 8

BEP = $\frac{\text{Fixed Cost}}{\text{Contribution/Unit}}$

= $\frac{₹\ 24,000}{₹\ 8/\text{Unit}}$

= 3,000 Units

BEP (in value) = 3,000 units x ₹ 24/unit

= ₹ 72,000

If sales are 15% above BEP, the amount of profit is computed below :

Sales (3,000 units plus 15% i.e. 3,450 units) (₹ 24)	=	₹ 82,800.
(–) Variable Cost (3,450 units x ₹ 16/unit)	=	55,200
Contribution	=	27,600
(–) Fixed Cost	=	24,000
Profit	=	3,600

If sales are 20% above BEP, the amount of profit is computed below :

Sales (3,000 units plus 20% i.e. 3,600 units) (₹ 24)	=	₹ 86,400
(–) Variable Cost (3,600 units x ₹ 16)	=	₹ 57,600
Contribution	=	28,800
(–) Fixed Cost	=	24,000
Profit	=	4,800

Ans. to Q. No. 13.

	Present Situation
Sales	₹ 100 lakhs
(–) Profit (20% of Sales)	₹ 20 lakhs
Total Cost	₹ 80 lakhs
(–) Fixed Cost	₹ 25 lakhs
Variable Cost	₹ 55 lakhs
Contribution	₹ 45 lakhs

(Sales – Variable cost)

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{₹\,45,00,000}{₹\,1,00,000} \times 100$$

$$= 45\%$$

Proposed Situation

Sales $\left(₹\,100\text{ lakhs} \times \frac{120}{100} \times \frac{90}{100}\right)$	=	₹ 108 lakhs
(–) Variable Cost $\left(₹\,55\text{ lakhs} \times \frac{120}{100} \times \frac{95}{100}\right)$	=	₹ 62.7 lakhs
Contribution	=	₹ 45.3 lakhs
(–) Fixed Cost $\left(₹\,25\text{ lakhs} \times \frac{80}{100}\right)$	=	₹ 20 lakhs
Profit	=	₹ 25.3 lakhs

Hence, as compared to present situation, the profit in the proposed situation gets increased by ₹ 5.3 lakhs

Ans. to Q. No. 14

Sales	=	₹ 10,00,00,000
(–) Variable Cost (60% of Sales	=	6,00,00,000
Contribution	=	₹ 4,00,00,000
(–) Cash fixed Cost (Bal. Figure)	=	2,80,00,000
Profit before Dep. (12% of Sales)	=	1,20,00,000
(–) Depreciation	=	1,00,00,000
Profit	=	20,00,000

$$\text{BEP (in value)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{2,80,00,000 + 1,00,00,000}{40\%} = ₹\,9,50,00,000$$

Ans. to Q. No. 15.

$$\text{BEP (in units)} = \frac{\text{Fixed Cost}}{\text{Contribution/unit}}$$

$$= \frac{₹\,6,000}{₹\,6/\text{unit}}$$

$$= 1,000 \text{ units}$$

In the given question, Production Overheads I is fixed cost (2,000 units x ₹ 3/unit)
= 1,500 units x ₹ 4/unit = ₹ 6,000)

And Production Overheads II is variable cost because it is ₹ 2/unit at all levels.

Contribution/unit is computed below :

Contribution/unit (before Production Overheads II)	=	₹ 8
(–) Production Overheads II per unit	=	₹ 2
Contribution/unit	=	₹ 6

Ans. to Q. No. 16.

Present and Proposed Contribution per unit

Variable Cost/unit	**Present**	**Proposed**
Material	56	56 plus 6% = 59.36
Labour	10	10 plus 3% = 10.80
Expenses	6	6 plus 3% = 6.18
Selling Price/Unit	73	76.34
Contribution/Unit	120	120.00
P/V Ratio	48	43.66
	40%	36.38%

(a) Statement showing current year and next year profit

Particulars	**Current Year**	**Next Year**
Units sold	15,000	15,000
Contribution/Unit	₹ 48	₹ 43.66
Total contribution	₹ 7,20,000	₹ 6,54,900
Fixed Cost	₹ 1,00,000	₹ 1,05,000
Profit	₹ 6,20,000	₹ 1,49,000

(b) Existing P/V Ratio is 40% which is to be maintained-

$$\text{Now P/V Ratio} = \frac{\text{SP/Unit} - \text{VC/Unit}}{\text{SP/Unit}} \times 100$$

$$40 = \frac{\text{SDP/Unit} - 43.66}{\text{SP/Unit}} \times 100$$

Solving, we get SP/Unit = ₹ 127.23

(c) Last year Profit = ₹ 6,20,000

Quantity to be sold next year in order to achieve last year profit is computed below :

$$= \frac{\text{Fixed Cost + Desired Profit}}{\text{Contribution/Unit}}$$

$$= \frac{₹\,1,05,000 + ₹\,6,20,000}{₹\,43.66}$$

= 16,606 Units (Approx.)

Ans. to Q. No.17.

(i) P/V Ratio $= \frac{S-V}{S} \times 100$

$= \frac{80-48}{80} \times 100 = 40\%$

BEP (Value) $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$= \frac{₹\,18,00,000}{40\%} = ₹\,45,00,000$

(ii) Desired increase in Sales $= \frac{\text{Desired increase in profit}}{\text{P/V Ratio}}$

$= \frac{₹\,3,60,000}{40\%} = ₹\,9,00,000$

(iii) SP/Unit = ₹ 80 (unchanged)
VC/Unit = ₹ 48 + ₹ 7 = ₹ 55
C/Unit = ₹ 80 – ₹ 55 = ₹ 25

Future Desired Profit = Present Actual Profit

= Present contribution – fixed Cost
= (1,00,000 units) (₹ 32/Unit) – ₹ 18,00,000
= ₹ 14,00,000

Units to be sold in the future to maintain the present profit is computed below :

$$= \frac{\text{Fixed Cost + Desired Profit}}{\text{Contribution/unit}}$$

$$= \frac{₹\,18,00,000 + \text{Rs. } 14,00,000}{₹\,25 \text{ per unit}}$$

= 1,28,000 units

Hence, the profit which is presently obtained by selling 1,00,000 units will be obtained in the future by selling 1,28,000 units. In other words, the sales quantity is to be increased by 28% to off-set the increase of ₹ 7 per unit in variable cost.

Ans. to Q. No. 18.

Present Variable Cost per unit

Material	₹ 40
Labour	₹ 10
Overheads	₹ 4
	₹ 54

SP/Unit = ₹ 90
C/Unit = SP/Unit – VC/Unit

$$\text{P/V Ratio} = \frac{C}{S} \times 100 = \frac{36}{90} \times 100 = 40\%$$

Present Profit= Sales x P/V Ratio – Fixed Cost

$$= \left(13,50,000 \times \frac{40}{100}\right) - 1,40,000$$

= ₹ 4,00,000

(i) Future Variable Cost per unit

Material(₹ 40 plus 7.5%)	₹ 43
Labour (₹ 10 plus 10%)	₹ 11
Overheads (₹ 4 plus 5%)	₹ 4.20
	₹ 58.20

$$\text{P/V Ratio} = \frac{S-V}{S} \times 100$$

$$40 = \frac{S-58.20}{S} \times 100$$

Present P/V Ratio of 40% is to be maintained

Solving, we get –
Selling Price/Unit = ₹ 97

(ii) Present Actual Profit is ₹ 4,00,000 which is also desired in the future. Selling Price epr unit has remained ₹ 80 but variable cost per unit has become ₹ 58.20. Hence, contribution per unit has become ₹ 31.80.

No. of units to be sold in the future to maintain the present profit is computed below :

$$= \frac{\text{Fixed Cost + Desired Profit}}{\text{Contribution/unit}}$$

$$= \frac{(1,40,000 \text{ plus } 3\%) + 4,00,000}{31.80}$$

= 17,113 units (approximately).

Ans. to Q. No. 19.

(i) First Half

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{\text{Fixed Cost + Profit}}{\text{Sales}} \times 100$$

$$= \left(\frac{₹\,5,00,000 + ₹\,2,00,000}{₹\,14,00,000}\right) \times 100$$

$$= 50\%$$

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{₹\,5,00,000}{50\%} = ₹\,10,00,000$$

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\,2,00,000}{50\%} = ₹\,4,00,000$$

(ii) In the second half, the company has incurred loss of ₹ 1,00,000. Hence, amount of sales in the second half is computed below :

$$\frac{\text{Fixed Cost + Profit}}{\text{P/V Ratio}}$$

$$= \frac{₹\,5,00,000 + (-1,00,000)}{50\%}$$

$$= ₹\,8,00,000$$

(iii) Whole Year

Fixed Cost = ₹ 5,00,000 + ₹ 5,00,000

= ₹ 10,00,000

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{₹\,10,00,000}{50\%}$$

= ₹ 20,00,000

Sales for the whole year

= ₹ 14,00,000 (First half) + ₹ 8,00,000 (Second half)

= ₹ 22,00,000

Hence, Margin of Safety for the whole year –

= Sales – BEP

= ₹ 22,00,000 – ₹ 20,00,000

= ₹ 2,00,000

Ans. to Q. No. 20.

Variable Cost is 60% of Sales. Hence, P/V Ratio is 40%.

(a) $$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{₹\,2,00,000}{40\%} = \text{Rs. } 5,00,000$$

Since, BEP occurs at 80% of sales, we can conclude that

$$\text{Sales} = \frac{\text{BEP}}{80\%} = \frac{₹\,5,00,000}{80\%}$$

= ₹ 6,25,000

(b) Sales at 90% Capacity = 90% of 6,25,000
= ₹ 5,62,500

Profit = Sales x P/V Ratio – Fixed Cost

$$= 5,62,500 \times \frac{40}{100} - 2,00,000$$

= ₹ 25,000

Ans. to Q. No. 21.

Computation of Contribution/Unit

	A	B	C
Selling Pirce / Unit	140	120	90
Variable Cost/Unit			
Material (₹ 20/kg.)	80	40	20
Labour (₹ 5/hr.)	5	15	10
Variable Overheads	19	30	20
	95	85	40
Contribution/Unit	45	35	40

(i) Computation of Budgeted Profit

Product	Budgeted Units	Contribution Per Unit	Contribution
A	6,400	45	2,88,000
B	3,200	35	1,12,000
C	2,400	40	96,000
			4,96,000
		(–) Fixed Cost	(–) 1,71,200
		Profit	3,24,800

(ii) Since raw material availability is the limiting factor, the profitability decision has to be taken on the basis of contribution per kg. of raw material, which is computed below :

	A	B	C
Contribution/Unit	₹ 45	₹ 35	₹ 40
Raw Material Usage/Unit	4 kgs.	2 kgs.	1 kg.
Contribution per kg. of raw material	45/4	35/2	40/1
	₹ 11.25	₹ 17.50	₹ 40
Ranking	III	II	I

Taking into consideration the fact that total raw material consumption cannot be more than 18,400 kgs., the most profitable product combination is computed below :

Product	Units	Raw Material Used Per Unit	Raw Material Used Total
A	2,400	4 kgs.	9,600 kgs.
B	3,200	2 kgs.	6,400 kgs.
C	2,400	1 kg.	2,400 kgs.
			18,400 kgs.

The amount of maximum profit, as per above recommendation, is computed below :

Product	Units	Contribution Per Unit	Contribution Total
A	2,400	45	1,08,000
B	3,200	35	1,12,000
C	2,400	40	96,000
			3,16,000
		(–) Fixed Cost	1,71,200
		Profit	1,44,800

Ans. to Q. No. 22.

(i) Current Contribution Analysis

	X	Y
Variable Cost/Unit		
Material (₹ 20/kg.)	20	30
Labour (₹ 15/hr.)	15	15
Variable Overheads	15	15
Selling Price/Unit	50	60
Contribution/unit	80	100
	30	40

(ii) Profit currently earned by the company

Product	Units	Contribution Per Unit	Contribution Total
X	15,000	30	4,50,000
Y	12,000	40	4,80,000
			9,30,000
		(–) Fixed Cost	3,96,000
		Profit	5,34,000

(iii) Machine Hours available

Product	Current	Machine Hours Per Unit	Machine Hours Total
X	15,000 units	½ M. hr.	7,500 M. hrs.
Y	12,000 units	¾ M. hr.	9,000 M. hrs.
			16,500 M. hrs.

Contribution per Machine Hour

	X	Y
Contribution/Unit	₹ 30	₹ 40
M. hrs./unit	0.5 M. hrs.	0.75 M. hrs.
Contribution/M. hr.	30/0.5 = ₹ 60	40/0.75 = ₹ 53.33
Ranking	I	II

Determination of Most Profitable Combination

Product	Units	Machine Hours Per Unit	Machine Hours Total
X	18,000 (Max.)	0.5 M. hr.	9,000 M. hrs.
Y	10,000	0.75 M. hr.	7,500 M. hrs.
			16,500 M.hrs.

Hence, under the given constraints, it is recommended to sell 18,000 units of X and 10,000 units of Y in order to obtain maximum profit.

(iv) Determination of Maximum Profit

Product	Units	Contribution Per Unit	Contribution Total
X	18,000	30	5,40,000
Y	10,000	40	4,00,000
			9,40,000
		(–) Fixed Cost	(3,96,000)
		Profit	5,44,000

Ans. to Q. No.23.

Product P

Selling Price/unit	=	₹ 100
(–) Variable Cost/unit	=	₹ 60
Contribution/unit	=	₹ 40
Machine Hrs./unit	=	5

Hence, Contribution per Machine Hour = $\frac{₹\ 40}{5} = ₹\ 8$

Component B – 15

It can be purchased at ₹ 25 per unit. However, if it is decided to produce this component, the relevant cost is computed below :

Variable Manufacturing Cost	₹ 10
Opportunity Cost (2 Machine Hrs. x ₹ 8/M. Hr.)	₹ 16
	₹ 26

Therefore, it is advised to purchase the component and not to manufacture it.

Ans. to Q. No. 24.

Comparative Profitability Statement

Particulars	At Present	After accepting the offer
Sales (Note – 1)	₹ 6,00,000	₹ 8,00,000
Variable Cost		
Material (Note – 2)	₹ 1,20,000	₹ 1,53,000
Wages	2,40,000	3,46,800
Variable Overheads	60,000	85,000
	4,20,000	5,84,800
Contribution	₹ 1,80,000	₹ 2,15,200
(–) Fixed Cost	1,20,000	1,50,000
Profit	60,000	65,200

Conclusion : The offer from the foreign market is recommended to be accepted as it may lead to increase in profit to the extent of ₹ 5,200.

Note – 1 :

Present Sales (12,000 units x ₹ 50)	₹ 6,00,000
Sale in foreign market (5,000 units x ₹ 40/unit)	2,00,000
	₹ 8,00,000

Note – 2 :

Present Materials	=	1,20,000	
Present Output	=	12,000	units
Proposed Output	=	17,000	units
Present Materials Cost	=	₹ 10	per unit
Proposed Materials Cost	=	₹ 9	per unit

Proposed Materials Cost is ₹ 1,20,000 x $\frac{17,000 \text{ units}}{12,000 \text{ units}} \times \frac{₹ 9/\text{unit}}{₹ 10/\text{unit}}$

Note – 3 :

Present Wages	=	₹ 1,53,000
Proposed Wages (ignoring inefficiency)	=	₹ 2,40,000
Proposed Wages (considering inefficiency)	=	₹ 2,40,000 x $\frac{17,000 \text{ units}}{12,000 \text{ units}}$
	=	₹ 3,40,000

Note – 4 : Present Variable Overheads = ₹ 3,40,000 plus 2%

= ₹ 3,46,800

Proposed Variable Overheads = ₹ 60,000

= ₹ 60,000 x $\frac{17,000 \text{ unit}}{12,000 \text{ units}}$

= ₹ 85,000

Ans. to Q. No. 25.

Option 1 (To continue)

Contribution		
(500 units x ₹ 1/unit)	=	₹ 500
(–) Fixed Cost	=	₹ 1,500
	Loss	₹ 1,000

Option 2 (To shut down)

Fixed Cost	=	₹ 1,000
Additional Cost for closing	=	₹ 100
		₹ 1,100

Hence, the factory should run.

Ans. to Q.26.

Calculation of Profit and break-even point

	50% capacity (12,500 units)		90% capacity (22,500 units)	
	P.U. ₹	Total ₹	P.U. ₹	Total ₹
Sales	19.40	2,42,500	19	4,27,500
Variable Costs:				
Material	10	1,25,000	9.50	2,13,750
Labour	3	37,500	3	67,500
Variable overheads	2	25,000	2	45,000
	15	1,87,500	14.50	3,26,250
Total	4.40	55,000	4.50	1,01,250
Contribution (Sales – VC)		30,000		30,000
Less: Fixed Cost		25,000		71,250
Profit		30,000		30,000
B.E. Point (in units)		4.40		4.50
$= \frac{\text{F.C.}}{\text{Contribution P.U.)}}$		= 6,818		= 6,667

Ans. to Q.27.

Marginal Cost Statement

	X	Y	Z
Capacity in units	5,000	2,000	3,000
	₹	₹	₹
Selling price	100	50	60
Material	40	10	30
Other variable costs	36	25	10
Total variable cost	76	35	40
Contribution (Sales – VC)	24	15	20
Material used in kg	4	1	3
Contribution per kg (₹)	6	15	6.67
P/V ratio (C ÷ S)	24%	30%	33.33%

(i) Total raw material available is 18,000 kg. ranking on the basis of contribution per kg of material is Y, Z, X. Thus, on this basis:

2,000 unis of Y @ 1 kg per uint = 2,000 kg
3,000 units of Z @ 3 kg per unit = 9,000 kg
1,750 units of X @ 4 kg per unit = 7,000 kg (Balance)
18,000

Profit Computation

	₹
Contribution of Y = 2,000 unis × ₹ 15 =	30,000
Contribution of Z = 3,000 units × ₹ 20 =	60,000
Contribution of X = 1,750 units × ₹ 24 =	42,000
Total =	1,32,000
Less fixed cost (20,000 + 15,000 + 10,000)	45,000
Profit =	87,000

(ii) Output 7,500 units. Ranking on the basis of contribution per unit X, Z and Y.

	₹
Contribution of X – 5,000 units × ₹ 24	1,20,000
Contributino of Z – 2,500 unis × ₹ 20	50,000
7,500 Total	1,70,000
Less: Fixed Cost	45,000
Profit	1,25,000

(iii) Total sales limited to ₹ 6,50,000. Ranking on the basis of P/V ratio Z, Y, X.

	₹
Sale of 3,000 units of Z @ ₹ 60	1,80,000
Sale of 2,000 units of Y @ ₹ 50	1,00,000
Sale of 3,700 units of X @ ₹ 100	3,70,000
	6,50,000

Contribution and Profit

	₹
Contribution – Z 1,80,000 × $33\frac{1}{3}\%$	60,000
– Y 1,00,000 × 30%	30,000
– X 3,70,000 × 24%	88,800
Total	1,78,800
Less: Fixed Cost	45,000
Profit	1,33,800

Ans. to Q.28.

Contribution = Fixed Cost + Profit
A = 30,000 + .30,000 = ₹ 60,000
B = 16,000 + 24,000 = ₹ 40,000
Contribution per unit A = ₹ 60,000 ÷ 10,000 units = ₹ 6
B = ₹ 40,000 ÷ 10,000 units = ₹ 4

(i) Break-even point = $\frac{\text{Fixed cost}}{\text{Contribution per unit}}$

$A = \frac{30,000}{6} = 5,000 \text{ units}$ $\qquad B = \frac{16,000}{4} = 4,000 \text{ units}$

(ii) Sales at which both the macines earn equal profit

$= \frac{\text{Difference in fixed cost}}{\text{Difference in contribution}}$

$= \frac{30,000 - 16,000}{6 - 4} = \frac{14,000}{2} = 7,000 \text{ units}$

(iii) B is more profitable between 4,000 to 7,000 units.
(iv) A is more profitable when sales are above 7,000 units.

Ans. to Q.29.

Let us assume that at present 100 units are sold at ₹ 10 per unit. Since P/V ratio is 40%, contribution per unit is ₹ 4 and variable cost per unit is ₹ 6.

On accouant of 10% decrease, new selling per unit is ₹ 9 and new contribution per unit is ₹ 3.

Furture Desired Profit
= Present Actual Profit
= Present Contribution – FC
= (100 Units) (₹ 4/unit) – FC
= ₹ 400 – FC

Units to be sold in future to maintain the present profit

$= \frac{\text{FC} + \text{DP}}{\text{Contribujtion per unit}}$

$= \frac{\text{FC} + ₹\ 400 - \text{FC}}{₹\ 3}$

$= \frac{400}{3} = 133.33 \text{ units.}$

It means the profit which is presently obtained by selling 100 units will be obtained in future by selling 133.33 units.

Hence, the sales quantity is to increase by 33 1/3% if same profit is desired.

Ans. to Q.30.

1. Contribution = Fixed Cost + Profit
   ₹ 20,000 = 12,000 + Profit
   Profit = ₹ 20,000 – 12,000 = ₹ 8,000
   P/V ratio = 100% – Variable cost
   = 100% – 60% = 40%
   Sales = $\frac{\text{Contribution}}{\text{P/V ratio}} = \frac{20,000}{40\%} = ₹\ 50,000$
   Selling price per unit = $\frac{\text{Rs.}50,000}{10,000 \text{ units}} = ₹5$
2. Break-even point = Actual Sales – Margin of Safety
   = ₹ 48,000 – 8,000 = ₹ 40,000
   Break-even point = $\frac{\textit{Fixed cost}}{\textit{P / V ratio}}$
   P/V ratio = $\frac{12,000}{40,000} = 0.3 \text{ or } 30\%$
3. At 3,000 units, total cost @ ₹ 4 = ₹ 12,000

At 4,000 units, total cost @ ₹ 3.50 = ₹ 14,000
Difference = ₹ 2,000

$$\text{Variable Cost} = \frac{\text{Difference in cost}}{\text{Difference in output}} = \frac{₹\ 2,000}{1,000} = ₹\ 2 \text{ per unit}$$

Fixed Cost = ₹ 12,000 – (3,000 units × ₹ 2) = ₹ 6,000 (i.e. Total cost – V. cost)

B.E. Point = (5,000 × ₹ 2) + ₹ 6,000 = ₹ 16,000*

$$\text{P/V ratio} = \frac{Fixed\ cost}{B.E.\ point} = \frac{6,000}{16,000} = 0.375\ or\ 37.5\%$$

* At B.E.P., Total sales and total cost are equal.

Ans. to Q.31.

Smart Exports Ltd.
Satement of Profitability (for 6,000 units)

		₹
Revenue (6,000 units @ ₹ 30)		1,80,000
Less: Cost		
Direct Material	60,000	
Direct Labour	42,000	
Variable Factory Expenses	24,000	
Variable Office and Selling Expenses	18,000	
Additional Cost	10,000	1,54,000
Profit		26,000

Note: There is no extra fixed cost for the export order. As such, it is irrelevant.

Ans. to Q.32.

1. $\text{P/V Ratio} = \frac{Difference\ in\ Profit}{Difference\ in\ Sales} \times 100$

$$= \frac{8,000}{20,000} \times 100 = 40\%$$

2. Fixed Csot for the first half year = (Sales × P/V ratio) – Profit
= (₹ 1,00,000 × 40%) – ₹ 30,000 = ₹ 10,000
Fixed cost for the year = ₹ 10,000 + ₹ 10,000 = ₹ 20,000

3. $\text{Break-even Profit} = \frac{Fixed\ Cost}{P/V\ ratio}$

$$\text{B.E.P. for each half year} = \frac{10,000}{40\%} = ₹\ 25,000$$

$$\text{B.E.P. for the year} = \frac{20,000}{40\%} = ₹\ 50,000$$

4. $\text{Half-yearly Sale} = \frac{Fixed\ cost + Profit}{P/V\ ratio}$

$$= \frac{10,000 + 40,000}{40\%} = ₹\ 1,25,000$$

5. $\text{Annual Sale} = \frac{20,000 + 90,000}{40\%} = ₹\ 2,75,000$

Ans. to Q.33.

1. $\text{BEP} = \frac{Fixed\ Cost}{P/V\ Ratio}$

$$= \frac{2,40,000}{37.5\%} = ₹\ 6,40,000$$

Fixed Cost = ₹ 1,20,000 Staff Salaries
+ ₹ 80,000 Office Costs
+ ₹ 40,000 Advetisement Costs
Total = ₹ 2,40,000

Margin of Safety (MS) = Actual Sales – B.E.P.
= ₹ 9,60,000 – ₹ 6,40,000 = ₹ 3,20,000

2. At 20,000 shirts sales

	₹
Fixed Cost	2,40,000
Variable Cost (20,000 × ₹ 25)	5,00,000
Total Cost	7,40,000
Sales (20,000 × ₹ 40)	8,00,000
Hence, Profit	60,000

3. Variable Cost per unit with commission = ₹ (25 + 3) = ₹ 28
Contribution = ₹ 12 *i.e.*, ₹ (40 – 28)

$$\text{Sales Required} = \frac{\text{Fixedcost+Desiredprofit}}{\text{Contribution}} = \frac{2,40,000 + 15,000}{12} = \frac{2,55,000}{12} = 21,250 \text{ shirts}$$

4. Increased Selling Price = ₹ 40 + 15% = ₹ (40 + 6) = ₹ 46
Variable Cost = ₹ 25
Contributin (C) = ₹ (46 – 25) = ₹ 21
Fixed Cost (FC) = ₹ 2,40,000 + ₹ 33,000 = ₹ 2,73,000

$$\text{BEP} = \frac{\text{Fixedcost}}{\text{Contribution}} = \frac{2,73,000}{21} = 13,000 \text{shirts}$$

Sales at BEP = 13,000 × ₹ 46 = ₹ 5,98,000

Ans. to Q.34.

Marginal Cost Statement

	₹
Net selling price (₹ 10 – 5% discount)	9.50
Direct material	3.00
Direct labour	2.00
Variable overhead	2.00
Variable cost	7.00
Contribution (₹ 9.50 – 7.00)	2.50

Break-even point $= \frac{F}{C} = \frac{10,000}{2.50}$ 4,000 *units*

B.E. Point (in ₹) = 4,000 units @ ₹ 10	= ₹ 40,000
Less: 5% Discount	2,000
Net sales value at B.E. Point	₹ 38,000
When sales are 10% above B.E. Point	
Sales = 4,000 + 10% = 4,400 units	₹ 11,000
Contribution (4,400 units × ₹ 2.50)	₹ 10,000
Less: Fixed cost	Profit ₹ 1,000

Ans. to Q.35.

Statement of Marginal cost and Contribution

		Per unit ₹	Total (10,000 units) ₹
(A)	Sales	500	50,00,000
	Materials	100	10,00,000
	Labour	50	5,00,000
	Variable overheads	25	2,50,000
(B)	Variable cost	175	17,50,000
	Contribution (A – B)	325	32,50,000
	Less: Fixed overheads	200	20,00,000
	Profit	125	12,50,000

Contribution at new selling price = New SP – VC
= ₹ 425 – ₹ 175 = ₹ 250

Sales to earn a desired profit $= \frac{Fixed\ cost + Desired\ profit}{Contribution\ per\ unit}$

Sales to earn a profit of ₹ 12,50,000 at reduced selling price

$$= \frac{20,00,000 + 12,50,000}{250} = 13,000\ units$$

Ans. to Q.36.

$$P/V\ ratio = \frac{S-V}{S} = \frac{20-14}{20} = \frac{2}{20} = 30\%$$

(i) Break-even point $= \frac{Fixed\ cost}{P/V\ ratio} = \frac{5,40,000 + 2,52,000}{30\%}$

$$= \frac{₹\ 7,92,000}{30\%} = ₹\ 26,40,000$$

(ii) Units to be sold to earn a profit of ₹ 60,000

$$= \frac{Fixed\ cost + desired\ profit}{Contribution\ per\ unit} = \frac{7,92,000 + 60,000}{6} = 1,42,000\ units$$

Contribution = S – V = 20 – 14 = ₹ 6

(iii) Suppose units to be sole to earn 10% profit = 'x'

Total sales = Selling price × units = 20 x

Total sales = Variable cost + Fixed cost + Profit

20x = 14x + 7,92,000 + 2x

Thus 4x = 7,92,000

x = 7,92,000 ÷ 4

x = 1,98,000

Thus, sales to earn a net income of 10% on sales = 1,98,000 units

Ans. to Q.37.

Contribution = Selling Price – Variable cost
= ₹ 70 – ₹ 20 = ₹ 50 per bucket

(i) **B.E. Point (units)** $= \frac{Fixed\ cost}{Contribution\ per\ unit} = \frac{Rs.50,000}{Rs.50} = 1,000\ buckets$

(ii) **Required Sales** $= \frac{Fixed\ cost + Desired\ profit}{Contribution\ per\ unit} = \frac{Rs.50,000 + 30,000}{Rs.50} = 1,600\ buckets$

Profit per bucket = ₹ 30,000 + 1600 buckets = ₹ 18.75

(iii) Sales

2,200 buckets x SP/unit = V.C. + F.C. + Profit

SP / unit = 2,200 units x ₹ 20/unit + ₹ 52,000 + 2,200 units x ₹ 18.75/unit = ₹ 62.39 (app.)

Ans. to Q.38.

	Period I	Period II	Difference
	₹	₹	₹
Sales (@ ₹ 100 per unit)	7,00,000	9,00,000	2,00,000
Profit/ Loss (–)	(–) 10,000	10,000	20,000

$$P/V \text{ ratio} = \frac{\text{Difference in Profit}}{\text{Difference in sales}} \times 100 = \frac{20,000}{2,00,000} \times 100 = 10\%$$

Contribution period I (10% of ₹ 7,00,000)	₹ 70,000
Add: Loss in period I	₹ 10,000
(a) Fixed cost	₹ 80,000

Note: Fixed cost = Contribution – Profit (or Contribution + Loss)

$$\text{(b) Break-even point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{80,000}{10\%} = ₹\ 8,00,000$$

Number of units to break-even = 8,00,000 ÷ 100 = 8,000 units

$$\text{(c) Required sales} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}}$$

$$= \frac{80,000 + 40,000}{10\%} = ₹\ 12,00,000 \text{ or } 12,000 \text{ units}$$

Ans. to Q.39.

$$\text{P/V ratio} = \frac{\text{Increase in profit}}{\text{Increase in sales}} \times 100 = \frac{4,20,000}{60,00,000 - 45,00,000} \times 100$$

$$= \frac{4,20,000}{15,00,000} \times 100 = 28\%$$

$$\text{(i) Break-even Point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{14,00,000}{28\%} = ₹\ 50,00,000$$

(ii) When sales are ₹ 80,00,000		
Contribution = 80,00,000 × 28%	₹	22,40,000
Less: Fixed cost		14,00,000
	Profit	8,40,000

(iii) *New P.V. Ratio:*

Assume old Selling Price is ₹ 100 per unit. Since old P/V ratio is 28%, old variable cost per unit will be 72% of ₹ 100 = ₹ 72.

New selling price per unit is ₹ 100 less 10% = ₹ 90. Variable cost per unit will remain unchanged (₹ 72 per unit). New contribution per unit will be ₹ 18.

$$\text{New P/V ratio} = \frac{C}{S} = \frac{18}{90} \times 100 = 20\%$$

Profit in 2004 = (60,00,000 × 28%) – 14,00,000 = ₹ 2,80,000

Sales to earn the desired profit (in 2005)

$$= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{14,00,000 + 2,80,000}{20\%} = ₹\ 84,00,000$$

Ans. to Q.40.

Planned profit	= ₹ 20,000
Add: Fixed cost	₹ 12,000
Contribution required	₹ 32,000
Contribution per unit	= ₹ 1.50 – 0.75 = ₹ 0.75
Contribution from 40,000 units	= 40,000 × 0.75 = ₹ 30,000
New contribution	= ₹ 1 – 0.75 = ₹ 0.25 p.u.

Additional contribution of ₹ 2,000 @ ₹ 0.25 p.u. will require 8,000 units
Total sales required = 40,000 + 8,000 = 48,000 units

Ans. to Q.41.

Under Monopolistic Conditions

Suppose x is the selling price per unit

∴ Sales	= 2,000 x
Variable cost	= 2,000 × ₹ 100 = ₹ 2,00,000
Fixed Cost	= ₹ 37,000
Desired profit	= ₹ 2,00,000
S – V	= F + P
Or 2,000x – 2,00,000	= 37,000 + 2,00,000

$$x = \frac{4,37,000}{2,000} \text{ or } Rs.\ 218.50 \text{ per unit}$$

Thus, selling price = ₹ 218.50 per unit

Under Competitive Conditions

Suppose x is the selling price per unit

Sales	= 10,000 x
Variable cost	= 10,000 × ₹ 100 or ₹ 10,00,000
Fixed cost	= ₹ 37,000
Desired profit	= ₹ 2,00,000
Or 10,000x – 10,00,000	= 2,37,000

$$x = \frac{12,37,000}{10,000} \text{ or ₹ } 123.70 \text{ perunit}$$

This selling price = ₹ 123.70 per unit

Ans. to Q.42.

	Sales ₹	Profit/ Loss (–) ₹
At 8,000 units	1,20,000	(–) 40,000
At 20,000 units	3,00,000	(+) 80,000
Difference	1,80,000	1,20,000

$$P/V \text{ ratio} = \frac{Difference\ in\ Profit}{Difference\ in\ Sales} = \frac{1,20,000}{1,80,000} = \frac{2}{3} \text{ or } 66.67\%.$$

Fixed cost = (S × P/V ratio) – Profit = (3,00,000 × 2/3) – 80,000 = ₹ 1,20,000
Break-even point = F ÷ P/V ratio = 1,20,000 ÷ 2/3 = ₹ 1,80,000

Ans. to Q.43.

Statement of Marginal Cost and Contribution
(of 3,000 articles for export)

	₹
Materials @ ₹ 20 per article	60,000
Wages @ ₹ 18 per article	54,000
Variable overhead – Factory @ ₹ 10 per article	30,000
– Selling and dist. @ ₹ 8 per article	24,000
Marginal cost of sales	1,68,000
Sales (3,000 articles @ ₹ 65)	1,95,000
Contribution	27,000
Less: Additional packing cost	3,000
Additional profit	24,000

Acceptance of this export order results in additional profit of ₹ 24,000 and thus the order should be accepted.

Note: Fixed overhead have not been taken into account in deciding the acceptability of this order because fixed overhead have already been recovered from sale in the home market.

Ans. to Q.44.

(a) The variable cost of producing the component is shown below:

	₹
Materials	2.75
Labour	1.75
Other variable costs	0.50
Variable or Marginal cost	5.00
Fixed cost	1.25

On the face of it, it appears that it is cheaper to buy the component at ₹ 5.75 each because it is less than own cost of ₹ 6.25 each but it should be understood that the fixed costs cannot be saved if it is decided to buy the component instead of making it. Thus if the component is purchased then it will really cost ₹ 7 per component *i.e.*, ₹ 5.75 paid for purchase plus ₹ 1.25 of fixed cost which will continue to be incurred and cannot be saved. It is therefore, advised to make the component.

(b) If the price offered is ₹ 4.85 per unit, then the offer can be accepted as there will be a saving of 15 paise per unit.

Ans. to Q.45.

(i) Statement of Budgeted Profit

	A	*B*	*C*	*Total* ₹
Budged production (units)	6,400	3,200	2,400	
Selling price ₹	140	120	90	
Sales (S)	8,96,000	3,84,000	2,16,000	14,96,000
Raw materials	5,12,000	1,28,000	48,000	
Direct wages	32,000	48,000	24,000	
Variable overhead	64,000	96,000	48,000	
Total variable cost (V)	6,08,000	2,72,000	1,20,000	10,00,000
Contribution (S–V)	2,88,000	1,12,000	96,000	4,96,000
Less: Fixed cost*				1,71,200
Profit				3,24,800

*Calculation of Fixed Cost

A = 6,400 units × 9	= ₹ 57,600
B = 3,200 units × ₹ 22	70,400
C = 2,000 units × ₹ 18	43,200
Total fixed cost	= ₹ 1,71,200

(ii) When raw material is the key factor

	A	B	C
Raw material per unit of output	4 kg	2 kg	1 kg
Total raw material consumed (kg)	6,400 × 4 = 25,600	3,200 × 2 = 6,400	2,400 × 1 = 2,400
"Contribution per kg of raw material	= ₹ 2,88,000 / 25,600kg. = ₹ 11.25	= ₹ 1,12,000 / 6,400kg. = ₹ 17.50	= ₹ 96,000 / 2,400kg. = ₹ 40
	III	II	I

Ranking

Suggested sales mix (raw material is the key factor)

Rank I – Product C – 2,40,000 units × 1 kg	= 2,400 kg
Rank II – Product B – 3,200 units × 2 kg	= 6,400 kg
Rank III – Product A – 2,400 units × 4 kg (balance)	= 9,600 kg
Total materials available	18,400 kg

Thus the suggested product mix is: *A* – 2,400 units, *B* 3,200 units and *C* – 2,400 units

Calculation of Profit

			Contribution
Product	A	2,400 units @ ₹ 45 p.u.	₹ 1,08,000
	B	3,200 units @ ₹ 35 p.u.	₹ 1,12,000
	C	2,400 units @ ₹ 40 p.u.	₹ 96,000
	Total contribution		3,16,000
	Less: Total fixed cost		1,71,200
			₹ 1,44,800

Ans. to Q.46.

Statement of Marginal Cost and Profit
(For current year)

	Per unit	60,000 units
	₹	₹
Sales	14.300	8,58,000
Direct materials (3.50 + 6%)	3.710	2,22,600
Direct wages (1.25 + 8%)	1.350	81,000
Variable overhead – Factory	3.125	1,87,500
– Sales	0.200	12,000
Variable cost	8.385	5,03,100
Contribution (Sales – Variable cost)		3,54,90
*Fixed cost		2,45,850
Profit		1,09,050

Calculation of fixed overhead

Factory overhead –	60,000 units @ ₹ 3.125 =	₹ 1,87,500
Sales overhead –	60,000 units @ ₹ 0.60 =	₹ 36,000
		2,23,500
Add: 10% increase		22,350
	Fixed Cost ₹	2,45,850

Statement of Price Recommendation
(For 20,000 units)

	₹
Marginal cost (₹ 8.385 × 20,000 units)	1,67,700
Additional profit required (1,67,300 – 1,09,050)	58,250
Total sales value	2,25,950
Selling price per unit (2,25,950 ÷ 20,000) = ₹ 11.30 (Approx.)	

Ans. to Q.47

(i) **When machine 99 is working at full capacity** – In this situation, cost of the Y plus contribution lost during the period of manufacture should be compared with supplier's price.

Selling price of X	=	₹ 100
Less: Marginal cost		60
Contribution		40
Contribution per hour	= ₹ 40 ÷ 20 hours = ₹ 2	
Cost of making y	= Marginal cost + Contribution lost	
	= ₹ 5 + ₹ 6 (3 hrs. @ ₹ 2 per hour)	
	= ₹ 11	
Cost of Y if bought	= ₹ 10	

As the cost of making is more than suppliers price, it is advisable to buy it.

(ii) **When machine 99 has idle capacity** – In this situation, there will be no loss of contribution when component Y is made because machine will be idle during that period if Y is not made. The cost of making will be only its marginal cost of ₹ 5. As the supplier's price is ₹ 10, it is advisable to make this component Y.

Ans. to Q.48

Present Position

	Products			*Total*
	X	*Y*	*Z*	
Selling price ₹	20	25	30	
Less: Variable cost ₹	10	15	18	
Contribution ₹	10	10	12	
P/V ratio	50%	40%	40%	
Sales mix	40%	35%	25%	100%
Sales ₹	2,00,000	1,75,000	1,25,000	5,00,000
Contribution (Sales × P/V ratio)	1,00,000	70,000	50,000	2,20,000
Less: Fixed cost ₹				1,50,000
Profit ₹				70,000

Proposed Position

	Products			Total
	X	*Y*	*Z*	
Selling price ₹	20	25	30	
Less: Variable cost ₹	10	15	18	
Contribution ₹	10	10	12	
P/V ratio	50%	40%	50%	
Sales mix	50%	30%	20%	100%
Sales ₹	2,50,000	1,50,000	1,00,000	5,00,000
Contribution (Sales × P/V ratio)	1,25,000	60,000	50,000	2,35,000
Less: Fixed cost ₹				1,50,000
Profit ₹				₹ 85,000

Conclusion – The proposed change should be accepted as it will increase profit by ₹ 15,000.

Ans. to Q.49.

(a)

Statement of Marginal Cost and Contribution
Statement of Suggested Sales Mix and Profit

Product	*Units produced*	*Raw material per unit (kg.)*	*Raw material consumed (kg.)*	*Contribution*	
				Per Unit	*Total*
Y	6,000	0.4	2,400	5.60	33,600
X	8,000	0.7	5,600	7.80	62,400
Z (Balance)	1,600	1.5	2,400	12.60	20,160
Total contribution					1,16,160
Less: Fixed overhead					50,000
Profit					66,160

(b) Availability of additional 4,500 kg. of raw material will be used to produce 4,500 ÷ 1.5 = 3,000 units of product Z because the market demand of Y and X products has already been fully met. Additional profit from this additional product of product Z is computed as shown below :

		₹
Additional contribution (3,000 units @ ₹ 12.60)		37,800
Less : Additional costs		
Labour (3,000 × ₹ 12 × 25%)	9,000	
Variable overhead (3,000 × ₹ 8.40 × 25%)	6,300	15,300
Additional net contribution		22,500
Less : Additional fixed overheads		20,000
Additional Profit		2,500

Conclusion – The company should go in for the additional production of 3,000 units of Z product from additional availability of raw material because it will add ₹ 2,500 to the profits of the company.

Ans. to Q.50.

Basic Calculations :

1. P/V Ratio in 1996

$$\text{P/V Ratio} = \frac{\text{Selling Price per unit} - \text{Variable Cost per unit}}{\text{Selling Price per unit}} \times 100$$

$$= \frac{₹\ 60 - ₹\ 48}{₹\ 60} \times 100 = \frac{₹\ 12}{₹\ 60} \times 100 = 20\%$$

2. ***Number of units sold (in 1996)***

$$\text{Break-even Point} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{₹\ 3,60,000}{₹\ 12} = 30,000 \text{ units}$$

The margin of safety is 40%. Hence break-even point is at 60% of units sold.

$$\text{Or No. of units sold} = \frac{\text{Break - even point}}{60\%} = \frac{30,000 \text{ units}}{60} \times 100 = 50,000 \text{ units}$$

3. **Profit earned in 1996**

Profit = Units sold in 1996 x Contribution per unit – Fixed costs

= 50,000 units x ₹ 12 – ₹ 3,60,000

= ₹ 6,00,000 – ₹ 3,60,000 = ₹ 2,40,000.

Fixation of Selling Price in 1997

Variable Cost per unit in 1997 = ₹ 48 + ₹ 4.80 = ₹ 52.80

Fixed Cost in 1997 = ₹ 3,60,000 + ₹ 18,000 = ₹ 3,78,00

P/V Ratio in 1996 = 20%

Since P/V Ratio is 20%, hence, Variable cost is 80%.

$$\text{Hence, the required selling price} = \frac{\text{Rs.52.80}}{80\%} = \text{Rs.66}$$

Number of units to be produced and sold in 1997 to earn the same profit as in 1996

Profit in 1996 = ₹ 2,40,000

Fixed cost in 1997 = ₹ 3,78,000

Desired contribution in 1997 (₹ 2,40,000 + ₹ 3,78,000) = ₹ 6,18,000

Contribution per unit in 1997 = Selling price per unit – Variable cost per unit

= ₹ 60 – ₹ 52.80 = ₹ 7.20

$$\text{Number of units to be produced and sold in 1997} = \frac{\text{Desired Contribution in 1997}}{\text{Contribution per unit in 1997}}$$

$$= \frac{₹\ 6,18,000}{₹\ 7.20} = 85,833 \text{ units}$$

Ans. to Q.51.

i. BEP = $\frac{\text{Fixed cost}}{\text{contribution per unit}}$ = 50,000 / 50 = 1,000 buckets.

ii. Buckets to be sold for desired profit of ₹ 30,000.

$$\text{Sales for Desired Profit} = \frac{\text{Fixed Cost + Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{50,000 + 30,000}{50}$$

= 80,000 / 50

= 1,600 buckets

iii. Computation of new selling price :

		₹
Profit per bucket at sales of 1,600 buckets :		
	Sales (1,600 x 70)	1,12,000
Less :	Variabble cost 1,600 x 20	32,000
	Contribution	80,000
Less :	Fixed Cost	50,000
	Profit	30,000
Profit per bucket 30,000 / 1,600 =		18.75
Total sales 1,600 + 600 = 2,200 buckets.		
Total Profit desired = 2,200 x 18.75 =		₹ 41,250
Let selling price be '*x*'		

The following equation can be made :

Total Sales	=	Total cost + Profit.
2,200*x*	=	20 (2,200) + 52,000 + 41,250
2,200*x*	=	1,37,250
or *x*	=	₹ 62.39 per bucket.

Ans. to Q.52.

i. BEP

	=	Fixed cost / Contribution per unit
	=	2,40,000/15 = 16,000 units or
	=	16,000 x 40 = ₹ 6,40,000
Margin of Safety (MS)	=	Actual sales – Break-even sales
	=	24,000 x 40 = 6,40,000
	=	9,60,000 – 6,40,000
	=	₹ 3,20,000

ii. Net Profit when 20,000 shirts are sold :

Contribution : 20,000 x 15	₹ 3,00,000
Less : Fixed cots	₹ 2,40,000
Profit	₹ 60,000

iii. Sales for desired profit :

$$= \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{New Contribution per unit}}$$

$$= \frac{2,40,000 + 15,000}{15 - 3}$$

= 21,250 units

Ans. to Q.53. Computation of Profit as per Proposal of General Manager

1. New Sales Volume (Units 1,00,000 + 5%)	1,05,000
	₹
2. Sales Value (1,05,000 x 47.50)	49,87,500
3. Cost of Sales :	
Variable Costs = $\frac{30,00,000}{1,00,000} \times 1,05,000$	31,50,000
Fixed Cost :	
Present = 7,00,000 + 3,00,000	10,00,000
Additional Fixed Cost	1,15,000
Total Costs	42,65,000
Profit (2) – (3)	7,22,500

Computation of Profit as per Proposal of Sales Manager

1. New Sales Units (1,00,000 – 10,000)		90,000
2. Sales Value (90,000 x 55)		₹ 49,50,000
3. Cost of Sales		
Variable Cost = $\frac{30,00,000}{1,00,000} \times 90,000$		27,00,000
Fixed Cost :		
Present	10,00,000	
Less : Saving in Fixed Cost	1,50,000	
Total Cost		8,50,000
Profit = (2) – (3)		35,50,000
		14,00,000

The profit as per the proposal of Sales Manager is much higher as compared to the proposal of the General Manager. Hence, the proposal of the Sales Manager should be accepted.

Ans. to Q.54.:

(i) BEP $= \frac{F}{S-V} = \frac{60,000}{100-40} = 1,000$ Files

(ii) Desired Sales $= \frac{F+P}{S-V} = \frac{60,000+30,000}{100-40} = 1,500$ files

Profit per file $= \frac{Rs.30,000}{1,500} = Rs.20$

(iii) New FC = 60,000 + 2,000 = ₹ 62,000; New Sale = 1,500 + 500 = 2,000 files.

Let new selling price per file be 'S'

$2,000 = \frac{62,000 + 20\,(2,000)}{S-40}$; or 2,000 (S – 40) = 62,000 + 40,000

2,000S – 80,000 = 1,02,000; or 2,000S = 1,02,000 + 80,000 = 1,82,000

S = New Selling Price = 1,82,000 ÷ 2,000 = ₹ 91

Ans. to Q.55. :

Contribution per pair of chappals = SP – VC = ₹ 30 – ₹ 21 = ₹ 9

P/V Ratio $= \frac{C}{S} \times 100$

$= \frac{₹\,9}{₹\,30} \times 100 = 30\%$

(a) BEP (in units) $= \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$

$= \frac{₹\,3,60,000}{₹\,9} = 40,000$ pairs of chappals

BEP (in value) $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = ₹12,00,000$

If 35,000 pairs of chappals are sold, the profit or loss is computed below :

Sales (35,000 x ₹ 30)	₹ 10,50,000
(–) Variable Cost (35,000 x ₹ 21)	₹ 7,35,000
Contribution	₹ 3,15,000
(–) Fixed Cost	₹ 3,60,000
Loss	₹ 45,000