Topic - 12

# MARGINAL COSTING

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### 1. Calculation of PVR, BEP, MOS, Profits

1. A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to ₹ 5 lakhs. Calculate the following:
   a. Break-even sales
   b. Total sales
   c. Total variable cost
   d. Current profit
   e. New 'margin of safety' if the sales volume is increased by 7 ½ %.

2. 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 value needed to earn a profit of 10% on sales.
   b) Calculate sales price per unit to bring BEP down to 1,20,000 units.
   c) Calculate margin of safety sales if profit is ₹ 60,000.

3. A company producing a single article sells it at ₹ 20 each. The marginal cost of production is ₹ 12 each and the fixed costs are ₹ 9,000 per quarter. You are required to calculate for the year the following:
   a. Profit volume ratio (PV Ratio)
   b. Break even sales in value
   c. Break even sales in units (Volume)
   d. Sales required to earn a profit of ₹ 12,000
   e. Profit at sales of ₹ 2,00,000
   f. Margin of safety for (d) and (e) above.

4. A company has a P/V ratio of 40%. By what percentage must sales be increased to offset: 20% reduction in selling price?

5. Product Z has a profit volume ratio of 28%. Fixed operating costs directly attributable to product Z during the quarter II of the financial year will be ₹ 2,80,000. Calculate the sales revenue required to achieve a quarterly profit of ₹ 70,000.

6. (a) If Margin of Safety is ₹ 2,40,000 (40% of sales) and P/V ratio is 30% of AB Ltd, CALCULATE its (1) Break even sales, and (2) Amount of profit on sales of ₹ 9,00,000.

(b) X Ltd. has earned a contribution of ₹ 2,00,000 and net profit of ₹ 1,50,000 of sales of ₹ 8,00,000 What is its margin of safety? (SM)

**7.** A company has fixed cost of ₹ 90,000, sales ₹ 3,00,000 and profit of ₹ 90,000. Required
a. What is the sales value in the next period if the company suffered a loss of ₹ 30,000
b. What is the margin of safety for a profit of ₹ 90,000.

**8.** PMR ltd sold 275000 units of its product at ₹ 37.5 per unit. Variable cost are ₹ 17.50 per unit (manufacturing costs of ₹ 14 and selling costs of ₹ 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹ 3500000 (including depreciation of ₹ 1500000). There are no beginning or ending inventories. Required:

a. Estimated BEP sales quantity and cash break even sales level quantity
b. Estimate the PV Ratio
c. Estimate the number of units that must be sold to earn an income (EBIT) of ₹ 250000
d. Estimate the sales level to achieve an after tax income (PAT) of ₹ 250000. Assume 40% corporate income tax rate.

**9.** A company produces single product which sells for ₹ 20 per unit. Variable cost is ₹ 15 per unit and fixed overhead for the year is ₹ 630000. Calculate:
a. Sales value needed to earn a profit of 10% on sales.
b. Sales price per unit to bring BEP down to 120000 units
c. Margin of safety sales if profit is ₹ 60000

**10.** Fill in the blanks for each of the following independent situations:

| Situations | A | B | C | D | E |
|---|---|---|---|---|---|
| Selling price per unit | a. | ₹ 50 | ₹ 20 | g. | ₹ 30 |
| Variable cost as % of selling price | 60 | c. | 75 | 75 | i. |
| No of units sold | 10000 | 4000 | E | 6000 | 5000 |
| Marginal contribution | ₹ 20000 | ₹ 80000 | F | ₹ 25000 | ₹ 50000 |
| Fixed costs | ₹ 12000 | d. | ₹ 120000 | ₹ 10000 | j. |
| Profit/Loss | b. | ₹ 20000 | ₹ 30000 | h. | ₹ 15000 |

**11.** Ascertain profit, when sales ₹ 200000. Fixed cost ₹ 40000, BEP ₹ 160000 and Ascertain sales, when fixed cost ₹ 20000, profit ₹ 10000, BEP ₹ 40000

**12.** PMR has given the following data

| Particulars | Amount ₹ |
|---|---|
| Selling price per unit | 20 |
| Direct material cost per unit | 8 |
| Direct labour cost per unit | 2 |
| Variable overhead per unit | 2 |
| Fixed overhead (total) | 20000 |

Find out:

a. PV ratio
b. Break even sales
c. Margin of safety at a sale level of ₹ 100000
d. Profit, if sales are 20% above the break even sales
e. Sales to make a profit of ₹ 5000
f. PV ratio if the selling price is increased by 10%
g. Break even sales, if the selling price is increased by 10%
h. Break even sales, if the fixed overhead is increased by 20%

**13.** S.R. has prepared the following budget estimate for the year ending 31st march,2006

| | |
|---|---|
| Sales (units) | 15,000 |
| Fixed expenses | ₹ 34,000 |
| Sales value | ₹ 1,50,000 |
| Variable costs | ₹ 6 per unit |

Required

i. Find the P.V Ratio, Break Even point and Margin of Safety
ii. Calculate revised P.V. Ratio, Break Even point and Margin of Safety in each of following cases:
   a. Decrease of 10% in selling price
   b. Increase of 10% in variable costs
   c. Increase in sales volume by 2,000 units
   d. Increase of ₹ 6000 in fixed cost.

**14.** From the following information you are required to calculate the break-even point present your answer in the graphical from. the fixed cost for the year are ₹ 80000, variable cost per unit for the single product being made is ₹ 12. selling price per unit is ₹ 20.

**15.** PMR manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit. if the fixed costs for this year are ₹ 480000 and the annual sales are 60% margin of safety calculate the rate of net return on sales, assuming an income tax level of 40%.

**16.** From the following information calculate the break even point and the turnover required to earn a profit of ₹ 36000. Fixed overheads ₹ 180000, variable cost per unit ₹ 2, selling price per unit ₹ 20. if the company is earning a profit of ₹ 36000 express the margin of safety available to it.

**17.** SR Ltd. reports the following cost structure at two capacity levels:

| | (100% capacity) | (75% capacity) |
|---|---|---|
| | 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?

**18.** The P/V Ratio of Delta Ltd. is 50% and margin of safety is 40%. The company sold 500 units for ₹ 5,00,000. You are required to calculate:

(i) Break – even point, and

(ii) Sales in units to earn a profit of 10% on sales

**19.** The following figures are related to LM Limited for the year ending 31st March, 2014 : Sales – 24,000 units @ ₹ 200 per unit;

P/V Ratio 25% and Break-even Point 50% of sales.

You are required to calculate:

(i) Fixed cost for the year

(ii) Profit earned for the year

(iii) units to be sold to earn a target net profit of ₹ 11,00,000 for a year.

(iv) Number of units to be sold to earn a net income of 25% on cost.

(v) Selling price per unit if Break-even Point is to brought down by 4,000 units.

**20.** A company gives the following information:

Margin of safety ₹ 375000

Total cost ₹ 387500

Margin of safety quantity 15000 units

Break even sales in units 5000 units

You are required to calculate;

a. Selling price per unit
b. Profit
c. Profit/volume ratio
d. Break even sales in Rs
e. Fixed cost.

**21.** A company has introduced a new product and marketed 20,000 units. Variable cost of the product is ₹ 20 per units and fixed overheads are ₹ 3,20,000

You are required to:

(i) Calculate selling price per unit to earn a profit of 10% on sales value, BEP and Margin of Safety?

(ii) If the selling price is reduced by the company by 10%, demand is expected to increase by 5,000 units, then what will be its impact on Profit, BEP and Margin of Safety?

(iii) Calculate Margin of Safety if profit is ₹ 64,000.

**22.** A single product company sells its product at ₹ 60 per unit. In 20X3, 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 20X4, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

(i) Find the selling price required to be fixed in 20X4 to earn the same P/V ratio as in 20X3.

(ii) Assuming the same selling price of ₹ 60 per unit in 20X4, find the number of units required to be produced and sold to earn the same profit as in 20X3.

**23.** A manufacturing company is producing a product 'A' which is sold in the market at ₹ 45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

| Particulars | Amount ₹ |
|---|---|
| Material | 12 |
| Wages | 9 |
| Overheads | 6 |

Margin of safety is ₹ 4,12,500. You are required to:

a. Calculate fixed cost and break-even point.
b. Calculate the volume of sales to earn profit of 20% on sales.
c. If management is willing to invest ₹ 10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.
d. Management expects additional sales if the selling price is reduced to ₹ 44. Calculate units to be sold to achieve the same profit as desired in above (iii).

**24.** During a particular period ABC Ltd. Has furnished the following data sales ₹ 10,00,000. Contribution to sales ratio 37% and Margin of safety is 25% of sales.

A decrease in selling price and decrease in the fixed cost could change the contribution to sales ratio to 30% and margin of safety to 40% of the revised sales. Calculate.

a. Revised fixed cost
b. Revised sales and
c. New Break even point.

**25.** The following information pertain to ZB Limited for the year :

| **Particulars** | |
|---|---|
| Profit volume ratio | 30% |
| Margin of Safety (as % of total sales) | 25% |
| Fixed cost | ₹ 12,60,000 |

You are required to calculate :

a. Break even sales value (₹).
b. Total sales value (₹) at present,
c. Proposed sales value (₹) if company wants to earn the present profit after reduction of 10% in fixed cost.
d. Sales in value (₹) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged.
e. New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%.

## 2. Two period analysis

**26.** SHA ltd. Provides the following trading results:

| year | Sales | Profit |
|---|---|---|
| 2012 – 13 | ₹ 2500000 | 10% of sales |
| 2013 – 14 | ₹ 2000000 | 8% of sales |

You are required to calculate:

a. Fixed cost
b. Break even point
c. Amount of profit, if sales is ₹ 3000000
d. Sale, when desired profit is ₹ 475000
e. Margin of safety at a profit of ₹ 270000

**27.** From the following data relating to company calculate

i. break even sales,

ii. sales required to earn a profit of ₹ 6,000 per period

| Period | Total sales(₹) | Total Costs(₹) |
|---|---|---|
| 1 | 42500 | 38700 |
| 2 | 39200 | 36852 |

**28.** Calculate BEP from the following figures:

| Period | Total sales(₹) | Profit (₹) |
|---|---|---|
| 1 | 160 | 4 |
| 2 | 175 | 10 |

Form the above chart predict the variable cost, contribution, fixed cost and profit associated with a sales volume of ₹ 250 lakhs, and set out your prediction in the form of a profit statement.

**29.** Following information is available for the years 1 and 2 of PMR Ltd.

| Year | Year 1 | Year 2 |
|---|---|---|
| Sales | ₹ 3200000 | ₹ 5700000 |
| Profit / (Loss) | (₹ 300000) | ₹ 700000 |

Calculate:

a. PV ratio
b. Total fixed costs and
c. Sales required to earn a profit of ₹ 12,00,000

**30.** Following figures have been extracted from the books of M/s. RST Private Limited

| Financial Year | Sales(₹) | Profit/Loss (₹) |
|---|---|---|
| 2016 – 17 | 4,00,000 | 15,000(loss) |
| 2017 – 18 | 5,00,000 | 15,000 (Profit) |

You are required to calculate:

**(i)** Profit Volume Ratio
**(ii)** Fixed Costs
**(iii)** Break Even Point
**(iv)** Sales required to earn a profit of ₹ 45,000.
**(v)** Margin of Safety in Financial Year 2017 – 18.

**31.** The PMR co. furnishes you the following income information for a financial year:

| Particulars | First Half | Second Half |
|---|---|---|
| Sales | ₹ 810000 | ₹ 1026000 |
| Profit earned | ₹ 21600 | ₹ 64800 |

From the above, compute the following items assuming that fixed cost remains the same amount in both periods:
a. PV ratio
b. Fixed cost
c. Profit or loss where sales are ₹ 648000
d. Sales required to earn a profit of ₹ 108000

**32.** PMR Ltd a multi product company furnished you the following date relating to the year

| Particulars | First Half year | Second Half year |
|---|---|---|
| Sales | 45000 | 50000 |
| Total costs | 40000 | 43000 |

Assuming that there is no change in prices and variable costs and that the fixed expenses are incurred equally in the two half years periods, calculate for the year
a. The profit volume ratio
b. Fixed expenses
c. Break even sales
d. Percentage of margin of safety.

**33.** PMR. Ltd. furnished you the following data for 2007 –

| | January to march ₹ | April to December ₹ |
|---|---|---|
| Sales | 3,00,000 | 12,00,000 |
| Net profit | 10,000 | 90,000 |

Find out:
a. Break even sales for 2007
b. Sales required to earn a profit of 1,20,000

**34.** The following figures are available from the records of ABC Company as at 31st March.

| | 2015(₹ in lakhs) | 2016(₹ in lakhs) |
|---|---|---|
| Sales | 200 | 250 |
| profit | 30 | 45 |

Calculate:
a. The P/V ratio and total fixed expenses.

b. The break-even level of sales.
c. Sales required to earn a profit of ₹ 70 lakhs.

**35.** A company had incurred fixed expenses of 450000, with sales of ₹ 1500000 and earned a profit of ₹ 300000 during the first half year. in the second half, it suffered a loss of ₹ 150000. Calculate:
a. PVR, BEP and MOS for the first half year.
b. Expected sales value for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year
c. BEP and MOS for the whole year.

**36.** Following information is available for the first and second quarter of the year for ABC Limited:

| Quarter | Production (in units) | Semi variable cost |
|---|---|---|
| Quarter I | 36000 | 280000 |
| Quarter II | 42000 | 310000 |

Required: segregate the semi variable cost and calculate
a. Variable cost per unit and
b. Total fixed cost

**37.** PMR Limited started its operation in 2012 with the total production capacity of 2,00,000 units. The following data for two years is made available to you:

| | 2012 | 2013 |
|---|---|---|
| Sales units | 80,000 | 1,20,000 |
| Total cost (₹) | 34,40,000 | 45,60,000 |

There has been no change in the cost structure and selling price and it is expected to continue in 2014 as well. Selling price is ₹ 40 per unit. you are required to calculate:
(i) Variable cost per unit
(ii) Profit volume ratio.
(iii) Break-Even Point (in units)
(iv) Profit at 75% of the total capacity in 2014

**38.** PMR ltd furnished you the following information relating to the half year ended 30th September.

| | |
|---|---|
| Fixed expenses | ₹ 45000 |
| Sales value | ₹ 150000 |
| Profit | ₹ 30000 |

During the second half of the year the company has projected a loss of ₹ 10000. Calculate:
a. The BEP and MOS for six months ended 30th September

b. Expected sales volume for the second half of the year assuming that the PV Ratio and fixed expenses remain constant for the second half year also.

c. The break even point and margin of safety for the year ended 30th march.

**39.** The particulars of two plants producing an identical product with the same selling price are as under:

| Particulars | Plant A | Plant B |
|---|---|---|
| Capacity utilization | 70% | 60% |
| | ₹ lakhs | ₹ lakhs |
| Sales | 150 | 90 |
| Variable cost | 105 | 75 |
| Fixed cost | 30 | 20 |

It has been decided to merge Plant A with Plant B. the additional fixed expenses involved in the merger amount to ₹ 2 lakhs p.a.

**Required:**

a. Find the break even point of Plant A and Plant B before merger and the break even point of the merged plant
b. Find the capacity utilization of the integrated plant required to earn a profit of ₹ 18 lakhs.

**40.** A, B, and C are three similar plants under the same management who want to be merged for better operation. The detail are as under –

| Particulars | Plant A | Plant B | Plant C |
|---|---|---|---|
| Capacity operated | 100% | 70% | 50% |
| | ₹ (in lakhs) | ₹ (in lakhs) | ₹ (in lakhs) |
| Turnover | 300 | 280 | 150 |
| Variable cost | 200 | 210 | 75 |
| Fixed cost | 70 | 50 | 62 |

Find out.

1. Capacity of merged plant for break even
2. The profit at 75% capacity of the merged plant
3. The turnover form the merged plant to give a profit of ₹ 28 lakhs.

**41.** A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

a. On 1st January, 2016, the company has an opening stock of 20000 packets whose variable cost is ₹ 180 per packet.
b. in 2015 production was 120000 packets and the expected production in 2016 is 150000 packets. Expected sales for 2016 is 160000 packets.
c. in 2015 fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2016. The variable cost is expected to increase by 25%. Selling pricae for 2016 has been fixed at ₹ 300 per packet.

you are required to calculate the break even volume in units for 2016

**42.** Two manufacturing companies A and B are planning to merge. The details are as follows:

| | A | B |
|---|---|---|
| Capacity utilization (%) | 90 | 60 |
| Sales ₹ | 63,00,000 | 48,00,000 |

| | | |
|---|---|---|
| Variable cost ₹ | 39,60,000 | 22,50,000 |
| Fixed cost ₹ | 13,00,000 | 15,00,000 |

Assuming that the proposal is implemented, calculate:

a. Break Even sales of the merged plant and the capacity utilization at that stage
b. Profitability of the merged plant at 80% capacity utilization.
c. Sales turnover of the merged plant to earn a profit of ₹ 60,00,000.
d. When the merged plant is working at a capacity to earn a profit of 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

## 3. Overall BEP Or composite BEP

**43.** PMR ltd manufactures and sells four types of products under the brand names of P,Q,R, and S. the sales mix in value comprises of 33 1/3%, 41 2/3%, 16 2/3, and 8 1/3% of products P,Q,R,S respectively. The total budgeted sales (100%) are ₹ 60,000 per month. Operating costs are –

Variable cost : Product P 60% of the selling price
Variable cost : product Q 68% of the selling price
Variable cost : product R 80% of the selling price
Variable cost : Product S 40% of the selling price
Fixed cost is ₹ 14,000 per month.
Calculate the BEP for the products on an overall basis.

**44.** 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.

**45.** S.R. Ltd. manufactures and sells a single product X whose selling price is ₹ 40 per unit and the variable cost is ₹ 16 per unit.

a. If the Fixed Costs for this year are ₹ 4,80,000 and the annual sales are at 60% margin of safety, calculate the rate of net return on sales, assuming an income tax level of 40%
b. For the next year, it is proposed to add another product line Y whose selling price would be ₹ 50 per unit and the variable cost ₹10 per unit. The total fixed costs are estimated at ₹ 6,66,600. The sales mix of X : Y would be 7 : 3. At what level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

**46.** The budgeted sales of three products of a company are as follows:

| **Particulars** | **X** | **Y** | **Z** |
|---|---|---|---|
| Budgeted sales in units | 10000 | 15000 | 20000 |
| Budgeted selling price per unit | ₹ 4 | ₹ 4 | ₹ 4 |
| Budgeted variable cost per unit | ₹ 2.50 | ₹ 3.00 | ₹ 3.50 |
| Budgeted fixed expenses (total) | ₹ 12000 | ₹ 9000 | ₹ 7500 |

Compute for each product:

a. Budgeted profit
b. Budgeted break even sales and
c. Budgeted margin of safety in terms of sales value. Also compute overall PVR, BEP and MOS

**47.** A company has three factories situated in North, East, and South with its head office in Mumbai. The management has received the following summary report on the operations of each factory for a period

(₹000)

| **Particulars** | **Sales** | | **Profit** | |
|---|---|---|---|---|
| | Actual | Over/(under) budget | Actual | Over/ (under) budget |
| **North** | 1100 | (400) | 135 | (180) |
| **East** | 1450 | 150 | 210 | 90 |
| **South** | 1200 | (200) | 330 | (110) |

Calculate for each factory and for the company as a whole for the period

a. Fixed costs and
b. Break even sales

**48.** The Product mix of a Gama Ltd. is as under:

| | Products | |
|---|---|---|
| | M | N |
| Units | 54,000 | 18,000 |
| Selling price | ₹ 7.50 | ₹ 15.00 |
| Variable cost | ₹ 6.00 | ₹ 4.50 |

Find the break-even points in units, if the company discontinues product 'M' and replace with product 'O'. The quantity of product 'O' is 9,000 units and its selling price and variable costs respectively are ₹ 18 and ₹ 9. Fixed Cost is ₹ 15,000.

**49.** PMR Limited manufactures three different products and the following information has been collected form books of accounts:

| | **Products** | | |
|---|---|---|---|
| | A | **B** | C |
| Sales Mix | 40% | 35% | 25% |
| Selling price | ₹ 300 | ₹ 400 | ₹ 200 |
| Variable Cost | ₹ 150 | ₹ 200 | ₹ 120 |
| Total Fixed Costs | | ₹ 18,00,000 | |
| Total Sales | | ₹ 60,00,000 | |

The company has currently under discussion, a proposal to discontinue the manufacture of Product C and replace it with Product E, When the following results are anticipated:

| | **Products** | | |
|---|---|---|---|
| | **A** | **B** | **C** |
| Sales Mix | 45% | 30% | 25% |

| | | | |
|---|---|---|---|
| Selling price | ₹ 300 | ₹ 400 | ₹ 300 |
| Variable Cost | ₹ 150 | ₹ 200 | ₹ 150 |
| Total Fixed Costs | | ₹ 18,00,000 | |
| Total Sales | | ₹ 64,00,000 | |

**Required :**

a. CALCULATE the total contribution to sales ratio and present break-even sales at existing sales mix.

b. CALCULATE the total contribution to sales ratio and present break-even sales at proposed sales mix.

c. STATE whether the proposed sales mix is accepted or not ?

## 4. Cost indifference point

**50.** A practicing Chartered is considering two proposals, the purchase of a new small car or an old bigger car. Calculate cost BEP form the following estimated cost figures -

| Item Cost | New Small Car (₹) | Old Bigger car (₹) |
|---|---|---|
| Purchase Price | 350000 | 200000 |
| Sales Price after 5 years | 50000 | 20000 |
| Repairs and services p.a. | 10000 | 12000 |
| Taxes and insurance p.a. | 4700 | 1700 |
| Mileage per liter of petrol | 12 km | 7.2 km |
| Petrol price per liter (₹) | 36 | 36 |

What are the non financial considerations involved, which may influence the decision ?

**51.** A company proposes to install a machine for the manufacture of a component which at present is being purchased at ₹ 24 each. There are 2 alternatives namely a. installation of an automatic machine and b. installation of a semi-automatic machine. The details of the 2 machines are as under –

| | Automatic machine | Semi Automatic Machine |
|---|---|---|
| Initial Cost of the machine | ₹ 9,00,000 | ₹ 6,00,000 |
| Life of machine | 10 years | 10 years |
| Fixed overheads other than depreciation on machine (p.a.) | ₹ 1,62,000 | ₹ 84,000 |
| Variable expenses of the component | ₹ 12 | ₹ 15 |

The company charges depreciation on a straight line method. Scrap value of the machine at the end of the life is nil.

Required :

a. At what volume of output should the company change over from purchase of components to manufacture by installation of Automatic Machine or semi Automatic Machine.

b. At what volume of manufacture of the components will the company switch over from installation of one type of machine to other.

**52.** Two firm A ltd and B ltd sell the same type of product in the same market. Their budgeted profit and loss account for the year ending 31st march are follows (In ₹)

| Particulars | A Ltd | | B Ltd | |
|---|---|---|---|---|
| Sales | | 500000 | | 600000 |
| Variable cost | 400000 | | 400000 | |
| Fixed cost | 30000 | 430000 | 70000 | 470000 |
| Net profit | | 70000 | | 130000 |

a. Calculate at which sales level both the firms will earn equal profit

b. State which firm is likely to earn greater profits in condition of

(i) Heavy demand for the product

(ii) Low demand for the product. Gove reasons.

**53.** The following are cost data for three alternative ways of processing the clerical cases brought under the LC court system:

| Particulars | A Manual | B Semi Automatic | C Fully Automatic |
|---|---|---|---|
| Monthly fixed costs: | | | |
| Occupancy | 15000 | 15,000 | 15,000 |
| Maintenance contract | 0 | 5,000 | 10,000 |
| Equipment lease | 0 | 25,000 | 10,000 |
| Total | 15000 | 45000 | 125000 |
| Unit variable cost (per report) | | | |
| Supplies | 40 | 80 | 20 |
| Labour | 200<br>(5 hrs x 40) | 60<br>(1 hr x 60) | 20<br>(0.25 hr x 80) |
| Total | 240 | 140 | 40 |

Required :

1. Calculate cost indifference points. Interpret your results
2. If the present case load is 600 cases and it is expected to go up to 850 cases in near future, which method is most appropriate on cost considerations?

**54.** XY Ltd. Produces two product X and Y, whose respective fixed costs are F1 ad F2. You are given that the unit contribution of Y is one fifth less than the unit contribution of X, that the total of F1 and F2 is ₹ 1,50,000, that the BEP of X is 1,800 units ( for BEP of X F2 is not considered) and that 3,000 units is the indifference point X and Y. (i.e. X and Y make equal profits at 3,000 unit volume, Considering their respective fixed costs). There is no inventory build up as whatever is produced is sold.

Required

Find out the values F1 and F2 and units contribution of X and Y.

## 5. Continue or shut down decision

**55.** A Paint manufacturing company manufactures 2,00,000 p.a. medium sized units of X when working at normal capacity. It incurs the following costs of manufacture per unit.

Direct Material ₹ 7.80; Direct Labour ₹ 2.10;
Variable Overhaed ₹ 2.50 Fixed Overhead ₹ 4.00
Each unit of the product is sold for ₹ 21 with variable selling and administrative expenses of 6kk0 paise per unit. During the next quarter only 10,000 units can be produced and sold. Management plans to shut down the plant estimating that the fixed manufacturing cost can be reduced to ₹ 74,000 for the quarter. When the plant is operating, the fixed overheads are incurred at a uniform rate throughout the year. Additional costs of plant shut-down for the quarter are estimated as ₹ 14,000.

Required –

a. To express your opinion, along with the calculations, as to whether the plant should be shut down during the quarter, and
b. To calculate the shut down point, for quarter in units of products (i.e. in terms of no. of units)

**56.** U Ltd manufactures 20,000 units of X in a year at its normal production capacity. The unit cost as to variable costs & fixed costs at this level are ₹ 13 and ₹ 4 respectively. The selling price per unit is ₹ 20.

Due to trade depression, it is expected that only 2,000 units of X can be sold during the next year. The management plans to shut-down the plant. The fixed costs for the next year then is expected to be reduced to ₹ 33,000. Additional costs of plant shut-down are expected as ₹ 12,000. Should the plant be shut-down? what is the shut-down point ?

**57.** Zed limited sells its product at ₹ 30 per unit. During the quarter ending on 31$^{st}$ march, 2014, it produced and sold 16000 units and suffered a loss of ₹ 10 per unit. if the volume of sales is raised to 40000 units, it can earn a profit of ₹ 8 per unit.

You are required to calculate :

a. Break even point in ₹
b. Profit if the sales volume is 50000 units

Minimum level of production where the company needs not to close the production if unavoidable fixed cost is ₹ 150000.

**58.** Mr. X has ₹ 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are ₹ 80,000 per year, Show computations to answer the following questions:

a. What sales volume must be obtained to break even ?
b. What sales volume must be obtained to get 15 per cent return on investment ?
c. Mr. X estimates that even if he closed the doors of his business, he would incur ₹ 25,000 as expenses per year. At what sales would he be better off by locking his business up?

## 6. Marginal costing and Absorption costing

**59.** PMR has a production capacity of 200000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. Fixed costs are ₹ 360000 per year. Variable selling cost are ₹ 3 per unit and fixed selling costs are ₹ 270000 per year. The unit selling price is ₹ 20. In the year just ended on 30th june, the production was 160000 units and sales were 150000 units. The closing inventory on 30th june was 20000 units. The actual variable production costs for the year were ₹ 35000 higher than the standard.

You are required to ;

a. Calculate the profit for the year by absorption costing method and marginal costing method

b. Explain the difference in the profits.

**60.** PMR can produce 400000 units of product p.a. at 100% capacity. The variable production cost are ₹ 40 per unit and the variable selling expenses are ₹ 12 per sold unit. The budgeted fixed production expenses were ₹ 2400000 p.a. and the fixed selling expenses were ₹ 16,00,000 During the year ended 31st march, the company worked at 80% of its capacity. The operating data for the year are as follows:

| | |
|---|---|
| Production | 320000 units |
| Sales at ₹ 80 per unit | 310000 units |
| Opening stock of finished goods | 40000 units |

Fixed production expenses are absorbed on the basis of capacity, and fixed selling expenses are recovered on the basis of period. Prepare statements of cost and profit for the year ending 31st march on the basis of marginal costing and on the basis of absorption costing. (Nov 08)

**61.** PMR assembles and sells motor vehicles at ₹ 24000 per vehicle. It uses are an actual costing system, in which unit costs are calculated on a monthly basis. Data relating to march and april months of a year is as follows

| Particulars | March | April |
|---|---|---|
| Units data : beginning inventory<br>Production<br>Sales | 0<br>500<br>350 | 150<br>400<br>520 |
| Variable cost data:<br>Manufacturing cost per unit produced<br>Distribution costs per unit sold | <br>10000<br>3000 | <br>10000<br>3000 |
| Fixed cost data:<br>Manufacturing costs<br>Marketing costs | <br>2000000<br>600000 | <br>2000000<br>600000 |

**a.** Present income statements for PMR in march and April under variable costing and absorption costing

**b.** Explain the differences between both profits

**62.** PMR has just completed its first year of operation. The unit costs on a normal costing basis are as under :

| | |
|---|---|
| Direct material 4 kg at ₹ 4 | Rs 16 |
| Direct labour 3 hours at ₹ 18 | Rs 54 |
| Variable overheads 3 hours at ₹ 4 | Rs 12 |
| Fixed overhead 3 hours at ₹ 6 | Rs 18 |
| Total | Rs 100 |

Selling and administrative costs are variable cost ₹ 20 per unit and fixed cost ₹ 760000. During the year, the company has the following activity:

| | |
|---|---|
| Units produced | 24000 |
| Units sold | 21500 |
| Units selling price | 168 ₹ |
| Direct labour hours worked | 72000 |

Actual fixed overhead was ₹ 48000 less than the budgeted fixed overhead. Budgeted variable overhead was ₹ 20000 less than the actual variable overhead. The company used an expected actual activity level of 72000 direct labour hours to compute the pre determined overhead rates.

Required:

a. Compute the unit cost and total income under absorption costing and marginal costing
b. Compute the under or over absorption of overhead
c. Reconcile the difference between the total income under absorption and marginal costing.

**63.** WONDER LTD. manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

| Activity Level | 50% | 100% |
|---|---|---|
| Sales and production (units) | **400** | **800** |
| | (₹) | (₹) |
| Sales | 8,00,000 | 16,00,000 |
| Production costs:` | | |
| - Variable | 3,20,000 | 6,40,000 |
| - Fixed | 1,60,000 | 1,60,000 |
| Selling and distribution costs: | | |
| - Variable | 1,60,000 | 3,20,000 |
| - Fixed | 2,40,000 | 2,40,000 |

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year.

In the first quarter, 220 units were produced and 160 units were sold. Required:

a. What would be the fixed production costs absorbed by ZEST if absorption costing is used?
b. What would be the under/over-recovery of overheads during the period?
c. What would be the profit using absorption costing?
d. What would be the profit using marginal costing?

## 7. Effect of change in cost, volume, and profit

**64.** A factory engaged in manufacturing plastic buckets is working to 40% capacity and produces 10000 buckets p.a. The present cost break up for one bucket is material ₹ 10, Labour ₹ 3, and OH ₹ 5 (of which 60% is fixed). The selling price is ₹ 20 per bucket. if 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 BEP at those capacity productions.

**65.** The following data relate to a manufacturing company: Plant capacity 400000 units per annum. Present utilization 40%. Actual data were as under:

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:

a. Reduce selling price by 10% and

b. Spend additionally ₹ 3 lakhs on sales promotion.

Required: How many units should be made in order to earn a profit of ₹ 5 lakhs.

**66.** The accounts of a company are expected to reveal a profit of ₹ 1400000 after charging fixed costs of ₹ 1000000 for the year ended 31st march. The selling price of the product is ₹ 50 per unit and variable cost per unit is ₹ 20. Market investigations suggest the following responses to the price changes:

| Alternatives | Selling price reduced by | Quantity sold increased by |
|---|---|---|
| I | 5% | 10% |
| II | 7% | 20% |
| III | 10% | 25% |

Evaluate these alternatives and state which of the alternatives, on profitability consideration, should be adopted for the forthcoming year.

**67.** PQR Ltd. has furnished the following data for the two years:

| | 20X3 | 20X4 |
|---|---|---|
| Sales | ₹ 8,00,000 | ? |
| Profit/Volume Ratio (P/V ratio) | 50% | 37.5% |
| Margin of Safety sales as a % of total sales | 40% | 21.875% |

There has been substantial savings in the fixed cost in the year 20X4 due to the restructuring process. The company could maintain its sales quantity level of 20X3 in 20X4 by reducing selling price.

You are required to calculate the following;

(i) Sales for 20X4 in Value,

(ii) Fixed cost for 20X4,

(iii) Break-even sales for 20X4 in Value.

**68.** The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales ..... ₹ 5,00,000
Direct Materials .....₹ 2,50,000
Direct Labour.....₹ 1,00,000
Variable Overheads.....₹ 40,000
Capital Employed.....₹ 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required
Find out by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

**69.** An Indian soft drink company is planning to establish a subsidiary company in Bhutan 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 Bhutanese subsidiary:

| | Total annual costs | Percent of Total Annual Cost which is variable |
|---|---|---|
| Material | 2,10,000 | 100% |
| Labour | 1,50,000 | 80% |
| Factory Overheads | 92,000 | 60% |
| Administration Expenses | 40,000 | 35% |

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8 % of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary. You are required to

a. Compute the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.
b. Calculate the break-even point in rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is 14 per bottle.

**70.** An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March, 20X5 is as under:

| Budgeted Output | 40,000 Units<br>₹ in lakhs | ₹ In lacs |
|---|---|---|
| Net Realisation | | 700 |
| Variable Costs: | | |
| Materials | 264 | |
| Labour | 52 | |
| Direct expenses | 124 | 440 |
| Specific Fixed Costs | 90 | |
| Allocated Fixed Costs | 112.50 | 202.50 |
| Total Costs | | 642.50 |

| | |
|---|---|
| Profit | 57.50 |
| Sales | 700.00 |

Calculate:

a. Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.
b. Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit.

**71.** A company manufactures two types of herbal product, A and B. its budget shows profit figures after apportioning the fixed joint cost of ₹15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

| | A | B |
|---|---|---|
| Profit (**₹**) | 1,50,000 | 30,000 |
| Selling Price / unit (**₹**) | 200 | 120 |
| P/V Ratio (%) | 40 | 50 |

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

(i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by $7_{1/2}$ %.

(ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(iii) Simultaneous introduction of both the option, viz, (i) and (ii) above

**72.** M/s Gaurav Private Limited is manufacturing and selling two products: 'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

(i) Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

(ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

(iii) Break-even is planned at 70% of the total sales of each product.

(iv) Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.

You are required to calculate :

1. Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.
2. Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.

**73.** Amy Ltd. manufacture and sales its product RM. The following figures have been collected from cost records of last year for the product RM:

| **Elements of Cost** | **Variable Cost portion** | **Fixed Cost** |
|---|---|---|
| Direct Material | 30% of Cost of Goods Sold | -- |
| Direct Labour | 15% of Cost of Goods Sold | -- |

| | | |
|---|---|---|
| Factory Overhead | 10% of Cost of Goods Sold | ₹ 3,45,000 |
| Administration Overhead | 2% of Cost of Goods Sold | ₹ 1,06,500 |
| Selling & Distribution Overhead | 4% of Cost of Sales | ₹ 1,02,000 |

Last Year, 7,500 units were sold at ₹ 185 per unit.

(i) Break even Sales (in rupees)

(ii) Profit earned during last year

(iii) Margin of safety (in%)

(iv) Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

**74.** Following data is available from the costing department of Aarya Ltd. Which manufactures and markets a single product:

| | | | |
|---|---|---|---|
| Material | Rs.32 per unit | Fixed Cost (Rs.) | Rs. 10,000 |
| Conversion Cost (Variable) | Rs. 24 per unit | Present Sales (units) | 90,000 |
| Dealer's Margin (10% of Sales) | Rs. 8 per unit | Capacity Utilization | 60 % |
| Selling Price | Rs. 80 per unit | | |

There is acute competition in the market, thus extra efforts are necessary to enhance the sales. For this, following suggestions have been proposed:

(i) Reducing selling price by 5 per cent.

(ii) Increasing dealer's margin by 20 percent over the existing rate.

(iii) Which of these two suggestions would you RECOMMEND, if the company desires to maintain the present profit? GIVE REASONS.

## 8. Question on optimum mix

**75.** Sales price per unit 200 for A and 150 for B

Variable cost per unit 100 for A and 100 for B

Fixed cost ₹900000

Maximum Demand A 30000, B 30000

Raw material required per unit A 10 kg and B 2 kg

Maximum 100000 kg R.M. is available.

Find out maximum profit.

**76.** A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

| | X | Y | Z |
|---|---|---|---|
| Selling Price (**₹ / unit**) | 10 | 12 | 12 |
| Variable Costs (**₹ / unit**) | 6 | 9 | 7 |
| Market Demand (unit) | 3,000 | 2,000 | 1,000 |

| | | | |
|---|---|---|---|
| Production Capacity (unit) | 2,000 | 3,000 | 900 |
| Fixed Costs (₹) | | 30,000 | |

Calculate opportunity cost.

**77.** A co. has a limited supply of material X to the extent of 50,000 kgs. The material is used to manufacture three types of products namely – A, B and C. The cost details of these products are given below:

| Particulars | A | B | C |
|---|---|---|---|
| Selling Price (₹ / unit) | 120 | 80 | 200 |
| Variable Costs (₹ / unit) | 100 | 70 | 150 |
| Material required (kgs/unit) | 1 | 2 | 5 |
| Market Demand (unit) | 15,000 | 20,000 | 5,000 |
| Total Fixed Cost (₹) | ₹ 2,00,000 | | |

Advise the management about the optimum utilization of available material, to maximize the profits of the company. Also calculate such profit.

**78.** ABC Limited produces and sells two product – X and Y. The product is highly demanded in the market. Following information relating to both the products are given as under:

| | Per Unit (₹) | |
|---|---|---|
| | X | Y |
| Direct Materials | 140 | 180 |
| Direct Wages | 60 | 100 |
| Variable Overheads (₹ 5 per machine hour) | 20 | 40 |
| Selling price | 300 | 450 |

The company is facing scarcity of machine hours for working. The availability of machine hours are limited to 60,000 hrs in a month. At present, the monthly demand of product X and product Y is 8,000 units and 6,000 units respectively. The fixed expenses of the company are ₹ 2,25,000 per month.

**You are required to:**

DETERMINE the product mix that generates maximum profit to the company in the given situation and also CALCULATE the profit of the company .

**79.** V Ltd. Produces two products 'P' and 'Q'. The draft budget for the next month is as under:

| Particulars | P | Q |
|---|---|---|
| Budgeted production and sales (units) | 80,000 | 40,000 |
| Selling price (₹ / unit) | 50 | 25 |
| Total Cost (₹/unit) | 40 | 20 |
| Machine Hours per unit | 1 | 2 |
| Maximum sales potential (units) | 1,00,000 | 60,000 |

The fixed expenses are estimated at ₹ 9,60,000 per month. The company absorbs fixed o/h on the basis of machine hours which are fully utilized by the budgeted production and cannot be further increased.

When the budget was discussed, the MD stated that the product mix should be altered to yield optimum profit.

The MD suggested that he could introduce a new Product 'C' each unit of which will take 1.5 machine hours. However, a process involving a capital outplay of ₹ 2,00,000 is to be installed for processing product 'C'. The additional fixed o/h relating to the processing of 'C' was estimated at ₹ 60,000 p.m. The variable cost of the product C was estimated at ₹ 21 p.u.

Required:

1. Calculate the profit as per draft budget for the next month.
2. Revise the product mix based on data given for P and Q to yield optimum profit.
3. The company decides to discontinue either product P or Q whichever is giving lower profit and proposes to substitute Product C instead. Fix the selling price of Product C In such a way as to yield 15% p.a. return on additional capaital employed besides maintaining the same overall profit as envisaged in (2.) above

**80.** The M tech company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

| Particulars | Process A ₹ | Process B ₹ |
|---|---|---|
| Variable cost per unit | 12 | 14 |
| Sales price per unit | 20 | 20 |
| Total fixed costs per year<br>Capacity | 3000000<br>430000 | 2100000<br>500000 |
| Anticipated sales in next years (in units) | 400000 | 400000 |

Suggest

a. Which process should be chosen?

b. Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows: A 600000 units, B 500000 units ? Why?

**81.** X Ltd. Supplies spare parts to an air craft company Y Ltd. The production capacity of X Ltd. facilitates production of any one spare part for a particular period of time. The following are the cost and other information for the production of the two different spare parts A and B:

| Per unit | Part A | Part B |
|---|---|---|
| Alloy usage…… | 1.6 kgs | 1.6 kgs |
| Machine Time: Machine A …… | 0.6 hrs. | 0.25 hrs |
| Machine Time: Machine B …… | 0.5 hrs. | 0.55 hrs |
| Target Price(₹) …… | 145 | 115 |
| Total hours available:…… | Machine A 4,000 hours<br>Machine B 4,500 hours | |

Alloy available is 13,000 kgs. @ ₹ 12.50 per kg.

Variable overheads per machine hours :…… Machine A: ₹ 80
Machine B: ₹ 100

**Required**

(i) Identify the spare part which will optimize contribution at the offered price.

(ii) If Y Ltd. reduces target price by 10% and offers ₹ 60 per hour of unutilized machine hour, what will be the total contribution from the spare part identified above?

New question

**82.** Moon Ltd. Produces product X,Y and Z and has decided to analyze its production mix in respect of these three products – X,Y and Z. You have the following information:

| Particulars | X | Y | Z |
|---|---|---|---|
| Direct material ₹ **(per unti)** | 160 | 120 | 80 |
| Variable Overheads ₹ **(per unit )** | 8 | 20 | 12 |

Direct Labour:

| Department | Rate per Hour ₹ | Hours per unit | Hours per unit | Hours per unit |
|---|---|---|---|---|
| A | 4 | 6 | 10 | 5 |
| B | 8 | 6 | 15 | 11 |

From the current budget further details are as below:

| Particulars | X | Y | Z |
|---|---|---|---|
| Annual production at present (in units) | 10,000 | 12,000 | 20,000 |
| Estimated selling price per unit (**₹**) | 312 | 400 | 240 |
| Sales departments estimate of possible sales in the coming year (units) | 12,000 | 16,000 | 24,000 |

There is a constraint on supply of labour in department A and its manpower can't be increased beyond its present level. Required:

a. Identity the best possible product mix of Moon Ltd.

b. Calculate the total contribution from the best possible product mix.

**83.** MNP Company Limited produces two products 'A' and 'B'. The relevant cost and sales data per unit of output is as follows.

| Particulars | Product A (₹) | Product B (₹) |
|---|---|---|
| Direct material | 55 | 60 |
| Direct labour | 35 | 45 |
| Variable factory overheads | 40 | 20 |
| Selling Price | 180 | 175 |

The availability of machine hours is limited to 55,000 hours for the month. The monthly demand for product 'A' and product 'B' is 5,000 units and 6,000 units, respectively. The fixed expenses of the company are ₹ 1,40,000 per month. Variable factory overheads are ₹ 4 per machine hour. The company can produce both products according to the market demand. Required:

Calculate the product mix that generates maximum profit for the company in the situation and also calculate profit of the company.

**84.** An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

| | Wheat | Rice | Maize |
|---|---|---|---|
| Yield (in kgs per hectare) | 2,000 | 500 | 100 |
| Selling Price (₹ per kg) | 20 | 40 | 250 |

The variable cost data of different crops are given below:

(All figures in ₹ per kg)

| Crop | Labour charges | Packing Materials | Other variable expenses |
|---|---|---|---|
| Wheat | 8 | 2 | 4 |
| Rice | 10 | 2 | 1 |
| Maize | 120 | 10 | 20 |

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

| Crop | Maximum Area (in hectares) | Minimum Area (in hectares) |
|---|---|---|
| Wheat | 160 | 100 |
| Rice | 50 | 40 |
| Maize | 60 | 10 |

You are required to:

(i) Rank the crops on the basis of contribution per hectare.

(ii) Determine the optimum product mix considering that all the three cereals are to be produced.

(iii) Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000.

(Assume that there are no other constraints applicable to this company)

**85.** The cost structure of an article (the selling price of which is ₹ 45,000) is materials 50%, Labour 20% and Overheads 30%. An increase of 15% in the cost materials and 25% in the costs of labour is anticipated. These increased costs in relation to selling price would cause a 25% decrease in the profit per article. You are required to determine:

a. The profit per article being earned at present, and

b. The new selling price so as to earn the same percentage of profit to sales as before.

**86.** A company produces a machine and sells it for ₹ 30,000. There is increase of 20% in materials cost, 10% in labour cost and 10% in Overheads cost. The only figures available are that material cost is 50% of cost of sales, Labour cost is 30% of cost of sales and overheads cost is 20% of cost of sales. The anticipated increased cost in relation to the present sales price would cause a 30% decrease in the amount of the present gross profit. What would be the selling price of the machine to give the same percentage of gross profit as before ?

**87.** A Ltd. Manufacture and sales its product R-9. The following figures have been collected form cost records of last year for the product R-9:

| Elements of Cost | Variable Cost portion | Fixed Cost |
|---|---|---|
| Direct Material | 30% of Cost of Goods Sold | --- |
| Direct Labour | 15% of Cost of Goods Sold | --- |
| Factory Overhead | 10% of Cost of Goods Sold | ₹ 2,30,000 |
| Administration Overhead | 2% of Cost of Goods Sold | ₹ 71,000 |
| Selling & Distribution Overhead | 4% of Cost of Sales | ₹ 68,000 |

Last Year 5,000 units were sold at ₹ 185 per unit. From the given DETERMINE the followings:

a. Break-even Sales (in rupees)
b. Profit earned during last year
c. Margin of safety (in %)
d. Profit if the sales were 10% less than the actual sales.
(Assume that Administration Overhead is related with production activity)

**88.** J Ltd. manufacture a Product –Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹ 1,000 lakhs which appears to be high. Existing selling price is ₹ 680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –

a. Break-even point at existing levels in units and in rupees.
b. The number of units required to be sold to earn the target profit.
c. Profit with 10% increase in selling price and drop in sales volume by 10% .
d. Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged.

## 9. Additional Questions

**89.** Company manufacture and sell 3 types of mobile handset. It also manufactures wireless charger for mobile. The company has worked out following estimates for next year.

| | Annual Demand | Selling Price (₹ per unit ) | Material Cost (₹ per unit) | Labour Cost (₹ per unit) |
|---|---|---|---|---|
| X5 | 5,000 | 8,000 | 2,000 | 1,000 |
| X6 | 4,000 | 9,000 | 2,500 | 1,500 |
| X7 | 3,000 | 12,000 | 3,000 | 2,000 |
| Wireless Charger | 15,000 | 1,500 | 300 | 200 |

To encourage the sale of wireless charger a discount of 10% in its price is being offered if it were to be purchased along with mobile. It is expected that customer buying mobile will also buy the wireless charger. the company factory has an effective capacity of 35,000 labour hours. The labour is paid @ 500 per hour. Overtime of labour has to be paid at double the normal rate. Other variable cost work out to be 50% of direct labour cost and fixed cost is ₹ 1,00,00,000. There will be no inventory at the end of the year.

PREPARE statement of profitability.

**90.** At budget activity of 80% of total capacity, a company earns a P/V ratio of 30% and a profit of 15% of total sales. Due to covid pandemic resulting in poor demand, the company has to reduce its selling price by 10%. The company was able to achieve a production and sales volume for the year equivalent to 50% of total capacity. The sales value at this level was ₹ 27,00,000 at a reduced price of ₹ 18 per unit. Due to reduction in production, the actual variable cost went up by 5% of the budget.

You are required to:

a. PREPARE statement of profitability at budget and actual activity.

b. FIND P/V ratio and BES (in ₹ and unit of the actual sales activity).

**91.** UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at Rs 450 per unit. During the quarter ending on 31st December 2021, it produced and sold 12,000 units ad suffered a loss of Rs 35 per unit.

During the quarte4r ending on 31st March 2022, it produced and sold 30,000 units and earned a profit of Rs 40 per unit.

You are required to calculate :

a. Total fixed cot incurred by UV Ltd. Per quarter

b. Break even sales value (in rupees)

c. Calculate profit, if the sale volume reaches 50,000 units in the next quarter (i.e. quarter ending on 30th June, 2022)

**92.** SR Ltd. Is a manufacturer of garments. For the three months of financial year 2022-23 commencing on 1st April 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labor hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

| Particulars | Shirt Rs | Shirts Rs |
|---|---|---|
| Sales price | 60 | 44 |
| Raw material | | |
| Fabric @ 12 per metre | 24 | 12 |
| Dyes and Cotton | 6 | 4 |
| Direct Labour @ 8 per hour | 8 | 4 |
| Fixed overhead @ 4 per hour | 4 | 2 |
| Profit | 18 | 22 |

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July 2022. There will be no opening stock at the beginning of July 2022.

Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

- The company intends to carry stock of finished garments sufficient to meet 40% of the next month's sale from July 2022 onwards.

- The estimated selling price will be same as above

Required:

i. Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-2023 to maximize company's profit.

ii. Prepare the following budgets on a monthly basis for July, August, and September 2022:

a. Sales budget showing sales units and sales revenue for each product.

b. Production budget (in units) for each product.

**93.** The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

| | ₹ |
|---|---|
| Selling Price per unit | 1000 |
| Variable cost per unit: | |
| Cost of Material used | 750.00 |
| Sales commission | 50.00 |
| Total Variable Cost | 800.00 |
| Annual fixed expenses: | |
| Rent | 7,00,000 |
| Salaries | 11,00,000 |
| Other fixed expenses | 5,00,000 |
| Total Fixed Cost | 23,00,000 |

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.

**Requirement:**

(a) What is the annual break-even point both in terms of units and value?

(b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?

(c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.

Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if 20,000 bags were sold.