

6. MARGINAL COSTING

NO. OF PROBLEMS IN 41E OF CA INTER: CLASS ROOM - 29, ASSIGNMENT - 34.

NO. OF PROBLEMS IN 42E OF CA INTER: CLASS ROOM - 27, ASSIGNMENT - 30

NO. OF PROBLEMS IN 43E OF CA INTER: CLASS ROOM - 32, ASSIGNMENT - 32

MODEL WISE ANALYSIS OF PAST EXAM PAPERS OF IPCC & CA INTER

| S. No | MODEL NAME | M11 | N11 | M12 | N12 | M13 | N13 | M14 | N14 | M15 | N15 | M16 | N16 | M17 | N17 | M18(O) | M18(N) | N18(O) | N18(N) | M19(O) | M19(N) | N19(O) | N19(N) |
|-------|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 1. | MARGINAL COST SHEET | - | - | - | 8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 5 | 5 | 5 |
| 2. | P/V RATIO, BEP, MOS, PROFIT | - | 5 | - | - | 5 | - | 5 | 3 | 5 | 5 | 5 | 13 | 8 | 8 | 8 | 15 | 5 | 10 | - | - | - | - |
| 3. | SHUT DOWN POINT | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4. | INDIFFERENCE POINT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5. | LIMITING FACTOR | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 6. | ABSORPTION VS. MARGINAL | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

SIGNIFICANCE OF EACH PROBLEM COVERED IN THIS MATERIAL

| Problem No. in this material | Problem No. in NEW SM | Problem No. in OLD SM | Problem No. in OLD PM | RTP | MTP | Previous Exams | Remarks |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------|--------------------|----------------|---------|
| CR 1 | - | - | - | - | - | N-17 | - |
| CR 2 | - | - | - | - | - | - | M-18(N) |
| CR 3 | - | - | - | - | - | - | N-18(N) |
| CR 4 | PQ-7 | ILL-11 | - | - | - | - | - |
| CR 5 | ILL-9 | ILL-16 | - | - | - | - | - |
| CR 6 | - | - | - | - | - | M-19(N,O) | - |
| CR 7 | - | - | Q-9 | - | - | - | - |
| CR 8 | ILL-5 | ILL-8 | - | - | - | - | - |
| CR 9 | PQ-12 | ILL-18 | - | - | - | - | - |
| CR 10 | PQ-6 | ILL-10 | - | - | - | - | - |
| CR 11 | PQ-15 | ILL-21 | - | - | - | - | - |
| CR 12 | - | - | - | - | - | - | N-16 |
| CR 13 | - | - | - | M-17 | N-15, M-19(N,O) | - | - |
| CR 14 | - | - | - | N-19(N,O) | - | - | - |
| CR 15 | - | - | - | - | N-19(N,O) | - | - |
| CR 16 | - | - | - | - | - | N-19(O) | - |
| CR 17 | - | - | - | - | - | M-18(O) | - |
| CR 18 | - | - | - | - | - | M-18(N) | - |
| CR 19 | - | - | - | - | - | M-16 | - |
| CR 20 | - | - | - | - | - | M-19(N) | - |
| CR 21 | - | ILL-14 | - | - | - | - | - |
| CR 22 | ILL-14 | - | - | - | - | - | - |
| CR 23 | - | - | Q-5 | - | - | - | - |
| CR 24 | PQ-2 | - | - | - | - | - | - |
| CR 25 | - | - | - | M-20(N,O) | - | - | - |
| CR 26 | PQ-9 | - | - | - | - | - | - |
| CR 27 | PQ-18 | - | - | - | - | - | - |
| CR 28 | PQ-19 | - | - | - | - | - | - |
| CR 29 | - | - | - | - | - | - | - |

| | | | | | | | |
|--------|--------|-------|------|-----------|------|---------|---|
| CR 30 | ILL-13 | - | - | - | - | - | - |
| CR 31 | ILL-11 | - | - | - | - | - | - |
| CR 32 | PQ-1 | ILL-2 | - | - | - | - | - |
| ASG 1 | - | - | - | - | - | - | - |
| ASG 2 | - | - | - | - | - | - | - |
| ASG 3 | - | - | - | - | - | - | - |
| ASG 4 | - | - | - | N-18(N,O) | - | - | - |
| ASG 5 | - | - | - | - | - | - | - |
| ASG 6 | - | - | - | - | M-19 | - | - |
| ASG 7 | - | - | - | - | - | - | - |
| ASG 8 | - | - | - | - | - | - | - |
| ASG 9 | - | - | - | - | - | - | - |
| ASG 10 | - | - | - | - | - | - | - |
| ASG 11 | - | - | - | - | - | - | - |
| ASG 12 | - | - | - | - | - | - | - |
| ASG 13 | - | - | - | - | - | M-19(O) | - |
| ASG 14 | - | - | - | M-19 | - | - | - |
| ASG 15 | ILL-12 | - | - | - | - | - | - |
| ASG 16 | - | - | - | - | - | N-15 | - |
| ASG 17 | - | - | - | - | - | - | - |
| ASG 18 | - | - | - | - | - | - | - |
| ASG 19 | - | - | - | - | - | - | - |
| ASG 20 | - | - | - | - | - | - | - |
| ASG 21 | PQ-10 | - | - | - | - | - | - |
| ASG 22 | - | - | - | - | - | - | - |
| ASG 23 | - | - | - | - | - | - | - |
| ASG 24 | - | - | - | - | - | - | - |
| ASG 25 | - | - | - | - | - | - | - |
| ASG 26 | - | - | - | - | - | - | - |
| ASG 27 | - | - | - | - | - | - | - |
| ASG 28 | - | - | - | - | - | - | - |
| ASG 29 | - | - | - | - | - | - | - |
| ASG 30 | - | - | - | - | - | - | - |
| ASG 31 | - | - | - | - | - | - | - |
| ASG 32 | - | - | Q-21 | - | - | - | - |

BASIC PRINCIPLE OF THE THEORY OF MARGINAL COSTING

Marginal Cost: Marginal cost as understood in economics is the incremental cost of production which arises due to one-unit increase in the production quantity. Marginal cost is measured by the total variable cost attributable to one unit.

Marginal Costing: It is a costing system where products or services and inventories are valued at variable costs only. It does not take consideration of fixed costs. Costs are classified on the basis of behavior of cost (i.e. fixed and variable)

DETERMINATION OF COST AND PROFIT UNDER MARGINAL COSTING

Cost and Profit Statement under Marginal Costing

| | Amount (Rs.) | Amount (Rs.) |
|--|--------------|--------------|
| Revenue (A) | | xxx |
| Product Cost: | | |
| - Direct Materials | xxx | |
| - Direct employee (labour) | xxx | |
| - Direct expenses | xxx | |
| - Variable manufacturing overheads | xxx | |
| Product (Inventorial) Costs (B) | xxx | xxx |

| | | |
|---|-----|------------|
| Product Contribution Margin {A - B} | | xxx |
| - Variable Administration overheads | xxx | |
| - Variable Selling & Distribution overheads | xxx | xxx |
| Contribution Margin (C) | | xxx |
| Period Cost: (D) | | |
| Fixed Manufacturing expenses | xxx | |
| Fixed non-manufacturing expenses(Fixed Administrative O.H & Selling and Distribution O.H) | xxx | xxx |
| Profit/ (loss) {C - D} | | xxx |

MARGINAL COST EQUATION: SALES - V.C = CONTRIBUTION = F.C + PROFIT

What do you mean by Contribution?: Contribution or contribution margin is the difference between sales revenue and total variable costs irrespective of manufacturing or non-manufacturing.

CONTRIBUTION(C) = SALES REVENUE(S) - TOTAL VARIABLE COST (V)

What is the relationship between Profit and Contribution?: Once Fixed Costs are fully recovered, such excess Contribution is termed as Profits.

ABSORPTION COSTING

Absorption Costing is a procedure of cost recognition wherein costs are classified on the basis of functions (not based on nature). All costs of production, both Fixed and Variable, are included in inventory valuation. The presentation of profits under Traditional Absorption Costing System is as under:

Income Statement (Absorption costing)

| | (Rs.) |
|---|-------|
| Sales | xxxxx |
| Production Costs: | |
| Direct material consumed | xxxxx |
| Direct labour cost | xxxxx |
| Variable manufacturing overhead | xxxxx |
| Fixed manufacturing overhead | xxxxx |
| Fixed manufacturing overhead | xxxxx |
| Cost of Production | xxxxx |
| Add: Opening stock of finished goods (Value at cost of previous period's production) | xxxxx |
| | xxxxx |
| | xxxxx |
| Less: Closing stock of finished goods (Value at production cost of current period) | xxxxx |
| Cost of Goods Sold | xxxxx |
| Add: (or less) Under (or over) absorption of fixed Manufacturing overhead | xxxxx |
| Add: Administration costs XXXXX | |
| Selling and distribution costs XXXXX | xxxxx |
| Total Cost | xxxxx |
| Profit (Sales - Total cost) | xxxxx |

DISTINGUISH BETWEEN MARGINAL COSTING AND ABSORPTION COSTING

| PARTICULARS | MARGINAL COSTING | ABSORPTION COSTING |
|------------------|--|--|
| Cost Recognition | Only Variable manufacturing OH Costs are considered for product costing & inventory valuation. | Both Fixed and Variable manufacturing OH costs are considered for product costing and inventory valuation. |

| | | |
|--------------------|--|---|
| Classification | Classification of expenses is based on nature, i.e. Fixed and Variable. | Classification of expenses is based on function, i.e. Production, Administration, Selling and Distribution |
| Fixed Costs | Fixed manufacturing OH Costs are regarded as a Period Cost. | Fixed manufacturing OH Costs are charged to cost of production. |
| Presentation | Cost data presented highlight the Total Contribution and Contribution of each product. | Cost data are presented on conventional pattern. Net Profit of each product is determined after subtracting Fixed Cost along with their variable costs. |
| Variance Reporting | In Variance Reporting, FOH Expenditure Variance only can be computed. There is no Volume Variance since Fixed Overheads are not "absorbed" | In Variance Reporting, FOH Expenditure and Volume variance can be computed. Volume variance can also be sub - classified into Capacity, Efficiency and Calendar variance. |

DECISION MAKING INDICATORS

List the basic decision making indicators in Marginal Costing.

- a) Profit Volume Ratio (PV Ratio).
- b) Break Even Point (BEP).
- c) Margin of Safety. (MOS).
- d) Indifference Point.
- e) Shut Down Point

PV RATIO

The Profit Volume Ratio (PV Ratio) is the relationship between Contribution and Sales Value (C/S). It is also termed as Contribution to Sales Ratio (CSR).

Alternative Formula:
$$PV \text{ Ratio} = \frac{\text{Change in Contribution}}{\text{Change in Sales}} \times 100 = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

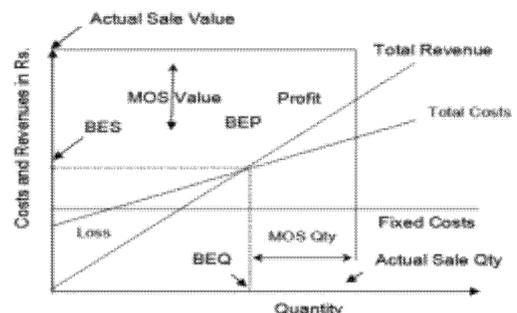
BREAK EVEN POINT (BEP)

1. **Meaning:** It is the level of Sales at which there is neither a Profit nor a Loss to the Firm (Total Revenue = Total Costs). In other words, at this point, the Total Contribution equals Fixed Costs.
2. **Assumption underlying Break Even Analysis:**
 - a) Total Costs can be easily **classified** into Fixed and Variable categories.
 - b) **Selling Price** per unit remains constant, irrespective of quantity sold.
 - c) **Variable Costs** per unit remain constant. However Total Variable Costs increases with increase in output levels.
 - d) **Fixed Costs** remain the same irrespective of output.
 - e) **Productivity** of the factors of production will remain the same.
 - f) The state of **technology**, process of production and quality of output will remain unchanged.
 - g) The Company manufactures and sells a single product. In the case of a multi - product Company, the **sales - mix** remains unchanged.

Formula:

a) Break Even Point (in Rs.) =
$$\frac{\text{Fixed Costs}}{\text{PV Ratio}}$$

This is denoted as BES (Break Even Sales Value)



b) Break Even Point (Qty) = $\frac{\text{Fixed Costs}}{\text{Contribution per unit}}$

This is denoted as BEQ (Break Even Quantity)

Significance of BEP: BEP represents the cut off Point for Profit or Loss of the business. At the BEP, the Profit or Loss equals zero. The significance of BEP may be summarized as:

| LEVEL OF SALES | IMPACT ON PROFITS |
|------------------|---|
| Less than BEP | Firm incurs Losses (Contribution < Fixed Cost) |
| Equal to BEP | No Profit & No Loss (Contribution = Fixed Cost) |
| Greater than BEP | Firms earns Profits (Contribution > Fixed Cost) |

MARGIN OF SAFETY

It represents the difference between the Sales at Break Even Point and the Total Sales.

Formulae:

- a) Margin of Safety (in Rs.) = Total Sales of Less BE Sales (OR) Profit/P V Ratio
- b) Margin of Safety (Qty) = Total sales (Q) - BEP (Q) (Or) Profit/Contribution per unit

Significance:

- a) Up to BEP, the Contribution earned is sufficient only to recover Fixed Costs. However, beyond the BEP, the Contribution is called Profit (since Fixed Costs are fully recovered by then)
- b) Profit is nothing but Contribution earned out of Margin of Safety Sales.
- c) The size of the Margin of Safety shows the strength of the business.
- d) A low Margin of Safety indicates that the Firm has large Fixed Expenses and is more Vulnerable to changes in Sales.
- e) A high Margin of Safety implies that a slight fall in may not affect the business very much.

Improvement in Margin of Safety: The possible steps to improve the Margin of Safety are:

- a) Increase in selling Price, provided the demand is inelastic so as to absorb the increase.
- b) Reduction in Fixed Expenses.
- c) Reduction in Variable Expenses.
- d) Increasing the Sales Volume provided capacity is available.

SHUT DOWN POINT

Shut Down Point indicates the level of operations (Sales), below which it is not justifiable to pursue production.

For this purpose, Fixed Costs of a business are classified into - (a) Avoidable or Discretionary Fixed Costs and (b) Unavoidable or Committed Fixed Costs. A Firm has to close down if its Contribution is insufficient to recover even the Avoidable Fixed Costs.

Formulae:

Shut Down Point (in Rs.)

$$\frac{\text{Avoidable Fixed Costs}}{\text{P V Ratio}}$$

Shut Down Point (Quantity)

$$\frac{\text{Avoidable Fixed Costs}}{\text{Contribution per unit}}$$

Where Avoidable Fixed Costs = Total Fixed Costs **Less** Minimum (Unavoidable) Fixed Costs.

INDIFFERENCE POINT

Indifference Point is the level of sales at which Total Costs/Total Profits of two options are equal. The decision maker is indifferent as to option chosen, since both option will result in the same amount of profit/cost.

Formulae:

$$\text{a) Indifference Point (in Rs.) : } \frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost Ratio}} \text{ OR } \frac{\text{Difference in Fixed Cost}}{\text{Difference in P V Ratio}}$$

$$\text{b) Indifference Point (in units): } \frac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost p. u.}} \text{ OR } \frac{\text{Difference in Fixed Cost}}{\text{Difference in Contribution p. u.}}$$

DISTINGUISH BETWEEN INDIFFERENCE POINT AND BEP

| PARTICULARS | INDIFFERENCE POINT | BREAK EVEN POINT |
|--------------|---|--|
| Definition | Indifference Point is the level of Sales at which Total Costs and Profits of two options are equal. | BEP is the level of Sales at which there is neither a Profit nor a Loss to the Firm. |
| Formula | Indifference Point (in Rs.) = $\frac{\text{Difference in Fixed Cost}}{\text{Diff. in VC Ratio PVR}}$ | Break Even Point (in Rs.) = $\frac{\text{Fixed Costs}}{\text{P V Ratio}}$ |
| Significance | It is the activity level at which Total Cost under 2 alternatives are equal. | It is activity level at which the Total Revenue is equal to its Total Cost. |
| Purpose | Used to choose between two alternative options for achieving the same objective (Decision making) | Used for Profit planning. |

KEY FACTOR / LIMITING FACTOR

Key Factor represents a resource whose availability is less than its requirement. It denotes the resource constraint situation it is a factor, which at a particular time or over a period limits the activities of a Firm. It is also called Critical Factor (since it is vital or critical to the Firm's success) and Budget Factor (since budgets are formulated by reference to such limitations or restraints). Some examples are Shortage of Raw Material, Labour Shortage, Restrictions in Plant Capacity, Demand or Sales Expectancy, Cash availability, etc.

In case of Key Factor situation, the procedure for decision-making is as under:

| STEP | DESCRIPTION |
|------|--|
| 1 | Identify the Key Factor. |
| 2 | Compute Total Contribution or Contribution per unit of the product. |
| 3 | Compute Contribution Per Unit of the Key Factor, i.e. Contribution per Direct Labour Hour, Contribution per kg of Raw Material, etc. |
| 4 | Rank the products based on Contribution per unit of the Key Factor. |
| 5 | Allocate the key resources based on Ranks given above |

FACTORS TO BE CONSIDERED IN MARGINAL COSTING DECISIONS

- Contribution:** Whether the product or option under consideration makes a Contribution or not, is the basic consideration. If there is No Contribution or Negative Contribution, the proposal is not acceptable.
- Specific Fixed Cost, if any:** Where a choice is to be made between two courses of action, the additional Fixed Overhead, if any, should be taken into account.
- Incremental Contribution:** Where additional quantities can be sold only at reduced prices, Incremental Contribution will be more effective in decision making, as it takes into account the Additional Sale Quantity and Additional Contribution per unit.
- Capacity:** Whether acceptance of the incremental order, or additional product line is within the Firm's capacity or whether Key Factor comes into play, should be analysed.
- Non-Cost Factors:** Non-Cost Factors should also be considered, wherever applicable.

PROBLEMS FOR CLASSROOM DISCUSSION

MODEL 1: P/V RATIO, BEP, MOS, PROFIT

PROBLEM 1:

| | |
|----------------|------------------|
| Fixed Cost | Rs. 1,20,000 |
| Variable costs | Rs. 3 per unit |
| Selling price | Rs. 7 per unit |
| Output | Rs. 50,000 units |

CALCULATE the profit for each of the following situation with the above data:

- i) With the data above
- ii) With a 10% increase in output.
- iii) With a 10% increase in fixed costs.
- iv) With a 10% increase in variable costs.
- v) With a 10% increase in selling price.
- vi) Taking all the above situations.

(B) (MTP N17) (Ans.: (i)80,000, (ii)100,000, (iii)68,000, (iv)65,000, (v)1,15,000, (vi)1,10,000)
(SOLVE PROBLEM NO 1 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost is reduced by 10%.
- ii) If selling price is decrease by 20%.

Note: _____

PROBLEM 2: Following figures have been extracted from the books of M/s. RST Private Limited:

| Financial Year | Sales (Rs.) | Profit/Loss (Rs.) |
|----------------|-------------|-------------------|
| 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 Rs. 45,000
- (v) Margin of safety in Financial Year 2017-18

(A)(M18 (N)-5M) (ANS.: I. 30%, II. RS.1,35,000, III. RS.4,50,000, IV. 6,00,000, V. RS.50,000)
(SOLVE PROBLEM NO 2 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If p/v ratio increased by 50% on BEP & MOS.
- ii) If profit for the year 2017-18 is Rs.25,000.

Note: _____

PROBLEM 3: A manufacturing company is producing a product 'A' which is sold in the market at Rs. 45 per unit. The company has the capacity to produce 40,000 units per year. The budget for the year 2018 - 19 projects a sale of 30,000 units.

The costs of each unit are expected as under:

| | |
|-----------|------------|
| | Rs. |
| Materials | 12 |
| Wages | 9 |
| Overheads | 6 |

Margin of safety is Rs.4,12,500

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You are required to:

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

(A)(N18 (N) - 10M) (ANS.: (I)3,75,000:(9,37,500(II)18,75,000(III)31,945 UNITS(IV)33,824UNITS)

(SOLVE PROBLEM NO 3 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If the margin of safety is 5,00,000.
- ii) If selling price Rs.60.

Note: _____

PROBLEM 4

- a) A company sells its product at Rs. 15/- per unit. In a period if it produces and sells 8,000 units, it incurs a loss of Rs 5/- per unit. If the volume is raised to 20,000 units, it earns a profit of Rs. 4/- per unit. Calculate the breakeven point both in terms of rupees as well as in units.

(B) (NEW SM, OLD SM) (ANS.: A) BEP = RS. 1,80,000 / 12,000 UTS.)

CONCEPT QUESTIONS:

What will be the impact on the question,

- i) If fixed cost is 12,00,000.
- ii) If profit per unit Rs.8.
- b) When volume is 4000 units, average cost is 3.75 per unit. When Volume is 5000 units, average cost is 3.5 per unit. The Break – Even point is 6000 units.

Calculate: (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio.

(B) (N19 (N) - 5M) (ANS.: i) Rs.2.5 ii)Rs.5,000 iii)25%) (SOLVE PROBLEM NO 4OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If BEP is 5000 units.
- ii) If new BEP is fixed cost is reduced by 10%.

Note: _____

PROBLEM 5: A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%.Its fixed costs amount to Rs. 5 lakhs.

Calculate the following:

- i) Break-even sales,
- ii) Total sales,
- iii) Total variable cost,
- iv) Current profit,
- v) New 'margin of safety' if the sales volume is increased by 7 ½ %

(B) (NEW SM, OLD SM) (ANS.: I. RS.12,50,000, II. RS. 20 LAKHS, III. RS.12 LAKHS, IV. RS.3 LAKHS, V. 9 LAKHS)

(SOLVE PROBLEM NO 5 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If the margin of safety is 50%.
- ii) If fixed cost is Rs.8,00,000.

PROBLEM 6: M Ltd. has an annual fixed cost of Rs. 98,50,000. In the year 20X8-X9, sales amounted to Rs.7,80,60,000 as compared to Rs.5,93,10,000 in the preceding year 20X7-X8. Profit in the year 20X8-X9 is Rs.37,50,000 more than that in 20X7-X8.

Required:

- i) CALCULATE Break-even sales of the company;
- ii) DETERMINE profit/ loss on a forecasted sales volume of Rs.8,20,00,000.
- iii) If there is a reduction in selling price by 10% in the financial year 20X8-X9 and company desires to earn the same amount of profit as in 20X7-X8, COMPUTE the required sales amount?

(A) (MTP1 M19 (N&O)) (ANS.: i)4,92,50,000ii)65,50,000,iii)10,67,58,000)
(SOLVE PROBLEM NO 6 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If P/v ratio increased by 50% then impact on BEP.
- ii) If variable cost ratio is reduced to 70%, then impact on BEP.

Note: _____

PROBLEM 7: The following figures are related to LM Limited for the year ending 31st March, 2012: Sales - 24,000 units @ Rs. 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 Rs. 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 be brought down by 4,000 units.

(A) (OLD PM, N12 - 8M) (ANS.: I. RS.6 LAKHS, II. RS.6 LAKHS, III. 34,000 UNITS, IV. 60,000 UNITS, V. RS.225)
(SOLVE PROBLEM NO 7 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If p/v ratio is 30%.
- ii) If % of BEP =40%.

Note: _____

PROBLEM 8: PQR Ltd. has furnished the following data for the two years:

| | 2013 | 2014 |
|--|-------------|---------|
| Sales | Rs.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 2014 due to the restructuring process. The company could maintain its sales quantity level of 2013 in 2014 by reducing selling price.

You are required to calculate the following:

- i) Sales for 2014 in Rs.
 - ii) Fixed cost for 2014
 - iii) Break-even sales for 2014in Rupees.
- (B) (NEW SM, OLD SM) (ANS.: I) 6,40,000; II)1,87,500; III)5,00,000)
(SOLVE PROBLEM NO 8 OF ASSIGNMENT PROBLEMS AS REWORK)

Concept questions: What will be the impact on the question,

- i) If p/v ratio in 2014 is 40%.
- ii) If margin of safety in 2013 is 30%.

PROBLEM 9: A single product company sells its products at Rs.60 per unit. In 2013, the company operated at a margin of safety of 40%. The fixed costs amounted to Rs. 3,60,000 and the variable cost ratio to sales was 80%. In 2014, 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 2014 to earn the same p/v ratio as in 2013.
- Assuming the same selling price of Rs. 60 per unit in 2014. Find the number of units required to be produced and sold to earn the same profit as in 2013.

(B) (NEW SM, OLD SM) (ANS.: A) SELLING PRICE = RS. 66; B) 85,834 UTS)

(SOLVE PROBLEM NO 9 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- If selling price is Rs.50.
- If fixed cost is Rs.4,50,000.

Note: _____

PROBLEM 10: (PRINTED SOLUTION AVAILABLE) 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.

| | Sales | | Profit | |
|-------|--------|-----------------------|--------|-----------------------|
| | Actual | Over / (Under) Budget | Actual | Over / (Under) Budget |
| North | 1,100 | (400) | 135 | (180) |
| East | 1,450 | 150 | 210 | 90 |
| South | 1,200 | (200) | 330 | (110) |

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

- The fixed costs.
- Break -Even Sales.

(NEW SM, OLD SM) (ANS.:(i) NORTH - 360; EAST - 660; SOUTH - 330; TOTAL FIXED COST -1350; II) BES - 2,500)

(B) (SOLVE PROBLEM NO 10 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- If actual sales of north division is 1500.
- If actual profit for each is 250.

Note: _____

PROBLEM 11: (PRINTED SOLUTION AVAILABLE) A company had incurred fixed expenses of Rs. 4,50,000, with sales of Rs. 15,00,000 and earned a profit of Rs. 3,00,000 during the first half year. In the second half, it suffered a loss of Rs. 1,50,000.

Calculate:

- The profit-volume ratio, break-even point and margin of safety for the first half year.
- Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.
- The break-even point and margin of safety for the whole year.

(A) (NEW SM, OLD SM) (ANS.: I. 50%, RS.9 LAKHS, RS.6 LAKHS, II. 6 LAKHS, III. RS.18 LAKHS, RS.3 LAKHS)

(SOLVE PROBLEM NO 11 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed expenses is Rs.300000.
- ii) If profit of 2,00,000 in the second half year.

Note: _____

PROBLEM 12: A company has introduced a new product and marketed 20,000 units. Variable cost of the product is Rs. 20 per units and fixed overheads are Rs. 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 Rs.64,000.

(A) (N16-8M) (ANS: (I) PRICE - 40; (II) PROFIT DECREASED FROM 10% TO 8.89% , B.E.P INCREASED BY RS.80,000 (OR) BY 4,000 UNITS , M.O.S INCREASE BY RS.20,000 (OR) BY 1,000 UNITS; (III) RS.1,28,000 (OR) 3,200 UNITS)

(SOLVE PROBLEM NO 12 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If variable cost per unit is Rs.15.
- ii) If fixed cost is Rs.5,00,000.

Note: _____

PROBLEM 13: A Company manufactures a product, currently utilising 80% capacity with a turnover of Rs. 8,00,000 at Rs. 25 per unit. The cost data are as under:

Material cost Rs. 7.50 per unit, Labour cost Rs. 6.25 per unit Semi-variable cost (Including variable cost of Rs. 3.75) per unit Rs.1, 80,000. Fixed cost Rs. 90, 000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

Calculate:

- i) Activity level at Break-Even-Point
- ii) Number of units to be sold to earn a net income of 8% of sales
- iii) Activity level needed to earn a profit of Rs. 95,000
- iv) What should be the selling price per unit, if break-even point is to be brought down to 40% activity level? (A) (MTP N15, RTP M17, MTP2 M19) (ANS.: (I) 50%; (II) 27,273 UNITS; (III) 88.33%; (IV) RS. 26.875)

(SOLVE PROBLEM NO 13 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If the selling price is Rs.20.
- ii) If P/V ratio is 30%.

Note: _____

PROBLEM 14: (PRINTED SOLUTION AVAILABLE) PVC Ltd sold 55,000 units of its product at 375 per unit. Variable costs are Rs.175 per unit (manufacturing costs of Rs.140 and selling cost Rs.35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs.65,00,000 (including depreciation of Rs.15,00,000). There is no beginning or ending inventories.

Required:

- i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.
- ii) COMPUTE the P/V ratio.
- iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of Rs.5,00,000.
- iv) COMPUTE the sales level achieve an after-tax income (PAT) of Rs.5,00,000, assume 40% corporate tax rate.

(A) (RTP N19 (N&O)) (ANS.: (I)32,500 UNITS,25,000UNITS; (II) 53.33%; (III) 35,000UNITS; (IV) RS. 1,37,50,859)
(SOLVE PROBLEM NO 14 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If variable cost per unit Rs.150
- ii) If depreciation is Rs.5,00,000.

Note: _____

PROBLEM 15: C.T. Ltd. manufactures and sells a single product X whose selling price is Rs. 100 per unit and the variable cost is Rs. 60 per unit.

- i) If the Fixed Costs for this year are Rs. 24,00,000 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%.
- ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 150 per unit and the variable cost Rs. 100 per unit. The total fixed costs are estimated at Rs. 28,00,000. The sales mix of X : Y would be 5 : 3.

COMPUTE the break- even sales in units for both the products

(B) (MTP N19 (N&O)) (ANS.: i)40;60,000 UNITS;1,50,000 UNITS;14.40%;ii)X-40,000 UNITS,Y-24,000 UNITS)
(SOLVE PROBLEM NO 15 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If selling price is Rs.72.
- ii) If fixed cost is Rs.15,00,000.

Note: _____

PROBLEM 16:

Following details are related to M/s XYZ Limited:

| | |
|-----------------------------|-------------|
| Total Cost | 56,78,000 |
| Margin of Safety | 48,18,450 |
| Margin of safety (in units) | 6,500 units |
| Break even sales | 3,500 units |

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You are required to calculate:

- (i) Profit
- (ii) Profit volume ratio
- (iii) Break even sales in rupees
- (iv) Fixed costs

(A) (N19(O) - 5M) (ANS.: i)17,35,000 ii) 36% iii) 25,94,550 iv)9,34,038)

(SOLVE PROBLEM NO 16 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If total cost is Rs.60,00,000
- ii) If BEP is Rs.5000 units.

PROBLEM 17: (PRINTED SOLUTION AVAILABLE) A company is producing an identical products in two factories. The following are the details in respect of both factories:

| | <u>Factory X</u> | <u>Factory Y</u> |
|---|------------------|------------------|
| Selling price per unit (Rs.) | 50 | 50 |
| Variable cost per unit (Rs.) | 40 | 35 |
| Fixed cost (Rs.) | 2,00,000 | 3,00,000 |
| Depreciation included in above fixed cost (Rs.) | 40,000 | 30,000 |
| Sales in units | 30,000 | 20,000 |
| Production capacity (units) | 40,000 | 30,000 |

You are required to determine:

- i) Break Even Point (BEP) each factory individually.
- ii) Cash break-even point for each factory individually.
- iii) BEP for company as a whole, assuming the present product mix is in sales ratio.
- iv) Consequence on profit and BEP if product mix is changed to 2:3 and total demand remain same

(B) (M18 (O)-8M) (ANS.: I. X- 20,000 ,Y-20,000, II. X-16,000 ,Y-18,000, III. 41,667, IV. INCREASE IN PROFIT RS.50,000 & BEP REDUCED BY 3205 UNITS) (SOLVE PROBLEM NO 17 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If a production capacity are 30000 & 20000 Units.
- ii) If depreciation for factory X is Rs.1,00,000.

Note: _____

PROBLEM 18: PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The cost Accountant has presented following information for the year to the management:

| Particulars | Amount (Rs.) | Amount (Rs.) |
|--------------------------------------|--------------|--------------|
| Sales 1,500 pieces @ 1,800 per piece | | 27,00,000 |
| Direct Material | 5,94,200 | |
| Direct Labour | 4,42,600 | |
| Overheads (40% Fixed) | 11,97,000 | 22,33,800 |
| Net Profit | | 4,66,200 |

Evaluate following options:

- i) If selling price is increased by Rs. 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?
- ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with readymade suit. The cost of each TIEPIN is Rs. 18. Calculate the sales to earn a profit of 20% on sales.

(A) (M18 (N)-10M) (I) PROFIT:RS. 5,17,200; (II) 34,20,000

(SOLVE PROBLEM NO 18 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If selling price is 2100.
- ii) If tie pin cost is Rs.10.

PROBLEM 19: A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

- i) On 1st January, 2016, the company has an opening stock of 20,000 packets whose variable cost is Rs. 180 per packet.
- ii) In 2015, production was 1,20,000 packets and the expected production in 2016 is 1,50,000 packets. Expected sales for 2016 is 1,60,000 packets.
- iii) In 2015, fixed cost per unit was Rs. 60 and it is expected to increase by 10% in 2016. The variable cost, is expected to increase by 25%. Selling price for 2016 has been fixed at Rs. 300 per packet.

You are required to calculate the Break-even, volume in units for 2016.

(A) (M16) (ANS.: i)93,600) (SOLVE PROBLEM NO 19 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If opening stock is at Rs. 250.
- ii) If opening stock is sold at Rs.200.

Note: _____

PROBLEM 20: (PRINTED SOLUTION AVAILABLE) M/s Gaurav Private Limited is manufacturing and selling two products BLACK and WHITE at Rs 20 and Rs 30 respectively.

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

- i) Sales planned for the year will be Rs 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 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 Rs 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 Rs 42,00,000 allocated as 22,00,000 to BLACK and Rs 20,00,000 to WHITE.

You are required to calculate:

- i) Number of units of BLACK and WHITE to be sold to breakeven during financial year 2019-20
- ii) Amount of reduction in fixed cost - product wise to achieve desired profit mentioned at (iv) above

(A) (M19 (N) - 10M) (ANS.: I) 2,20,500 (UNITS), 1,10,250 (UNITS); II) RS. 2,61,200)

(SOLVE PROBLEM NO 20 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If selling price is increase by 10% each.
- ii) If BEP is 40% of total sale.

Note: _____

PROBLEM 21: An automobile manufacturing companies produce different models of Cars. The budget in respect of model 007 for the month of March, 2013 is as under:

| Budgeted Output 40,000 Units | | |
|------------------------------|--------------|--------------|
| | Rs. In lakhs | Rs. In lakhs |
| Net Realization | | 700 |
| Variable Costs: | | |

| | | |
|-----------------------|------------|--------|
| Materials | 264 | |
| Labor | 52 | |
| Direct expenses | <u>124</u> | 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.
(B) (OLD SM)(ANS.:94.5 LAKHS, 44,521 UNITS)
(SOLVE PROBLEM NO 21 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If there is no fixed cost.
- ii) If P/V ratio is 40%.

Note: _____

PROBLEM 22: 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 | Rs. 5,00,000 |
| Direct Materials | Rs. 2,50,000 |
| Direct Labour | Rs. 1,00,000 |
| Variable Overheads | Rs. 40,000 |
| Capital Employed | Rs. 4,00,000 |

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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. *(A) (NEW SM) (ANS.:PROFIT OF RS.92,780 IS MORE THAN 23.19% OF CAPITAL EMPLOYED)*
(SOLVE PROBLEM NO 22 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If sales volume is increases by 15%.
- ii) If selling price is decrease by 10%.

Note: _____

PROBLEM 23: 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 Rs. 40 for J and Rs.20 for K. Fixed costs are Rs. 6,16,000 per month. Compute the break-even point.
(C) (OLD PM)(ANS.: J - 11,200 UTS; K - 8,400 UTS.)

(SOLVE PROBLEM NO 23 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost 7,00,000.
- ii) If sale mix is 5 units of J & 7 units of K.

Note: _____

MODEL 2: MARGINALCOST SHEET

PROBLEM 24: (PRINTED SOLUTION AVAILABLE) A Indian soft drink Company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

| Particulars | 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

- i) Compute the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.
- ii) Calculate the break-even point in Rupee sales as also in number of bottles for the Indian subsidiary on the assumption that the sale price is Rs. 14 per bottle.

(B) (NEW SOLUTIONS.: I) RS. 15/- II) BEP: RS. 4,48,000 (OR) 32,000 BOTTLES
(SOLVE PROBLEM NO 24 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If sales commission is 10%.
- ii) If annual sales are 50,000 bottles.

Note: _____

PROBLEM 25: A Ltd. manufacture and sales its product R-9. The following figures have been collected from 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 Rs.185 per unit. From the given DETERMINE the followings:

- 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)

(B) (RTP M20 (N&O)) (ANS.: (I) BES=6,90,882; (II) PROFIT= 1,25,000; (III) MOS=25.31%; (IV) RS. 75,600)

(SOLVE PROBLEM NO 25 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If administrative overhead are General.
- ii) If selling price is Rs.200 per unit.

Note: _____

MODEL 3: SHUT DOWN POINT

PROBLEM 26: (PRINTED SOLUTION AVAILABLE) Mr. X has Rs.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 Rs.80,000 per year. Show computations to answer the following problems:

- 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 Rs. 25,000 as expenses per year. At what sales would he be better off by shutting his business up?

(A) (NEW SM, OLD SM) (ANS: A) 2,00,000, B) 2,75,000, C) 1,37,500)

(SOLVE PROBLEM NO 26 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If investment in the business is Rs.15000.
- ii) If unavoidable fixed cost is Rs.50,000.

Note: _____

MODEL 4: INDIFFERENCE POINT

PROBLEM 27: (PRINTED SOLUTION AVAILABLE) The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

| | A Manual (Rs.) | B Semi-Automatic (Rs.) | C Fully-Automatic (Rs.) |
|-----------------------------------|-----------------------------|--------------------------|-----------------------------|
| Monthly fixed costs: | | | |
| Occupancy | 15,000 | 15,000 | 15,000 |
| Maintenance contract | --- | 5,000 | 10,000 |
| Equipment lease | --- | 25,000 | 1,00,000 |
| Unit variable costs (per report): | | | |
| Supplies | 40 | 80 | 20 |
| Labour | Rs. 200 (5 hrs. × Rs.40) | Rs.60 (1 hr. × Rs.60) | Rs.20 (0.25 hr. × Rs.80) |

Required:

- i) Calculate cost indifference points. Interpret your results.
- ii) 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?

(B) (NEW SM) (ANS.: (I) INDIFFERENCE POINT B/W A AND B IS 300 CASES , A AND C IS 550 CASES , B AND C IS 800 CASES;
(II) ALTERNATIVE C IS MOST APPROPRIATE) (SOLVE PROBLEM NO 27 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost are 20,000 50,000 1,50,000.
- ii) If labour cost for manual is Rs.400.

Note: _____

PROBLEM 28: XY Ltd. makes two products X and Y, whose respective fixed costs are F_1 and F_2 . You are given that the unit contribution of Y is one fifth less than the unit contribution of X, that the total of F_1 and F_2 is Rs. 1,50,000, that the BEP of X is 1,800 units (for BEP of X F_2 is not considered) and that 3,000 units is the in difference point between 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 F_1 and F_2 and units contributions of X and Y.

(B) (NEW SM) (ANS.: $F_1=RS.90,000$; $F_2=RS.60,000$; $X=RS.50$; $Y= RS.40$)
(SOLVE PROBLEM NO 28 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If BEP is 2000 units.
- ii) If indifference point is 4000 units.

Note: _____

MODEL 5 : LIMITING FACTOR

PROBLEM 29: (PRINTED SOLUTION AVAILABLE) X Ltd. This produces two products using the same raw-material and production facilities, provides you the following information.

| Particulars | Product A (Rs.) | Product B (Rs.) |
|---|-----------------|-----------------|
| Selling price per unit | 100 | 80 |
| Material @ Rs.2 per Kg | 20 | 10 |
| Labour @ Rs. 3 per hour | 15 | 30 |
| Variable overheads @ Rs. 4 per machine hour | 40 | 16 |
| Total fixed overheads: Rs. 6,00,000 | | |

Required: comment on the profitability of each product when:

- a) Sales quantity is limited;
- b) Sales value is limited;
- c) Raw-material is in short supply;
- d) Labour hours are limited;
- e) Production capacity (in terms of machine hours) is limited;
- f) There are heavy demand conditions;
- g) There are low demand conditions.

(B) (ANS.: IN THE CASES OF (A),(D),(G) PRODUCT A IS MORE PROFITABLE; WHILE IN (B),(C) ,(F) PRODUCT B IS MORE PROFITABLE) (SOLVE PROBLEM NO 29 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost is Rs.50000.
- ii) If selling price of Product-B is Rs.140.

Note: _____

PROBLEM 30: (PRINTED SOLUTION AVAILABLE) 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 (Rs.)..... | 145 | 115 |
| Total hours available: | Machine A 4,000 hours | Machine B 4,500 hours |

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

Variable overheads per machine hours:.....

- Machine A: Rs. 80
- Machine B: Rs. 100

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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 Rs. 60 per hour of unutilized Machine hour, what will be the total contribution from the spare part identified above?

(B)NEW SM (ANS:i) 1,79,982; 1,62,500 ii) 1,53,345

(SOLVE PROBLEM NO 30 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If Machine –A available hours 10,000 hours.
- ii) If Alloy availability is 5,000 kgs.

Note: _____

PROBLEM 31: 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.

| Particulars | X | Y | Z |
|----------------------------|--------|-------|-------|
| Selling Price (Rs./unit) | 10 | 12 | 12 |
| Variable Costs(Rs./unit) | 6 | 9 | 7 |
| Market Demand (unit) | 3,000 | 2,000 | 1,000 |
| Production Capacity (unit) | 2,000 | 3,000 | 900 |
| Fixed Costs (Rs) | 30,000 | | |

Required: Compute the opportunity costs for each of the products.

(B) (NEW SM) (ANS.: OPPORTUNITY COSTS FOR PRODUCT X, Y, Z IS RS.6,000; RS.8,000;RS.8,000)

(SOLVE PROBLEM NO 31 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If market demand for Product-Y is 4000 units.
- ii) If production capacity for product-Z is 1500 units.

Note: _____

MODEL 6: ABSORPTION VS MARGINAL COSTING

PROBLEM 32: (PRINTED SOLUTION AVAILABLE) XYZ Ltd. Has a production capacity of 2,00,000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are Rs.11 per unit. The fixed costs are Rs.3,60,000 per year. Variable selling costs are Rs.3 per unit and fixed selling costs are Rs.2,70,000 per year. The unit selling price is Rs.20. In the year just ended on 30th June, 2006, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 30th June was 20,000 units. The actual variable production costs for the year were Rs. 35,000 higher than the standard.

- a) Calculate the profit for the year
 - i) by absorption costing method and
 - ii) by marginal costing method

b) Explain the difference in profit

(A) (NEW SM, OLD SM) (ANS: (A) (I) 2,59,375; (II) 2,39,375; (B) OPENING VALUE OVERVALUED: RS. 20,000; CLOSING VALUE OVERVALUED: RS. 40,000;) (SOLVE PROBLEM NO 32 OF ASSIGNMENT PROBLEMS AS REWORK)

CONCEPT QUESTIONS: What will be the impact on the question

- i) If variable production cost per unit is Rs.15.
- ii) If fixed cost are Rs.4,50,000.

Note: _____

PRINTED SOLUTIONS TO SOME SELECTIVE PROBLEMS

PROBLEM NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 10,11,14,17,20,24,26,27,29,30,32

PROBLEM NO:10

$$P/V \text{ ratio} = \frac{\text{Change in profit}}{\text{Change in Sales}}$$

$$\text{North} = \frac{180}{400} = 45\%$$

$$\text{East} = \frac{90}{150} = 60\%$$

$$\text{South} = \frac{110}{200} = 55\%$$

MARGINAL COST OF STATEMENT

| Particulars | North | East | South | Total |
|--------------------------|-------|------|-------|-------|
| Sales | 1100 | 1450 | 1200 | 3750 |
| Less: Variable cost(b/f) | 605 | 580 | 540 | 1725 |

| | | | | |
|-------------------------------------|-------------------|-------------------|-------------------|------|
| Contribution (Sales X PV ratio) | 495 (1100*45%) | 870 (1450*68%) | 660 (1200*55%) | 2025 |
| Less: Fixed cost (b/f) | 360 | 660 | 330 | 1350 |
| Profit/loss | 135 | 210 | 330 | 675 |
| BEP (Rs.) (Fixed cost/P/v Ratio) | 800 (365/45%) | 1100 (660/60%) | 600 (330/55%) | 2500 |

$$\text{Combined P/V ratio} = \frac{\text{Total contribution}}{\text{Total sales}} = \frac{2025}{3750} = 54\%$$

$$\text{Total BEP(Rs.)} = \frac{\text{Total Fixed Cost}}{\text{Combined P/V Ratio}} = \frac{1350}{54\%} = \text{Rs.2500}$$

PROBLEM NO. 11

i) MARGINAL COST STATEMENT FOR THE FIRST HALF YEAR:

| Particulars | Amt. |
|------------------------|-----------|
| Sales | 15,00,000 |
| (-)variable cost (b/f) | 7,50,000 |
| contribution | 7,50,000 |
| (-) Fixed cost | 4,50,000 |
| Profit/loss | 3,00,000 |

$$\text{P/V ratio} = \frac{\text{contribution}}{\text{sales}} = \frac{7,50,000}{15,00,000} = 50\%$$

$$\text{BEP(Rs.)} = \frac{\text{Fixed cost}}{\text{p/v ratio}} = \frac{4,50,000}{50\%} = 9,00,000$$

$$\text{MOS} = \frac{\text{profit}}{\text{p/v ratio}} = \frac{3,00,000}{50\%} = 6,00,000$$

ii) MARGINAL COST STATEMENT FOR THE SECOND HALF YEAR:

| Particulars | Amount |
|------------------------|------------|
| sales | 6,00,000 |
| (-)variable cost (b/f) | (3,00,000) |
| contribution | 3,00,000 |
| (-) Fixed cost | (4,50,000) |
| Profit/loss | (1,50,000) |

Note:

- i) Selling price and Variable cost per unit are constant.
- ii) Therefore p/v ratio will be same in second half year.

$$\text{P/V ratio} = 50\% : \text{P/V ratio} = \frac{\text{contribution}}{\text{sales}}$$

$$\text{Sales} = \frac{\text{contribution}}{\text{p/v ratio}} = \frac{3,00,000}{50\%} = 6,00,000$$

iii) for the whole year(First and second half year)

$$\text{BEP(in rupees)} = \frac{\text{total Fixed cost for the year}}{\text{p/v ratio}} = \frac{4,50,000 + 4,50,000}{50\%} = 18,00,000$$

$$\text{MOS (in rupees)} = \text{Total sales} - \text{BEP} = (15,00,000 + 6,00,000) - 18,00,000 = 3,00,000$$

(or)

$$\frac{\text{profit}}{\text{p/v ratio}} = \frac{3,00,000(\text{profit}) - 1,50,000(\text{loss})}{50\%} = 3,00,000$$

PROBLEM NO:14

i) Contribution = Rs.375 - Rs.175 = Rs.200 per unit

fixed cost

$$\text{Break even Sales Quantity} = \frac{\text{fixed cost}}{\text{contribution per unit}} = \frac{65,00,000}{200} = 32,500 \text{ units.}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{cash fixed cost}}{\text{contribution margin per unit}} = \frac{50,00,000}{200} = 25,000 \text{ units.}$$

ii)
$$\text{P/V ratio} = \frac{\text{contribution margin per unit}}{\text{selling price per unit}} \times 100 = \frac{200}{375} \times 100 = 53.33\%$$

iii) No. of units that must be sold to earn an Income (EBIT) of Rs.5,00,000

$$\frac{\text{fixed cost} + \text{desired EBIT level}}{\text{contribution margin per unit}} = \frac{65,00,000 + 5,00,000}{200} = 35,000 \text{ units}$$

iv) After Tax Income (PAT) = Rs.5,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{5,00,000}{60} \times 100 = 8,33,333$$

$$\text{Estimate Sales Level} = \frac{\text{fixed cost} + \text{desired profit}}{\text{P/V ratio}} \text{ (or) } \frac{\text{fixed cost} + \text{desired profit}}{\text{contribution per unit}} \times \text{selling price per unit}$$

$$= \frac{65,00,000 + 8,33,333}{53.33\%} = \text{Rs. } 1,37,50,859.$$

PROBLEM NO:17

i) & ii) **MARGINAL COST STATEMENT :**

| Particulars | Factor X | Factor y |
|---|-------------------------------|-------------------------------|
| Selling price | 50 | 50 |
| Less: Variable cost per unit | 40 | 35 |
| Contribution per unit | 10 | 15 |
| P/V ratio = cost per unit / selling price | 20% (10/20) | 30% (15/50) |
| Fixed cost | 2,00,000 | 3,00,000 |
| Less: Depreciation | (40,000) | (30,000) |
| Cash fixed cost | 1,60,000 | 2,70,000 |
| BEP (in units) (Fixed cost/cost per unit) | 20,000 units (2,00,000/10) | 20,000 units (3,00,000/15) |
| BEP (in Rs.) (Fixed cost/P/v ratio) | 10,00,000 (2,00,000/20%) | 10,00,000 (3,00,000/30%) |
| Cash BEP (in units) (Cash fixed cost/cost per unit) | 16,000 units (1,60,000/10) | 18,000 units (2,70,000/15) |

| | | |
|---|----------------------------|----------|
| Cash BEP (in Rs.) (Cash fixed cost/p/v ratio) | 8,00,000 (1,60,000/20%) | 9,00,000 |
|---|----------------------------|----------|

(iii) **current sales mix** = 30,000:20,000 = 3:2

$$\text{Total BEP (in units)} = \frac{\text{Total fixed cost}}{\text{Combined cost per unit}} = \frac{2,00,000 + 3,00,000}{\frac{\text{Rs. } 10 \times 3 + \text{Rs. } 15 \times 2}{5(3+2)}} \Rightarrow \frac{5,00,000}{12} \Rightarrow 41,667 \text{ units}$$

(iv) **New sale mix 2:3**

$$\text{Total BEP (in units)} = \frac{\text{Total fixed cost}}{\text{Combined cost per unit}} = \frac{2,00,000 + 3,00,000}{\frac{\text{Rs. } 10 \times 3 + \text{Rs. } 15 \times 2}{5(3+2)}} \Rightarrow \frac{5,00,000}{13} \Rightarrow 38,462 \text{ units}$$

Change in sales mix leads to decline in BEP by 3205 units (41667-38462)

Profit = Contribution – Fixed cost

Profit if sales mix is 2:3 = (50,000 units × 13) - 5,00,000 = 1,50,000

Profit if sales mix is 3:2 = 50,000 × 12 - 5,00,000 = 1,00,000

Change in sales mix leads to income in profit = Rs. 50,000 (Rs. 1,50,000 - Rs. 1,00,000)

PROBLEM NO:20

i) Statement showing Break Even Sales

| Particulars | Black | White |
|---|-----------|-----------|
| Sales Planned | 81,00,000 | 54,00,000 |
| Selling Price (Rs.) | 18 | 24 |
| Number of units to be sold | 4,50,000 | 2,25,000 |
| Break Even sales (in Units), 70% of total sales | 3,15,000 | 1,57,500 |
| (Or) | | |
| Break Even sales (in Rs.), 70% of total sales | 56,70,000 | 37,80,000 |

ii) Statement Showing Fixed Cost Reduction

| Particulars | Black | White |
|---|-----------|-----------|
| Profit to be maintained (Rs.) | 8,26,200 | 7,45,200 |
| Margin of Safety (70% of Sales) (Rs.) | 24,30,000 | 16,20,000 |
| PVR (Profit/ Margin of Safety) x 100 | 34% | 46% |
| Contribution (Sales x 34% or 46%) (Rs.) | 27,54,000 | 24,84,000 |
| Less: Profit (Rs.) | 8,26,200 | 7,45,200 |
| Revised Fixed Cost (Rs.) | 19,27,800 | 17,38,800 |
| Present Fixed Cost (Rs.) | 22,00,000 | 20,00,000 |
| Reduction in Fixed Cost | 2,72,200 | 2,61,200 |

PROBLEM NO:24

I) **STATEMENT SHOWING SELLING PRICE:**

| Particulars | Variable cost | Fixed cost | Total Cost |
|---------------|-------------------------------|------------|------------|
| Material cost | 2,10,000 (2,10,000 × 100%) | - | 2,10,000 |
| Labour cost | 1,20,000 (1,50,000 × 80%) | 30,000 | 1,50,000 |

| | | | |
|--|------------------------|--------|----------|
| Factory over heads | 55,200 (92,000X60%) | 36,800 | 92,000 |
| Administration Expenses | 14,000 (40,000X35%) | 26,000 | 40,000 |
| Total cost Excluding commission | 3,99,200 | 92,800 | 4,92,800 |
| Add: Commission@8% | | | 48,000 |
| Total cost including commission | | | 5,40,00 |
| Add: Profit@10% | | | 60,000 |
| (a) Sales $\left[\frac{4,92,000 - 82}{? - 100} \right]$ | | | 6,00,000 |
| (b) No of bottles to be sold | | | 40,000 |
| Selling price (a/b) | | | Rs. 15 |

(II) CONTRIBUTION PER UNIT:

| Particulars | Amt. |
|---------------------------------|-------------|
| Selling price | 14 |
| Less: variable cost per unit | |
| Variable cost (3,99,200/40,000) | (9.98) |
| Commission (14X8%) | (1.12) |
| Contribution per unit | <u>2.90</u> |

$$P/V \text{ Ratio} = \frac{\text{Cost per unit}}{\text{Selling price}} = \frac{2.9}{14} = 20.7\%$$

$$\text{BEP (in units)} = \frac{\text{Fixed cost}}{\text{Cost per unit}} = \frac{92,800}{2.90} \Rightarrow 32,000 \text{ bottles}$$

$$\begin{aligned} \text{BEP (In Rs.)} &= \frac{\text{Fixed cost}}{P/V \text{ ratio}} && \text{or} && \text{BEP (in units)} \times \text{Selling Price} \\ &= \frac{92,800}{20.714\%} && && = 32,000 \times 14 \\ &= \text{Rs. } 44,800 && && = \text{Rs. } 44,800 \end{aligned}$$

PROBLEM NO. 26

a) Variable Cost Ratio = 60%

$$P/V \text{ Ratio} = 1 - VC \text{ Ratio} = 1 - 60\% \Rightarrow 40\%$$

$$\text{Break-even Point (in Rupees)} = \frac{\text{Fixed Cost}}{P/V \text{ Ratio}} = \frac{8,000}{40\%} = 2,00,000/-$$

b) Desired Profit = Investment x Rate of Return = 2,00,000 x 15% => 30,000

Sales required to earn the desired profit (in rupees) =

$$= \frac{\text{Fixed Cost} + \text{desired profit}}{P/V \text{ Ratio}} = \frac{80,000 + 30,000}{40\%} = 2,75,000$$

c) Avoidable fixed cost = Total fixed cost – un avoidable fixed cost = 80,000 – 25,000 = 55,000

$$\text{Shut down point} = \frac{\text{avoidable fixed cost}}{p/v \text{ ratio}} = \frac{55,000}{40\%} = 1,37,500$$

When sales are less than 1,37,500 then it is better to close the business

PROBLEM NO 27

I) COST INDIFFERENCE POINT:

| Particulars | A and B (Rs.) | A and C (Rs.) | B and C (Rs.) |
|--|---|--|---|
| Differential Fixed Cost ...(I) | Rs.30,000 (Rs.45,000 - Rs.15,000) | Rs.1,10,000 (Rs. 1,25,000 - Rs.15,000) | Rs.80,000 (Rs.1,25,000 - Rs.45,000) |
| Differential Variable Costs ...(II) | Rs.100 (Rs.240 -Rs.140) | 200 (Rs.240 - Rs.40) | 100 (Rs.140 - Rs.40) |
| Cost Indifference Point ...(I/II) (Differential Fixed Cost / Differential Variable Costs per case) | 300 cases | 550 cases | 800 cases |

INTERPRETATION OF RESULTS:

At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point alternative with higher fixed costs and lower variable costs should be used.

| No. of Cases | Alternative to be Chosen |
|-------------------|--------------------------|
| Cases ≤ 300 | Alternative 'A' |
| 300 ≥ Cases ≤ 800 | Alternative 'B' |
| Cases ≥ 800 | Alternative 'C' |

- ii) Present case load is 600. Therefore, alternative B is suitable. As the number of cases is expected to go up to 850 cases, alternative C is most appropriate.

PROBLEM NO:29

STATEMENT SHOWING CONTRIBUTION FOR PER KEY FACTOR:

| Particulars | Product A | Product B |
|--|-----------------------------------|---------------------------------|
| Selling price | 100 | 80 |
| Less: Variable cost per unit (Direct Material +Direct wages + Variable Over Head) | 75 (20+15+40) | 56 (10+30+16) |
| Cost per unit | 25 | 24 |
| No of Kg required per unit | 10 Kg (1Kg -2Rs) (? -15 Rs) | 2 Kg (1Kg - 2Rs ? - 10Rs) |
| No of labour hours required per unit | 5h (1h - 3) (? -15) | 10h (1h -3) (? - 16) |
| No of machine hours required per unit | 10h (1h - 4) (? - 10) | 4h (1h - 4) (? - 16) |
| P/V ratio = Cost per unit/selling price | 25%=(25/100) | 30%=(24/80) |
| Contribution per Kg of Raw material (Cost per unit/no of kg/p.u) | 2.5 Rs/Kg (25/10kg) | 4.8 Rs./Kg (24/5 kg) |
| Contribution per labour hour (cost per unit/no of labour hour per unit) | 5 Rs./LH (25/5h) | 2.4 Rs/LH (24/10h) |

| | | |
|--|-----------------------|---------------------|
| Contribution per machines hour (cost per unit/ no of machine hour/per unit) | 2.5 Rs/MH (25/10h) | 6 Rs./MH (24/4h) |
|--|-----------------------|---------------------|

- a) When no of units to be sold are limited, then product A is more profitable product than product B because it is having high contribution per unit and low BEP
- b) When sale value is limited/limiting factor then product B ia more profitable product than product A because it is having high P/V ratio.
- c) When raw material is key factor, then product B is more profitable product than product A because it is having high contribution per KG of raw material.
- d) When labour hours are budget factor, then product A is more profitable product than product B because its contribution per labour is higher than product B
- e) When machine hours are limiting factor, then product B is more profitable product than product A because it is having high contribution per machine hour.
- f) When there are heavy demand then product B is more profitable product than product A because its P/V ratio is high.
- g) When there are low demand then product A is more profitable than product B then it is having high cost per unit and low BEP

PROBLEM NO: 30

i)

| Particulars | Part A | Part B |
|---|----------|----------|
| Machine "A" (4,000 hrs) | 6,666 | 16,000 |
| Machine "B" (4,500 hrs) | 9,000 | 8,181 |
| Alloy Available (13,000 kg.) | 8,125 | 8,125 |
| Maximum Number of Parts to be manufactured | 6,666 | 8,125 |
| Particulars | (Rs.) | (Rs.) |
| Material (Rs.12.5 × 1.6 kg.) | 20.00 | 20.00 |
| Variable Overhead: Machine "A" | 48.00 | 20.00 |
| Variable Overhead: Machine "B" | 50.00 | 55.00 |
| Total Variable Cost per unit | 118.00 | 95.00 |
| Price Offered | 145.00 | 115.00 |
| Contribution per unit | 27.00 | 20.00 |
| Total Contribution for units produced ... (I) | 1,79,982 | 1,62,500 |

Spare Part A will optimize the contribution.

ii)

| | Part A |
|--|----------|
| Parts to be manufactured numbers | 6,666 |
| Machine A : to be used | 4,000 |
| Machine B : to be used | 3,333 |
| Underutilized Machine Hours (4,500 hrs. - 3,333 hrs.) | 1,167 |
| Compensation for unutilized machine hours (1,167hrs. × Rs.60) ... (II) | 70,020 |
| Reduction in Price by 10%, Causing fall in Contribution of Rs.14.50 per unit (6,666 units × Rs.14.5) ... (III) | 96,657 |
| Total Contribution ... (I + II - III) | 1,53,345 |

PROBLEM NO:32

Production unit:

Variable cost p.u = Rs.11

Fixed cost = 3,60,000

Non production cost (Selling & distribution)

Variable cost p.u = Rs. 3

Fixed cost = 2,70,000

No of units sold = opening stock production –closing stock

1,50,000 = opening stock + 1,60,000 -20,000

Opening stock = 10,000 units

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Overhead recovery rate (fixed production cost) = $\frac{\text{Estimated Fixed production cost}}{\text{Estimated units}}$

Estimated units

= $3,60,000/1,80,000 [2,00,000 \times 90\%]$ = Rs. 2 p.u

A)

i) STATEMENT SHOWING PROFIT/ LOSS AS PER ABSORPTION COSTING:

| Particulars | Amount Rs. | Amount Rs. |
|--|------------|-----------------|
| Sales (1,50,000X20) | | 30,00,000 |
| Production cost: | | |
| Variable (11X1,60,000)+35,00 | 17,95,000 | |
| Fixed cost (2X1,60,000) | 3,20,000 | |
| 1,60,000 units | 21,15,000 | |
| Add: Opening stock (10,000 unitsX13) | 1,30,000 | |
| Less: Closing stock (21,15,000/1,60,000X20,000) | 2,64,375 | |
| Production cost of units sold | 19,80,625 | |
| Non production cost (AOH & S&DOH) Variable (3X1,50,000) | 4,50,000 | |
| Fixed selling cost | 2,70,000 | (27,00,625) |
| Under recovery of fixed production cost(3,60,000-3,20,000) | | (40,000) |
| Profit | | 2,59,375 |

ii) STATEMENT SHOWING PROFIT/ LOSS AS PER MARGINAL COSTING:

| Particulars | Amount Rs. | Amount Rs. |
|---|-------------|-----------------|
| Sales (1,50,000X25) | | 30,00,000 |
| Less: Variable cost (11X1,60,000)+35,000 | (17,95,000) | |
| Add: Opening stock (10,000X11) | 1,10,000 | |
| Less: Closing Stock (17,95,000/1,60,000X20,000) | _(2,24,375) | |
| 1,50,000 | 16,80,625 | |
| Add: variable cost S & DOH (3X1,50,000) | 4,50,000 | (21,30,625) |
| contribution | | 8,69,375 |
| Fixed cost: | | |
| Production cost | | 3,60,000 |
| Non production (S&DOH) | | 2,70,000 |
| Profit | | 2,39,375 |

B) STATEMENT SHOWING DIFFERENCE IN PROFIT:

| Particulars | Absorption Costing | Marginal Costing | Impact on profit as per Marginal Costing |
|---|--------------------|------------------|--|
| Opening stock | 1,30,000 | 1,10,000 | 20,000 |
| Closing stock | 2,64,379 | 2,24,375 | (40,000) |
| Decrease in profit as per marginal costing (2,39,372-2,59,375) | | | 20,000 |

ASSIGNMENT PROBLEMS**MODEL 1: P/V RATIO, BEP, MOS, PROFIT****PROBLEM 1:**

| | |
|----------------|------------------|
| Fixed Cost | Rs. 50,000 |
| Variable costs | Rs. 10 per unit |
| Selling price | Rs. 15 per unit |
| Output | Rs. 25,000 units |

CALCULATE the profit for each of the following situation with the above data:

- With the data above
- With a 20% increase in output.
- With a 15% increase in fixed costs.
- With a 25% increase in variable costs.
- With a 10% increase in selling price.
- Taking all the above situations.

(B)(ANS.: (I) RS. 75,000 (II) 1,00,000 (III) Rs.67,500 (IV) RS. 12,500(V)Rs.1,12,500(VI)Rs.62,500.)

CONCEPT QUESTIONS: What will be the impact on the question,

- If fixed cost is Rs.15,000.
- If selling price is Rs.20.

PROBLEM 2: ABC Limited started its operations in the year 2013 with a total production capacity of 2,00,000 units. The following information, for two years, is made available to you:

| | Year 2013 | Year 2014 |
|-----------------|-----------|-----------|
| Sales (units) | 80,000 | 1,20,000 |
| Total Cost(Rs.) | 34,40,000 | 45,60,000 |

There has been no change in the cost structure and selling price and it is anticipated that it will remain unchanged in the year 2015 also. Selling price is Rs.40per unit

Calculate:

- Variable cost per unit.
- Profit volume Ratio.
- Break-even Point(in units)
- Profit if the firm operates at 75% of the capacity.

(A) (M15 - 5M)(ANS.: (I) RS. 28; (II)30%; (III) 1,00,000 UNITS; (IV) RS. 6,00,000.)

CONCEPT QUESTIONS:

What will be the impact on the question,

- i) If variable cost per unit is 35.
- ii) If selling price is Rs.50.

PROBLEM 3: A manufacturing company is producing a product 'X' which is sold in the market at Rs. 70 per unit. The company has the capacity to produce 1,00,000 units per year. The budget for the year 2019 - 20 projects a sale of 70,000 units.

The costs of each unit are expected as under:

| | Rs. |
|-----------|-----|
| Materials | 30 |
| Wages | 10 |
| Overheads | 10 |

Margin of safety is Rs.16,80,000

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You are required to:

- i) Calculate fixed cost and break-even point.
- ii) Calculate the volume of sales to earn profit of 10% on sales.
- iii) If management is willing to invest Rs.20,00,000 with an expected return of 15%. Calculate units to be sold to earn this profit.
- iv) Management expects additional sales if the selling price is reduced to Rs.60. Calculate units to be sold to achieve the same profit as desired in above (iii)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If the margin of safety is 7,00,000.
- ii) If selling price Rs.70. (A)ANS.: (I) Rs.9,19,954, (II) 32,20,000; (II) 70,766UNITS; (III) 60,977UNITS; (IV) 1,21,995 UNITS.)

PROBLEM 4:

a) A company sells its product at Rs. 16 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of Rs. 5 per unit. If the volume is raised to 20,000 units, it earns a profit of Rs. 4 per unit. Compute break-even point both in terms of rupees as well as in units.

(B) (RTP N18 (N&O)) (ANS: BEP (IN UNITS): 12,000 UNITS; BEP (IN RS.): RS. 1,80,000)

b) When volume is 10,000 units, average cost is 5 per unit. When Volume is 12,000 units, average cost is 4.5 per unit. The Break – Even point is 5000 units.

Calculate: (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio (B)

(ANS.: (i)Rs.2 (ii) Rs.30,000 (iii) Rs.8)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost is increase by 10% the impact on BEP.
- ii) If P/v ratio is increase by 30% then impact on BEP.

PROBLEM 5: Y Ltd. Maintains margin of safety of 40% with an overall contribution to sales ratio of 60%.Its fixed costs amount to Rs. 6 lakhs.

Calculate the following:

- i) Break-even sales, ii) Total sales, iii) Total variable cost, iv) Current profit,
- v) New 'margin of safety' if the sales volume is increased by 7 ½ %

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If the margin of safety is 70%.
- ii) If fixed cost is Rs.10,00,000 (B) (Ans: i) Rs.10,00,000 ii) Rs.16,66,667 iii) Rs. 6,66,667 iv)Rs.4,00,000)

PROBLEM 6: M Ltd. has an annual fixed cost of Rs. 98,50,000. In the year 20X8-X9, sales amounted to Rs.7,80,60,000 as compared to Rs.5,93,10,000 in the preceding year 20X7-X8. Profit in the year 20X8-X9 is Rs.37,50,000 more than that in 20X7-X8.

Required:

- i) Calculate Break-even sales of the company;
- ii) DETERMINE profit/ loss on a forecasted sales volume of Rs.8,20,00,000.
- iii) If there is a reduction in selling price by 10% in the financial year 20X8-X9 and company desires to earn the same amount of profit as in 20X7-X8, COMPUTE the required sales amount?

(A) (mtp,may19,s-i)(ans: i) Rs.4,92,50,000 ii) Rs.65,50,000 iii) Rs. 10,67,58,000)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If selling price is reduced by 20%.
- ii) If P/v ratio is reduced by 10%.

PROBLEM 7: The following figures are related to KLM Limited for the year ending 31st March, 2020: Sales - 30,000 units @ Rs. 100 per unit; P/V Ratio 40% and Break-even Point 45% 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 Rs. 18,00,000 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 be brought down by 4,000 units.

Concept questions:

What will be the impact on the question,

- i) If p/v ratio is 45%.
- ii) If % of BEP =60%.

(A) (ANS: I) F.C=RS.5,40,000 II) RS.6,60,000 III) RS.58,500 UNITS IV) 27,000 UNITS V) 116.84)

PROBLEM 8: PQR Ltd. has furnished the following data for the two years:

| | 2011 | 2012 |
|--|-------------|------|
| Sales | Rs.6,00,000 | ? |
| Profit/Volume Ratio (P/V ratio) | 45% | 30% |
| Margin of Safety sales as a % of total sales | 50% | 20% |

There has been substantial savings in the fixed cost in the year 2012 due to the restructuring process. The company could maintain its sales quantity level of 2011 in 2012 by reducing selling price.

You are required to calculate the following:

- i) Sales for 2012 in Rs.
- ii) Fixed cost for 2012
- iii) Break-even sales for 2012 in Rupees.

(B) (ANS: i)4,71,428 ii)1,13,143 iii) 3,77,143)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If sales in 2011 were Rs.10,00,000.
- ii) If P/v ratio in 2011 were 50%.

PROBLEM 9: A single product company sells its products at Rs.100 per unit. In 2019, the company operated at a margin of safety of 30%. The fixed costs amounted to Rs. 4,50,000 and the variable cost ratio to sales was 70%. In 2020, it is estimated that the variable cost will go up by 20% and the fixed costs will increase by 10%.

PROBLEM 13: Omega Manufacturing a product, Currently utilizing 75% capacity with a turnover of Rs.99,00,000 at Rs.275 per unit. The cost data is as under:

| | Amount (Rs.) |
|----------------------------|--------------|
| Direct material per unit | 96 |
| Direct wages per unit | 42 |
| Variable overhead per unit | 18 |
| Semi variable overheads | 7,32,000 |
| P/V ratio | 40% |

Fixed overheads cost is Rs.28,81,000 up to 80% level of Activity, beyond this level, an additional Rs.2,38,500 will be incurred.

- Break-even point in units and activity level at a break-even point.
- Number of units to be sold to earn profit of Rs.25 per unit. (A) (M19 (O) - 5M) (ANS: I) 29,900 UNITS; II) 41,500

CONCEPT QUESTIONS: What will be the impact on the question,

- If selling price is Rs.300.
- If P/V ratio is 30%.

PROBLEM 14: MNP Ltd sold 2,75,000 units of its product at Rs. 375 per unit. Variable costs are Rs 175 per unit (manufacturing costs of Rs. Rs 140 and selling cost Rs.35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs. 3,50,00,000 (including depreciation of Rs.1,50,00,000). there are no beginning or ending inventories.

Required:

- Compute breakeven sales level quantity and cash breakeven sales level quantity.
- Compute the P/V ratio.
- Compute the number of units that must be sold to earn an income (EBIT) of Rs. 25,00,000.
- Compute the sales level achieve an after-tax income (PAT) of Rs. 25,00,000. Assume 40% corporate Income Tax rate.

(A) (RTP M19) (ANS.: I) 1,75,000 UNITS, 1,00,000 UNITS. II) 53.33% III) 1,87,500 UNITS IV) 7,34,42,091

CONCEPT QUESTIONS: What will be the impact on the question,

- If selling price is Rs.350.
- If depreciation is Rs.10,00,000

PROBLEM 15: M.K. Ltd. Manufactures and sells a single product X whose selling price is Rs.40 per unit and the variable cost is Rs.16 per unit

- If the Fixed Costs for this year are Rs.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%
- For the next year, it is proposed to add another product line Y whose selling price would be Rs. 50 per unit and the variable cost Rs.10 per unit. The total fixed costs are estimated at Rs.,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 breakeven sales in rupee and quantities.

(B) (NEW SM) (ANS.: (I) 21.6%, (II) BREAK EVEN SALES IN RUPEE FOR X AND Y RS.7,07,000; RS.3,03,000 AND IN QUANTITIES 17,675 UNITS,6,060 UNITS)

CONCEPT QUESTIONS: What will be the impact on the question,

- If fixed cost is Rs.2,00,000.
- If sale mix is 2:5.

PROBLEM 16: A company gives the following information:

| | | |
|---------------------------|---|--------------|
| Margin of safety | : | Rs. 3,75,000 |
| Total cost | : | Rs. 3,87,500 |
| Margin of safety (Qty) | : | 15,000 units |
| Break even sales in units | : | 5,000 units |

You are required to calculate:

- i) Selling price per unit
- ii) Profit
- iii) Profit/volume ratio
- iv) Break even sales(in Rupees)

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- v) Fixed cost (A) (N15 - 5M) (ANS.: (I) RS. 25 (II) RS.1,12,500 (III) 30% (IV) RS.1,25,000 (V) RS.37,500)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If total cost were 5,00,000.
- ii) If margin of safety (QTY) 5,000 units.

PROBLEM 17: Baby Care Ltd. Has two factories for producing baby diapers of identical quality. The figures of year 2013-14 are as follows:

| | Factory - A | Factory - B |
|--------------------------------|-------------|-------------|
| Selling price per packet (Rs.) | 80 | 80 |
| Variable cost per packet (Rs.) | 65 | 68 |
| Fixed cost (Rs.) | 3,60,000 | 3,00,000 |
| Sales (packets) | 70,000 | 80,000 |
| Production capacity (packets) | 80,000 | 90,000 |

Fixed cost includes depreciation on plant and machinery in factory A and factory B Rs. 60,000 and Rs. 30,000 respectively. You are required to calculate:

- i) Break-even Point (BEP) in sales and units for each factory separately.
- ii) Cash BEP in units for each factory separately.
- iii) BEP in units for company as a whole. Current product mix of factory A and factory B is 2:3.

(B) (MTP M14) (ANS: (I) SALES-19,20,000, 20,00,000; UNITS-24000,25000; (II) CASH BEP- 20,000, 22,500; (III) COMBINED BEP- 50,000 PACKETS)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If a production capacity are 70,000 & 60,000.
- ii) If depreciation for factory-B is 50,000

PROBLEM 18: PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 1,000 pieces. The cost Accountant has presented following information for the year to the management:

| Particulars | Amount (Rs.) | Amount (Rs.) |
|--------------------------------------|--------------|--------------|
| Sales 1,000 pieces @ 2,000 per piece | | 20,00,000 |
| Direct Material | 5,00,000 | |
| Direct Labour | 4,00,000 | |
| Overheads (40% Fixed) | 5,00,000 | 14,00,000 |
| Net Profit | | 6,00,000 |

Evaluate following options:

- i) If selling price is increased by Rs. 200, the sales will come down to 70% of the total annual capacity. Should the company increase its selling price?
- ii) The company can earn a profit of 30% on sales if the company provide TIEPIN with readymade suit. The cost of each TIEPIN is Rs. 10. Calculate the sales to earn a profit of 30% on sales.

(A) (ANS.: I) NO II) 21,05,263)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If selling price is Rs.1200.
- ii) If P/v ratio is 30%.

PROBLEM 19: A dairy product company manufacturing baby food(CERELAC) with a shelf life of one year furnishes the following information:

- i) On 1st January, 2019, the company has an opening stock of 10,000 packets whose variable cost is Rs. 200 per packet.
- ii) In 2018, production was 1,50,000 packets and the expected production in 2019 is 1,80,000 packets. Expected sales for 2019 is 1,70,000 packets.
- iii) In 2018, fixed cost per unit was Rs. 50 and it is expected to increase by 20% in 2019. The variable cost, is expected to increase by 40%. Selling price for 2019 has been fixed at Rs. 350 per packet.

You are required to calculate the Break-even, volume in units for 2019.

(A) (ANS.95,714 units)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If opening stock is at Rs. 500.
- ii) If opening stock is sold at Rs.700.

PROBLEM 20: M/s Arnav Private Limited is manufacturing and selling two products AR and NAV at Rs 100 and Rs 70 respectively.**The following sales strategy has been outlined for the financial year 2019-20:**

- i) Sales planned for the year will be Rs 85,00,000 in the case of AR and 12,60,000 in the case of NAV.
- ii) The selling price of AR will be reduced by 15% and that NAV by 10%
- iii) Break-even is planned at 60% of the total sales of each product
- iv) Profit for the year to be maintained at Rs 15,00,000 in the case of AR and 1,00,800 in the case of NAV. This would be possible by reducing the present annual fixed cost of Rs 27,00,000 allocated as 25,00,000 to AR and Rs 2,00,000 to NAV.

You are required to calculate:

- i) Number of units of AR and NAV to be sold to breakeven during financial year 2019-20
- ii) Amount of reduction in fixed cost - product wise to achieve desired profit mentioned at (i) above

(A) (ANS.: I)60,000; 12,000 UNITS II) RS. 2,50,000,48,800)

CONCEPT QUESTIONS: What will be the impact on the question

- i) If selling price is increase by 25%.
- ii) If BEP is 50% of total sale.

PROBLEM 21: An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March, 20X9 is as under:

| Budgeted Output | 40,000 Units | |
|-----------------|--------------|----------|
| | In lakhs | In lakhs |
| Net Realisation | | 2,10,000 |

| | | |
|------------------------|---------------|-----------------|
| Variable Costs: | | |
| Materials | 79,200 | |
| Labour | 15,600 | |
| Direct expenses | <u>37,200</u> | 1,32,000 |
| Specific Fixed Costs | 27,000 | |
| Allocated Fixed Costs | <u>33,750</u> | <u>60,750</u> |
| Total Costs | | 1,92,750 |
| Profit | | <u>17,250</u> |
| Sales | | <u>2,10,000</u> |

CALCULATE:

- i) Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.
- ii) 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. (B) (ANS.: i) 36,000 UNITS; 28,350 ii) 44,521 UNITS)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If budgeted unit 21,000 units.
- ii) If total fixed cost Rs.1,00,000.

PROBLEM 22: 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 | Rs. 10,00,000 |
| Direct Materials | Rs. 1,00,000 |
| Direct Labour | Rs.2,00,000 |
| Variable Overheads | Rs.4,00,000 |
| Capital Employed | Rs.4,00,000 |

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The new Sales Manager who has joined the company recently estimates for next year a profit of about 40% on capital employed, provided the volume of sales is increased by 20% and simultaneously there is an increase in Selling Price of 10% and an overall cost reduction in all the elements of cost by 5%.

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

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If sales volume is decreases by 15%.
- ii) If selling price is increases by 25%.

PROBLEM 23: A Company sells two products, A and B. The sales mix is 7 units of A and 3 units of B. The contribution margins per unit are Rs. 100 for A and Rs.50 for B. Fixed costs are Rs. 10,00,000 per month. Compute the break-even point. (C) (ANS.: A – 8,235 UNITS; B -3,529 UNITS.)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost 9,00,000.
- ii) If sale mix is 4 units of A & 8 units of B.

MODEL 2: MARGINALCOST SHEET

PROBLEM 24: An Indian hot drink Company is planning to establish a subsidiary company in japan to produce Beer. Based on the estimated annual sales of 3500 bottles of the Beer, cost studies produced the following estimates for the Japan subsidiary:

| Particulars | Total annual costs | Percent of Total Annual Cost which is variable |
|-------------------------|--------------------|--|
| Material | 2,00,000 | 100% |
| Labour | 1,00,000 | 70% |
| Factory Overheads | 80,000 | 50% |
| Administration Expenses | 10,000 | 40% |

The Japan production will be sold by manufacturer's representatives who will receive a commission of 10% of the sale price. No portion of the Indian office expenses is to be allocated to the Japan subsidiary. You are required to

- Compute the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Japan.
- Calculate the break-even point in Rupee sales as also in number of bottles for the Indian subsidiary on the assumption that the sale price is Rs. 200 per bottle.

(B) (ANS.: I) RS. 159.18/- II) BEP: 842 Beers)

CONCEPT QUESTIONS: What will be the impact on the question,

- If sales commission is 20%.
- If annual sales are 1,00,000 bottles.

PROBLEM 25: A Ltd. manufacture and sales its product G. The following figures have been collected from cost records of last year for the product G:

| Elements of Cost | Variable Cost portion | Fixed Cost |
|---------------------------------|---------------------------|------------|
| Direct Material | 40% of Cost of Goods Sold | -- |
| Direct Labour | 10% of Cost of Goods Sold | -- |
| Factory Overhead | 5% of Cost of Goods Sold | 2,00,000 |
| Administration Overhead | 15% of Cost of Goods Sold | 1,00,000 |
| Selling & Distribution Overhead | 10% of Cost of Sales | 50,000 |

Last Year 8,000 units were sold at Rs.200 per unit. From the given DETERMINE the followings:

- Break-even Sales (in rupees)
- Profit earned during last year
- Margin of safety (in %)
- Profit if the sales were 15% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

(B) (ANS.: I) RS.7,14,869 II)RS.4,33,333 III)RS.7,14,869 IV)RS.3,15,856)

CONCEPT QUESTIONS: What will be the impact on the question,

- If fixed cost of AOH is 2,00,000
- If variable FOH is 10% of COGS.

MODEL 3: SHUT DOWN POINT

PROBLEM 26: Zed Limited sells its product at 30 per unit. During the quarter ending on 31st March, 2014, it produced and sold 16,000 units and' suffered a loss of 10 per unit. If the volume of sales is raised to 40,000 units; it can earn a profit of Rs. 8 per unit.

You are required to calculate:

- Break Even Point in Rupees.
- Profit if the sale volume is 50,000 units.

iii) Minimum level of production where the company needs not to close the production if unavoidable fixed cost is 1,50,000. (A) (OLD PM, N14 - 5M) (ANS.: (I)RS.7,20,000 (II)RS.5,20,000(III)16,500 UNITS)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If avoidable cost is Rs.60,000.
- ii) If unavoidable fixed cost is RS.1,00,000.

MODEL 4: INDIFFERENCE POINT

PROBLEM 27: Y Company has just been incorporated and plans to produce a product that will sell for Rs. 10 per unit. Preliminary market surveys show that demand will be around 10,000 units per year. The company has the choice of buying one of two machines, each of which has a capacity of 10,000 units per year. Machine A' would have fixed costs of 30,000 per year and would yield a profit of Rs. 30,000 per year on the sale of 10,000 units. Machine B' would have fixed costs of Rs. 18,000 per year and would yield a profit of Rs. 22,000 per year on the sale of 10,000 units. Variable Costs behave linearly for both machines.

Required:

- a) Break-even sales for each machine.
- b) Sales level where both machines are equally profitable.
- c) Range of sales where one machine is more profitable than the other.

(B) (ANS.: A) A - 5,000 UTS; B - 4,500 UTS; B) 6,000 UTS, C) UP TO 6,000 UTS - MACHINE B; MORE THAN 6,000 UTS - MACHINE)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost of M-A is Rs.10,000.
- ii) If profit is Rs.10,000 for M-B.

PROBLEM 28: XY Ltd. makes two products X and Y whose respective fixed costs are F₁ and 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 Rs. 2,05,700, that the BEP of X is 1,500 units (for BEP of X F₂ is not considered) and that 2,900 units is the in difference point between X and Y. (i.e. X and Y make equal profits at 2,900 unit volume, considering their respective fixed costs). There is no inventory buildup as whatever is produced is sold.

Required:

Find out the values F₁ and F₂ and units contributions of X and Y. (B) (ANS.: F₁ = 1,27,500, F₂ = 78,200, 85, 68)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If BEP is 1000 units.
- ii) If indifference point is 3000 units

MODEL 5: LIMITING FACTOR

PROBLEM 29: X Ltd. Which produces two products using the same raw-material and production facilities provides you the following information.

| Particulars | Product A (Rs.) | Product B (Rs.) |
|--|-----------------|-----------------|
| Selling price per unit | 150 | 100 |
| Material @ Rs.5 per Kg | 25 | 10 |
| Labour @ Rs. 4 per hour | 16 | 40 |
| Variable overheads @ Rs. 10 per machine hour | 50 | 30 |
| Total fixed overheads: Rs. 10,00,000 | | |

Required: comment on the profitability of each product when:

- a) Sales quantity is limited;
- b) Sales value is limited;
- c) Raw-material is in short supply;
- d) Labour hours are limited;
- e) Production capacity (in terms of machine hours) is limited;
- f) There are heavy demand conditions;
- g) There are low demand conditions.

(B) (ANS.: IN ALL THE CASES PRODUCT A IS MORE PROFITABLE THAN PRODUCT B)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed cost is Rs.50000.
- ii) If selling price of product Rs.100.

PROBLEM 30: X Ltd. Supplies spare parts to Q motor 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..... | 2 kgs. | 3 kgs. |
| Machine Time: Machine A..... | 1 hr. | 0.50 hrs. |
| Machine Time: Machine B..... | 0.75 hrs. | 0.25 hrs. |
| Target Price (Rs.)..... | 400 | 250 |
| Total hours available: | Machine A 15,000 hours | Machine B 8,000 hours |

Alloy available is 20,000 kgs. @ Rs. 10 per kg.

Variable overheads per machine hours:.....

Machine A: Rs. 100

Machine B: Rs. 150

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Required:

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

(B) (ANS.: A) A – 16,75,000; B – 8,83,378)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If Machine –A available hours 10,000 hours.
- ii) If Alloy availability is 15,000 kgs.

PROBLEM 31: 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.

| Particulars | A | B | C |
|----------------------------|--------|-------|-------|
| Selling Price (Rs./unit) | 8 | 12 | 15 |
| Variable Costs(Rs./unit) | 5 | 6 | 10 |
| Market Demand (unit) | 1000 | 2,000 | 1,000 |
| Production Capacity (unit) | 2,000 | 4,000 | 4,000 |
| Fixed Costs (Rs) | 30,000 | | |

Required: Compute the opportunity costs for each of the products. (B) (ANS ;RS.20,000; RS.20,000;RS.8,000)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If market demand for Product-Y is 4000 units.
- ii) If production capacity for product-Z is 1500 units.

MODEL 6: ABSORPTION VS MARGINAL COSTING

PROBLEM 32: ABC Ltd. Can produce 4,00,000 units of a product per annum at 100% capacity. The variable production costs are Rs. 40 per unit and the variable selling expenses are Rs. 12 per sold unit.

The budgeted fixed production expenses were Rs. 24,00,000 per annum and the fixed selling expenses were Rs.16,00,000. During the year ended 31st March, 2014, the company worked at 80% of its capacity. The operating data for the year are as follows:

| | |
|---------------------------------|----------------|
| Production | 3,20,000 units |
| Sales @ Rs 80 per unit | 3,10,000 units |
| Opening stock of finished goods | 40,000 units |

Fixed production expenses are absorbed on the basis of capacity and fixed selling expenses are recovered on the basis of period.

You are required to prepare Statements of Cost and Profit for the year ending 31st March, 2014:

- i) On the basis of marginal costing
- ii) On the basis of absorption costing.

(A) (OLD PM) (ANS.: (I) 46,80,000 (II) 47,40,000)

CONCEPT QUESTIONS: What will be the impact on the question,

- i) If fixed production expenses 20,00,000.
- ii) If fixed selling expenses were 10,00,000.

ADDITIONAL PROBLEMS FOR STUDENTS SELF PRACTICE

PROBLEM 1: A company has a P/V ratio of 40%. By what percentage must sales be increased to offset 20% reduction in selling price? (C) (NEW SM, OLD SM) (ANS.: 60%)

PROBLEM 2: Y Company has just been incorporated and plans to produce a product that will sell for Rs. 10 per unit. Preliminary market surveys show that demand will be around 10,000 units per year. The company has the choice of buying one of two machines, each of which has a capacity of 10,000 units per year. Machine A' would have fixed costs of 30,000 per year and would yield a profit of Rs. 30,000 per year on the sale of 10,000 units. Machine B' would have fixed costs of Rs. 18,000 per year and would yield a profit of Rs. 22,000 per year on the sale of 10,000 units. Variable Costs behave linearly for both machines.

Required:

- a) Break-even sales for each machine.
- b) Sales level where both machines are equally profitable.
- c) Range of sales where one machine is more profitable than the other.

(B) (ANS.: A) A - 5,000 UTS; B - 4,500 UTS; B) 6,000 UTS, C) UP TO 6,000 UTS - MACHINE B; MORE THAN 6,000 UTS - MACHINE A)

PROBLEM 3: 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 |
| | Lakhs | Lakhs |
| Sales | 8.00 | 16.00 |

| | | |
|--|------|------|
| Production costs: | | |
| Variable | 3.20 | 6.40 |
| Fixed | 1.60 | 1.60 |
| Selling & distribution costs: | | |
| Variable | 1.60 | 3.20 |
| Fixed | 2.40 | 2.40 |

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:

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

(B) (NEW SM, OLD SM) (ANS.: (A) 44,000; (B) OVER RECOVERY-4,000; (C) PROFIT-40,000; (D) PROFIT-28,000)

PROBLEM 4: The product mix of a Gama Ltd. is as under:

| Particulars | Products | |
|---------------|----------|--------|
| | M | N |
| Units | 54,000 | 18,000 |
| Selling price | Rs 7.5 | Rs 15 |
| Variable cost | Rs 6 | Rs 4.5 |

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 Rs. 18 and Rs. 9. Fixed Cost is Rs. 15,000.

(B) (NEW SM, OLD SM) (ANS.: N = 1,000 UNITS; O = 500 UNITS)

PROBLEM 5: Maxim Ltd. manufactures a product "N-joy". In the month of August 2014, 14,000 units of the product "N-joy" were sold, the details are as under:

| Particulars | (Rs.) |
|--------------------|----------|
| Sale Revenue | 2,52,000 |
| Direct Material | 1,12,000 |
| Direct Labour | 49,000 |
| Variable Overheads | 35,000 |
| Fixed Overheads | 28,000 |

A forecast for the month of September 2014 has been carried out by the General manager of Maxim Ltd. As per the forecast, price of direct material and variable overhead will be increased by 10% and 5% respectively.

Required to calculate:

- Number of units to be sold to maintain the same quantum of profit that made in August 2014.
- Margin of safety in the month of August 2014 and September 2014.

(OLD PM, RTP N14, MTP M15) (ANS.: (A). 18,212 UNITS, (B). RS.1,26,000, RS.1,63,902)

PROBLEM 6: A manufacturing concern was operating at a margin of safety of 40% in the year 2018 and was selling its product at Rs. 75 per unit. Variable Cost ratio to sales was 80% and fixed costs amounted to Rs. 5,40,000.

In the year 2019, the concern anticipates an increase in the variable costs and fixed costs by 15% and 5% respectively.

You are required to:

Find out the selling price to be fixed in the year 2019 keeping in view that concern is willing to maintain the same P/V ratio as it was in the year 2018. (A) (N18 (O) - 5M) (ANS.: SELLING PRICE: RS. 86.25)

PROBLEM 7: A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of Rs.15 lacs in the proportion of the numbers of units sold. The budget for 2018 indicates:

| Particulars | A | B |
|----------------------------|----------|--------|
| Profit (Rs.) | 1,50,000 | 30,000 |
| Selling Price / unit (Rs.) | 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 7½ %.
- 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.

(RTP M18 (N&O)) (ANS: INCREASE IN PROFIT FOR - (I) 63,000; (II) 2,40,000; (III) 3,21,000 , OPTION III IS THE BEST AS IT INCREASES THE PROFIT BY RS.3,21,000)

PROBLEM 8: Kevin Ltd. produces a product 'C123', the cost structure of product C123 is as follows:

| Amount | Per Unit (Rs.) |
|---------------------|----------------|
| Direct Material | 1,650 |
| Direct Labour | 925 |
| Variable overheads | 315 |
| Total Variable cost | 2,890 |

Selling price of C123 is Rs. 3,400 per unit and quantity of sales is 55,000 units per annum. Total fixed cost per annum is Rs. 1,80,00,000.

You are required to calculate:

- i) Break - even sales in units.
- ii) Margin of safety in units
- iii) If the total variable cost increased by 10% and fixed cost increased by Rs.20,00,000 how many additional units of C123 should be sold in order to obtain the present profit while selling price per unit remains unchanged. (MTP N14) (ANS.: (I) 35,294 UNITS (II) 19,706 UNITS (III) 1,35,973 UNITS)

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PROBLEM 9: ABC Baggage Ltd. Sells different styles of laptop bags with identical purchase costs and selling prices. The company is trying to find out the profitability of opening another store which will have the following expenses and revenues:

| Particulars | Amount per piece (Rs.) |
|-----------------------|------------------------|
| Selling Price | 600 |
| Variable costs: | |
| Material cost | 410 |
| Salesmen's commission | 60 |
| Total variable cost | 470 |

| | |
|--------------------------------------|-----------|
| Annual fixed expenses are: | (Rs.) |
| - Rent | 6,00,000 |
| - Office and administrative expenses | 20,00,000 |
| - Advertising | 8,00,000 |
| Other fixed expenses | 2,00,000 |

For the each following independent situation, you are required to:

- Calculate the annual break-even point in units and in value. Also determine the profit or loss if 35,000 units of bags are sold.
- The sales commissions are proposed to be discontinued, but instead a fixed amount of Rs.9,00,000 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?
- It is proposed to pay the store manager Rs. 5 per piece as further commission. The selling price is also proposed to be increased by 5%. What would be the break-even point in units?

(ANS.: I)BEP:27,692.31 OR 27,,693 UNITS; RS.1,66,12,829 II)PROFIT: RS.9,50,000;II)BEP: 28,125 UNITS; III)BEP:23,225.81 OR 23,226 UNITS)

PROBLEM 10:

- Ascertain profit, when sales = Rs.2,00,000, Fixed Cost =Rs.40,000, BEP = Rs.1,60,000.
- Ascertain sales, when fixed cost = Rs. 20,000, Profit =Rs.10,000, BEP = Rs.40,000.

(NEW SM, OLD SM) (ANS.: A. RS.10,000, B. RS.60,000)

PROBLEM 11: MFN 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 (Rs.) | 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 Rs.40 per unit.

You are required to calculate:

- Break-Even Point (in units)
- Profit at 75% of the total capacity in 2014

(OLD PM, M13 - 5M) (ANS.: 1,00,000 UNITS, RS. 6,00,000)

PROBLEM 12: 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 2009-10 will be Rs. 2,80,000. Calculate the sales revenue required to achieve a quarterly profit of Rs. 70,000.

(OLD PM) (ANS.: RS.12,50,000)

PROBLEM 13: The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Find the capacity sales when fixed costs are Rs. 90,000. Also compute profit at 75% of the capacity sales.

(NEW SM, OLD SM) (ANS.: SALES = 5,00,000, PROFIT - RS. 22,500)

PROBLEM 14: ABS Ltd. Has a production capacity of 2,50,000 units per year. Normal capacity utilization is reckoned as 80%. Standard variable production costs are Rs.10 per unit. The fixed costs are Rs.6,00,000 per year. Variable selling costs are Rs.2 per unit and fixed selling costs are Rs.3,00,000 per year. The unit selling price is Rs.25. In the year just ended on 30th June, 2006, the production was 1,80,000 units and sales were 1,60,000 units. The closing inventory on 30th June was 30,000 units. The actual variable production costs for the year were Rs. 35,000 higher than the standard.

- Calculate the profit for the year
 - by absorption costing method and
 - by marginal costing method
- Explain the difference in profit

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THE END