

Chapter-wise Test (1012)
Marginal costing

Instructions

- All questions are compulsory.
- Test Duration will be one hour and 10 minutes, starting from 11:00 AM to 12:10 PM
- 5 minutes of reading time will be provided before 11, i.e. question paper will be shared by 10:55 AM.
- Share your scanned answer sheets by 12:15 on the below link
<https://forms.gle/wLRZWiTvMELNpCeC6>

1. 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:

	Part A	Part B
Per unit		
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine P	0.6 hrs	0.25 hrs.
Machine Time: Machine Q	0.5 hrs.	0.55 hrs.
Target Price (₹)	145	115
Total hours available	Machine P 4,000 hours Machine Q 4,500 hours	
Alloy available is 13,000 kgs. @ ₹ 12.50 per kg.		
Variable overheads per machine hours	Machine P: ₹ 80 Machine Q: ₹ 100	

Required

- (i) IDENTIFY the spare part which will optimize contribution at the offered price.
(ii) If Y Ltd. reduces target price by 10% and offers ₹ 60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

[8 Marks]**Solution:**

(i)

	Part A	Part B
Machine "P" (4,000 hrs)	6,666	16,000
Machine "Q" (4,500 hrs)	9,000	8,181
Alloy Available (13,000 kg.)	8,125	8,125
Maximum Number of Parts to be manufactured (Minimum of the above three)	6,666	8,125

	(₹)	(₹)
Material ($\text{`12.5} \times 1.6 \text{ kg.}$)	20.00	20.00
Variable Overhead: Machine "P"	48.00	20.00
Variable Overhead: Machine "Q"	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 P : to be used	4,000
Machine Q : to be used	3,333
Underutilized Machine Hours (4,500 hrs. – 3,333 hrs.)	1,167
Compensation for unutilized machine hours (1,167 hrs. \times `60) (II)	70,020
Reduction in Price by 10%, Causing fall in Contribution of `14.50 per unit (6,666 units \times `14.5) (III)	96,657
Total Contribution (I + II – III)	1,53,345

2. MNP Ltd sold 2,75,000 units of its product at `375 per unit. Variable costs are `175 per unit (manufacturing costs of `140 and selling cost `35 per unit). Fixed costs are incurred uniformly throughout the year and amount to `3,50,00,000 (including depreciation of `1,50,00,000). there are 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 25,00,000.
(iv) COMPUTE the sales level achieve an after-tax income (PAT) of ` 25,00,000. Assume 40% corporate Income Tax rate. **(7 marks)**

Solution:

- (i) Full cost of the product per unit

Direct material	` 693
Direct labour	` 315
Variable manufacturing support	` 504
Fixed manufacturing support	<u>` 1092</u>
Total manufacturing costs	<u>` 2604</u>

- (ii) Contribution margin per unit

Selling price	` 3906
Less: Variable costs	
Direct material	` 693
Direct labour	` 315
Variable manufacturing support	<u>` 504</u>
Contribution margin per unit	<u>` 2394</u>

- (iii) Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.

Direct material	` 693
Direct labour	` 315
Variable manufacturing support	<u>` 504</u>
Total incremental costs	<u>` 1512</u>

- (iv) Minimum acceptable price would be the incremental costs in the short term i.e. ` 1512
(v) Yes, RPP Manufacturers may consider a price of ` 2100 per unit because this price is greater than the minimum acceptable price.

3. RPP Manufacturers is approached by an international customer for one-time special order similar to one offered to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity.

Required:

- (i) WHAT is the full cost of the product per unit?
- (ii) WHAT is the contribution margin per unit?
- (iii) WHICH costs are relevant for making the decision regarding this one-time special order? WHY?
- (iv) For RPP Manufacturers, WHAT is the minimum acceptable price of this one-time-special order only

For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not? **[5 Marks]**

Solution:

(i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 3,50,00,000}{\text{₹ } 200} = 1,75,000 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 2,00,00,000}{\text{₹ } 200} = 1,00,000 \text{ units.}$$

(ii) P/V ratio = $\frac{\text{Contribution/unit}}{\text{Selling Price/unit}} \times 100 = \frac{\text{₹ } 200}{\text{₹ } 375} \times 100 = 53.33\%$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹ 25,00,000

$$\frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{3,50,00,000 + 25,00,000}{200} = 1,87,500 \text{ units}$$

(iv) After Tax Income (PAT) = ₹25,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{\text{₹ } 25,00,000}{60} \times 100 = \text{₹ } 41,66,667$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \right)$$

$$= \frac{\text{₹ } 3,50,00,000 + \text{₹ } 41,66,667}{53.33\%} = \text{₹ } 7,34,42,091$$

4. During a particular period ABC Ltd has furnished the following data:

Sales Rs. 10,00,000

Contribution to sales ratio 37% and

Margin of safety is 25% of sales.

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

(i) Revised Fixed Cost.

(ii) Revised Sales and

(iii) New Break-Even Point.

[5 Marks]

Solution:

Contribution to sales ratio (PN ratio) = 37%

Variable cost ratio = 100% - 37% = 63%

Variable cost = Rs. 10,00,000 x 63% = Rs. 6,30,000

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is Rs. 6,30,000.

Revised Contribution to sales = 30%

Thus, Variable cost ratio = 100% - 30% = 70%

Thus, Revised sales = $\frac{\text{Rs. } 6,30,000}{70\%}$ = Rs. 9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety)
= 60%

(i) Revised fixed cost = revised breakeven sales x revised contribution to sales ratio

= Rs. 5,40,000 (Rs. 9,00,000 x 60%) x 30%

= Rs. 1,62,000

(ii) Revised sales = Rs. 9,00,000 (as calculated above)

(iii) Revised Break-even point = Revised sales x Revised break-even sales ratio

= Rs. 9,00,000 x 60%

= Rs. 5,40,000

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

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

The variable cost data of different crops are given below:

(All figures in ₹ per kg)

	Crop Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4

Rice	10	2	1
Maize	120	10	20

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

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

You are required to:

- (i) Rank the crops on the basis of contribution per hectare.
- (ii) Determine the optimum product mix considering that all the three cereals are to be produced.
- (iii) Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000. **[7 Marks]**

Solution:

- (i) Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(I)	Sales price per kg (₹)	20	40	250
(II)	Variable cost* per kg (₹)	<u>14</u>	<u>13</u>	<u>150</u>
(III)	Contribution per kg (₹)	6	27	100
(IV)	Yield (in kgs per hectare)	2,000	500	100
(V)	Contribution per hectare (₹)	12,000	13,500	10,000
(VI)	Ranking	II	I	III

*Variable cost = Labour Charges + Packing Material + Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

(ii) & (iii) Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof

Sl. No.	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60
(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210
(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

(ii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	<u>150</u>	2000	<u>300000</u>
	210		326000

(iii) Calculation of maximum profit earned by the company:

	Production (in kgs)	Contribution (₹ per kg)	Total contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	<u>18,00,000</u>

Total contribution		25,75,000
Less: Total Fixed Cost per annum		<u>(21,45,000)</u>
Maximum profits earned by the company		4,30,000

3 MCQ (Each Carry 1 marks)**Question 1:**

Prow shirts Ltd. Manufacturers three types of shirts standard, premium and elite. The unit selling price of these shirts are ₹ 500, ₹ 800 and ₹ 1200 respectively. The corresponding unit variable costs are ₹ 300, ₹ 500 and ₹ 600. The proportions (quantity-wise) in which these products are manufactured and sold are 50%, 30% and 20% respectively. Total fixed costs are ₹ 60,00,000. Overall breakeven quantity is

- (a) 19,453 Units
- (b) 19,354 Units
- (c) 18,194 Units
- (d) 19,153 Units

Answer: (b) 19,354 Units

Question 2:

The fixed expenses are ₹ 64,000 and the break-even point is ₹ 1,60,000. The new break-even point, if the selling price is reduced by 10% is

- (a) ₹ 1,60,000
- (b) ₹ 1,82,000
- (c) ₹ 1,92,000
- (d) ₹ 2,00,000

Answer: (c) ₹ 1,92,000

Question 3:

If P/V ratio is 40% of sales then what about the remaining 60% of sales:

- (a) Profit.
- (b) Fixed cost.
- (c) Variable cost.
- (d) Margin of safety.

Answer: (c) Variable cost.

