

Subject: Cost & Management Accounting – II

Topic: Short Term Decision Making

Semester: IV

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Some Important Definition:

- ✓ **Decision-making** means the process of choosing of the best one among the various alternative actions. For any business planning and control, the management is engaged in search of most appropriate course of action. Among the various alternatives feasible to the management, it has to choose the best one from the point of view of the business concern
- ✓ For effective decision making, following *steps* are to be considered:
 - a) Clearly defining the concerned problem;
 - b) Identifying and describing the available alternatives;
 - c) Evaluating relevant quantitative and qualitative factors;
 - d) Selecting the best one among the identified various alternatives;
 - e) Evaluating performance of the decision and providing feedback.
- ✓ Certain *concept of cost* which are used in the process of cost analysis for decision making are:
 - a) Marginal cost;
 - b) Differential cost;
 - c) Sunk cost;
 - d) Out of pocket cost;
 - e) Opportunity cost;
 - f) Imputed cost;
 - g) Replacement cost.
- ✓ A cost (or revenue) that is essentially important and relevant to a decision-making process is called *relevant cost (or relevant revenue)*. Relevant costs and revenue are those expected future costs and future revenues which differ under alternative courses of action being considered in decision making process.
- ✓ *Comparisons* of differential cost analysis and marginal costing are:
 - a) Both differential costing and marginal costing are techniques of cost analysis;

- b) Both the techniques are used by the management in its process of decision-making;
 - c) Both the techniques are based on the classifications of costs into fixed cost and variable costs;
 - d) When there is no change in fixed cost due to change in volume of production or sales, differential cost becomes equal to the marginal costs;
 - e) In marginal costing, profit-volume ratio, contribution margin, contribution per units of limiting factors etc. are the main parameters for evaluation of performance and decision-making. On the other hand, in differential cost analysis, differential costs are compared with differential revenues to select the best alternative in the process of decision-making.
- ✓ **A key or Limiting Factor** is a factor which limits or restricts production or sales level at a point of time due to scarcity of a factor of production. Key factor is a limitation of constraint, such as availability of raw material, labour, machine/plant capacity, capital, market demand etc., on the activities of a business.
 - ✓ Following are the some frequently applicable **situations of decision making**:
 - a) Determination of most profitable product/Sales Mix;
 - b) Accept or Reject Decision;
 - c) Make or by Decision;
 - d) Operate or Shut Down Decision.

1) Reference: Acceptance / Rejection of offer

A factory is running at 50% capacity due to trade recession. The following details are available:

Cost per unit:	Rs.
Direct Material	10.00
Direct Wages	3.00
Variable Overhead	2.00
Fixed Overhead	5.00
	20.00
	20.00

Current production per year 12,000 units.

Rs.

Total cost 2,40,000

Sales 1,80,000

Loss 60,000

A customer offers to buy 10,000 units at the rate of Rs. 17.00 per unit and managing directors hesitates to accept the offer.

Advise whether the company should accept or decline the offer, clearly showing the reason in support of your answer.

[C.U.B.Com. (Hons.), 2016]

Solution

Current annual production operating at 50% capacity = 12,000 units.

Therefore, spare production capacity utilizing balance 50% capacity = 12,000 units.

As the factory is currently operating at 50% capacity level, it has enough spare capacity to accept the offer of additional production of 10,000 units of the product.

If the offer of additional product is accepted:

	Rs.	Rs.
Selling price per unit		17.00
Less; Variable cost per unit:		
Direct material	10.00	
Direct wages	3.00	
Variable overhead	2.00	<u>15.00</u>
Contribution per unit		<u><u>2.00</u></u>

As no further fixed cost is to be incurred for producing additional 10,000 units over current production level, entire contribution earned from sale of additional 10,000 units would represent profit.

Therefore, Additional Profit would be earned from sale of additional 10,000 units
= 10,000 * Rs.2 =Rs. 20,000.

Hence, the customer's offer to buy 10,000 units of the product may be accepted.

2) Reference: Make or Buy

Carbon Ltd. Manufactures 50,000 units of a product with the following cost break up:

	Cost Per Unit (Rs.)
Direct material cost	5.00
Direct wages	3.00
Direct expenses	1.50
Other variable costs	2.50
Fixed costs	<u>4.00</u>
Total cost	<u>16.00</u>

The product with the same specification is available in the market at a price of Rs. 14

- I. Would you make to buy the component?
- II. What would be your decision if the supplier offer to sell the product at a price of (a) Rs.11; and (b) Rs.12.

Solution

Marginal (Variable) Cost per unit of the product:

	Cost Per Unit (Rs.)
Direct material cost	5.00
Direct wages	3.00
Direct expenses	1.50
Other variable costs	2.50
Total	<u>12.00</u>

- I. The company should go for making the product as marginal cost is lower than the current market price.
- II. (a) Marginal cost = Rs.12 per unit; offer price = Rs.11
They should buy the product from outside market as marginal cost is higher than the offer price.
(b) Marginal cost = Rs.12 per unit; Offer price = Rs.11
The company can either make the product internally or buy the product from outside sources as the marginal cost is equal to the offer price. In the case, certain non-cost factors are to be considered to arrive at the final decision.

3) Reference: Closing down of Plant/ Product

Alaska Paints, working at a normal capacity, manufactures 4,00,000 tins per year. The cost of manufacturing per tin is as follows:

	Rs.
Consumption of materials	15.60
Direct wages	4.20
Variable factory overhead	5.00
Fixed Overhead	8.00
	<u>32.80</u>

Variable selling and administrative expenses amount to Rs.1.25 per tin. Each tin is sold for Rs.45.00

During the next quarter, only 20,000 tins can be sold. The management plans to shut down the plant estimating that manufacturing fixed cost can be reduce by Rs.1,48,000 for the quarter. While the plant is in operation, fixed overheads are incurred at a uniform rate.

You are required to suggest:

- Whether the plant should be shutdown at this level and
- At what level of activity per quarter, the plant should be shutdown.

Solution

Particulars	Rs.
Variable cost per tin:	
Raw materials	15.60
Direct wages	4.20
Variable factory overhead	5.00
Variable selling & administrative expenses	1.25
	<u>26.05</u>
Selling price per tin	45.00
Contribution per tin	<u>18.95</u>
Fixed overheads for the year (4,00,000 * Rs.8)	32,00,000
Therefore, fixed overheads for the quarter [Rs.32,00,000 / 4]	8,00,000
Now, during the next quarter when 2,000 tins can be sold:	
	Rs.
Contribution from 20,000 tins (20,000 * 18.95)	3,79,000
Less: fixed overheads for the quarter	8,00,000
Possible loss	<u>4,21,000</u>

- a) If the plant operation is shut down, the company has to bear fixed overhead cost of (Rs.8,00,000-1,48,000 = Rs.6,52,000. Therefore, the shutdown of the plant will result in higher loss than the production of 20,000 units during the next quarter.
- b) As shut down point loss is calculated at Rs.6,52,000, it is advised to the company to shut down its plant operation when quarterly, contribution falls below (Rs.8,00,000 – Rs.6,52,000) = Rs. 1,48,000.

Therefore, Suggestion shut down point of the plant at a production of (Rs.1,48,000 / Rs.18.95) = 7,810 tins per quarter.

4) Reference: Production Mix

A company produces and sells two products A and B. The company incurs Rs.1,00,000 per annum toward fixed overheads and has provided the following further information:

	Product A Rs. Per unit	Product B Rs. Per unit
Direct materials @ Rs.50 per kg	200	250
Direct wages @ Rs.10 per hour	100	150
Variable overhead	100	150
Selling price	520	715

Depending on the availability of raw materials and labour hours, the company considers the following two alternatives sales mixes:

- a) 1,000 units of A and 600 units of B.
b) 600 units of A and 1,000 units of B.

Recommend which of the sales mix should be adopted by the company.

[C.U.B. Com (Hons.), 2006]

Solution

Particulars	Sales Mix (a) (i.e. 1,000 of A & 600 units of B)			Sales Mix (b) (i.e. 600 of A & 1,000 units of B)		
	Product A (Rs.)	Product B (Rs.)	Total (Rs.)	Product A (Rs.)	Product B (Rs.)	Total (Rs.)
Sales	5,20,000	4,29,000	9,49,000	3,12,000	7,15,000	10,27,000
Less: variable cost						
Direct materials	(2,00,000)	(1,50,000)	(3,50,000)	(1,20,000)	(2,50,000)	(3,70,000)
Direct wages	(1,00,000)	(90,000)	(1,90,000)	(60,000)	(1,50,000)	(2,10,000)
Variable overhead	(1,00,000)	(90,000)	(1,90,000)	(60,000)	(1,50,000)	(2,10,000)

Contribution	1,20,000	99,000	2,19,000	72,000	1,65,000	2,37,000
Less: Fixed cost			1,00,000			1,00,000
Profit			1,19,000			1,37,000

Comparative statement of tows sales-mix

From the above statement, it has been observed that profit from sales mix (b) is higher than that from sales mix (a). Therefore, it is recommended to the company to adopt Sales-Mix (b) (i.e. 600 units of products A & 1,000 units of product B) as it gives higher net profit to the company.

5) Reference: Limiting Factor

Your company produces two products P and Q. The relevant data per unit of output are given below:

	P (Rs.)	Q (Rs.)
Cost of direct material	28.00	13.00
Direct labour	15.00	25.00
Variable factory overhead	25.00	12.50
Fixed factory overhead	10.00	5.00
Variable selling expenses	14.00	10.00
Total cost	92.00	65.50
Selling price	100.00	70.00
Profit	8.00	4.50

Factory overheads are applied on the basis of machine hours. The existing plant and infrastructure will allow production and sale of either P or Q. Both the products are processed through the same production center.

You are required to suggest which product should be processed and sold.

Solution

Particulars	Product P		Product Q	
	Rs.	Rs.	Rs.	Rs.
Selling price		100.00		70.00
Less: Variable Costs:				
Direct material	28.00		13.00	
Direct labour	15.00		25.00	
Variable overhead	25.00		12.50	
Selling expenses	14.00	82.00	10.00	60.50
Contribution per unit		18.00		9.50
Variable factory overhead per unit		25.00		12.50

Total factory overheads per unit		10.00		5.00
		35.00		17.50

Since factory overheads are applied on the basis of machine hours and machine hours are indicative of available infrastructure, they constitute the key or limiting factor for the products. From the above calculation, it has been observed that the total factory overhead per unit for product P is the double than that of product Q, this indicates that product Q requires half the machine hours as compared to product P (or Product P requires double the machine hours as compared to product Q).

Therefore, the rate of contribution per machine hour from product P = $\text{Rs.}18 * 1 = \text{Rs.}18$ and from product Q = $\text{Rs.}9.50 * 2 = \text{Rs.}19.00$.

Therefore, Product Q should be processed and sold as it gives higher contribution per machine hour than the product P.

6) Reference: Production Mix with Limiting Factor

XYZ LTD. Producing products 'A' and 'B' using production process, has the following cost data:

	Product A	Product B
Selling price per unit (Rs.)	10.00	15.00
Variable cost per unit (Rs.)	6.00	8.00
Labour hours required		
Per unit production	1 hr.	2 hr.
Maximum demand in the market (unit)	1,00,000	2,00,000
Total available labour hours		4,00,000 hrs.
Fixed cost per annum		Rs.10,00,000

Considering the limiting factor of labour hours and market demand, you are required to calculate the best combination of the products to maximize profit of the company.

[C.U. BCom. (Hons.), 2014]

Solution

Here, labour hours is the key or limiting factory. Therefore, production decision should be taken as per the highest contribution per labour hour obtained from the products.

Contribution per unit:

Product A = Rs. (10-6) = Rs.4

Product B = Rs. (15-8) = Rs.7

Contribution per labour hour:

Product A = Rs.4 / 1hr.=Rs.4

Product B = Rs.7 / 2hrs.=Rs.3.50

Hence, the company should produce Product A first, as it gives higher contribution per labour hour and Product B should be produced utilizing remaining available labour hours to maximize profit of the concern. Labour hours to be used in production of Product A in full capacity

=1,00,000 units * 1 hr. = 1,00,000 labour hrs.

Therefore, Number of unit of product B to be produced utilizing remaining available labour hours = (4,00,000 – 1,00,000) / 2 hrs. = 1,50,000 units.

Hence, Total Profit would be earned from the most profitable sales-mix:

Rs.

Total Contribution:

Product A (1,00,000 units * Rs.4)	4,00,000
Product B (1,50,000 units * Rs.7)	10,50,000
	<u>14,50,000</u>
Less: Total fixed Cost	10,00,000
Total profit	<u><u>4,50,000</u></u>