

**CMA DECEMBER-2019 EXAMINATION  
MANAGEMENT LEVEL  
SUBJECT: P2.PERFORMANCE MANAGEMENT**

**Model Solution**

**ANSWER TO QUESTION 01**

- (a) Short-run decisions have implication for a time horizon of less than 1 year and two such decisions are-
- i. Pricing a one-time-only special order with no long-run implications; and
  - ii. Adjusting product mix and output volume in a competitive market.
- (b) Activity-based Management (ABM) consists of management decisions that use ABC information to satisfy customers and improve profitability. Four management decisions are- pricing and product-mix decision; cost reduction and process improvement decision; design decisions and planning and managing decisions.
- (c) First, financial measures are lag indicators that report on the results of past actions; Second, financial measures do not consider strategies of the organization; Third, contextual aspects of business firms are not considered; and finally, top managers are ordinarily responsible for the financial performance measures- not lower level managers.

(d)

<b>Benefits</b>	<b>Costs</b>
Create greater responsiveness to local needs	Leads to dysfunctional decision making
Leads to gains from quicker decision making	Results in duplication of activities
Increases motivation of subunit managers	

- (e) Value based pricing is a pricing method in which a company establishes selling prices based on the economic value of the benefits that their products and services provide to customers.
- (f) Value engineering is an approach to productivity improvement that attempts to increase the value obtained by a customer of a product by offering the same level of functionality at a lower cost.

Different types of value are recognized by the approach:

1. **Use value** relates to the attributes of a product which enable it to perform its function.
  2. **Cost value** is the total cost of producing the product.
  3. **Esteem value** is the additional premium price which a product can attract because of its intrinsic attractiveness to purchasers.
  4. **Exchange value** is the sum of the attributes which enable the product to be exchanged or sold.
- g) A shadow price is an estimated price for something that is not normally priced in the market or sold in the market. It is often used in cost-benefit accounting to value intangible assets, but can also be used to reveal the true price of a money market share. So, **Shadow pricing** is the practice of allotting a dollar-value to an abstract commodity for the purpose of cost-benefit analysis.
- h) In setting a Multinational Transfer Pricing a company will usually concentrate on satisfying a single objective, namely: "minimize income taxation". The four objectives stressed for domestic transfer pricing- goal congruence, motivation, autonomy, and performance evaluation are considered secondary.

Sum up of Multinational Transfer Pricing:

- Parent company owns a foreign subsidiary.
- Entity = parent or subsidiary.
- One entity supplies the other a component.
- Transfer price is price paid to the supplier by the entity that receives the component.
- Consolidated firm = parent cum subsidiary.
- Aim is to minimize income taxes

### **ANSWER TO QUESTION 02**

- (a) At present the selling price is Tk.45 and demand is 130,000 units. Each increase or decrease in price of Tk.1 results in a corresponding decrease or increase in demand of 10,000 units. Therefore if the selling price was increased to Tk.58 [Tk.45 + 130,000/10,000], demand would be zero. To increase demand by one unit the selling price must be reduced by Tk. 0.0001 (Tk. 1/10,000) so the maximum selling price for an output of  $x$  units is:  $SP = Tk. 58 - 0.0001x$

The total revenue for an output of  $x$  units is  $Tk. 58x - 0.0001x^2$

Therefore marginal revenue ( $MR$ ) =  $58 - 0.0002x$ , [ $MR = a - 2bx$ ]

Marginal cost ( $MC$ ) = Tk.18.75 (Total variable costs/annual production i.e Tk. 8,625,000/460,000 Units)

A firm should produce units up to the point where the marginal revenue equals the marginal cost:  
MR=MC

Where  $58 - 0.0002x = 18.75$

So,  $x = Tk. 196,250$

Therefore SP at the optimal output level =  $58 - 0.0001(196,250) = Tk. 38.375$

Contribution per unit =  $Tk. 58 - Tk. 38.375 = Tk. 19.625$

Annual Contribution = $Tk. 19.625 \times 196,250$ units =	<u>Tk.3,851,406.25</u>
Less: annual fixed overhead costs	<u>Tk 3,600,00.00</u>
Annual Profit	<u>Tk.3,491,406.25</u>

(b)

#### **Case-1**

: Weighted average contribution margin =  
 $[3 * (Tk. 2,000 - Tk. 750) + (Tk. 3,500 - Tk. 1,400)] / 4 = Tk. 1,462.50$

Break even point =  $Tk. 702,000 / Tk. 1462.50 = 480$  boats

Since  $\frac{3}{4}$  of the boats are standard and  $\frac{1}{4}$  is deluxe so, 360 standard boats and 120 deluxe model boats must be sold to reach the break-even point.

#### **Case-2:**

Under the current system, Star's profit

When 40,000 units are sold is

$((Tk.57 - Tk.35) * 40,000) - Tk.719,400 = \mathbf{Tk.160,600}$

If the new equipment is purchased, Star's profit

When 40,000 units are sold is

$$((\text{Tk.}57 - \text{Tk.}28) * 40,000) - \text{Tk.}1,023,700 = \text{Tk.}136,300$$

Star is better off not buying the new equipment.

(c) (1) The first step is to determine the activity rates:

<u>Activity cost pools</u>	<u>Total cost</u>	<u>Total activity</u>	<u>Activity rate (Cost/activity)</u>
Serving parties	Tk.12,000	5,000 parties	Tk. 2.40 per parties
Serving dinner	Tk.90,000	12,000 diners	Tk. 7.50 per dinner
Serving drinks	Tk.26,000	10,000 drinks	Tk. 2.60 per drink

According to the ABC costing system, the cost of serving each of the parties can be computed as follows:

(i) Party of 4 persons who order a total of drinks:

<u>Activity cost pools</u>	<u>Activity rate</u>	<u>Activity</u>	<u>ABC cost</u>
Serving parties	Tk.2.40 per parties	1 party	Tk. 2.40
Serving dinner	Tk.7.50 per dinner	4 diners	Tk. 30.00
Serving drinks	Tk. 2.60 per drink	3 drinks	<u>Tk. 7.80</u>
Total			<u>Tk. 40.20</u>

(ii) Part of two persons who order no drinks:

<u>Activity cost pools</u>	<u>Activity rate</u>	<u>Activity</u>	<u>ABC cost</u>
Serving parties	Tk.2.40 per parties	1 party	Tk. 2.40
Serving dinner	Tk.7.50 per dinner	2 diners	Tk.15.00
Serving drinks	Tk. 2.60 per drink	0 drinks	<u>Tk. 0.00</u>
Total			<u>Tk.17.40</u>

(iii) Party of 1 person who orders 2 drinks:

<u>Activity cost pools</u>	<u>Activity rate</u>	<u>Activity</u>	<u>ABC cost</u>
Serving parties	Tk.2.40 per parties	1 party	Tk. 2.40
Serving dinner	Tk.7.50 per dinner	1 diners	Tk. 7.50
Serving drinks	Tk. 2.60 per drink	2 drinks	<u>Tk. 5.20</u>
Total			<u>Tk.15.10</u>

(2) The average cost per dinner for each party can be computed by dividing the total cost of the party by the number of dinners in the party as follows:

(i)  $\text{Tk.}40.20/4 \text{ diners} = \text{Tk.}10.05 \text{ per dinner}$

(ii)  $\text{Tk.}17.40/2 \text{ diners} = \text{Tk.}8.70 \text{ per diner}$

(iii)  $\text{Tk.}15.10/1 \text{ diner} = \text{Tk.}15.10 \text{ per diner}$

(d) Req. 1)

**The Duranto Co.**  
**Overhead performance report – Machining department**  
**For the month of march**

Budgeted machine hours (MH)	20,000 hrs			
Actual machine hrs	18,000 hrs			
<u>Overhead costs Cost per MH</u>		<u>Actual Overhead cost</u>	<u>Budgeted Allowance</u>	<u>Spending</u>
		<u>Based on Actual MHs</u>	<u>Based on actual MHs</u>	<u>Variance</u>
Variable:				
Utilities	Tk.0.70	Tk.12,000	Tk.12,600	Tk.600 F
Lubricants	Tk.1.00	*16,500	18,000	1,500 F
Machine set up	Tk.0.20	4,800	3,600	1,200 U
Indirect labor	Tk.0.60	12,500	10,800	1,700 U
<b>Total VC</b>	<b>Tk.2.50</b>	<b>45,800</b>	<b>45,000</b>	<b>800 U</b>
Fixed cost;				
Lubricants		8,000	8,000	-----
Indirect labor		120,000	120,000	-----
Depreciation		32,000	32,000	-----
<b>Total FC</b>		<b>Tk.160,000</b>	<b>Tk.160,000</b>	<b>-----</b>
<b>Total overhead costs</b>		<b>Tk.205,800</b>	<b>Tk.205,000</b>	<b>Tk.800 U</b>

\*Tk. 24,500 total lubricants – 8,000 fixed lubricants = Tk.16,500 variable lubricants.

- Spending Variance = AH (AR – SR)

**Req. 2)** In order to compute an overhead efficiency variance, it would be necessary to know the standard hours allowed for the 9,000 units produced during March in the machining department.

(e)

	Company A	Company B	Company C
Sales	Tk.400,000	Tk. 750,000	Tk.600,000
Net Operating Income	Tk. 32,000	Tk. 45,000	Tk. 24,000
Average Operating Assets	Tk.160,000	Tk. 250,000	Tk.150,000
Return on investment (ROI)	20%	18%	16%
Minimum Required rate of return: (%)	15%	20%	12%
Taka amount	Tk. 24,000	Tk. 50,000	Tk. 18,000
Residual income	Tk. 8,000	Tk. 5,000	Tk. 6,000

Note:

1.  $ROI = \frac{\text{Net operating Income}}{\text{Average Operating Assets}}$
2. R.I. = Net Operating Income – ( Average Operating Assets X Required Rate of Return)
3. Taka Amount = Average Operating Assets X Minimum Required Rate of Return

**ANSWER TO QUESTION 03**

- (a) The analysis of sales for both internal and external sales are given below:

Analysis of Sales			
	Internal	External	Total
Number of Components	50,000	150,000	200,000
	Tk.000	Tk.000	Tk.000
Sales	768,000	3,072,000	3,840,000
Variable Costs	384,000	1,152,000	1,536,000
Contribution	384,000	1,920,000	2,304,000

Note: Internal Sales = Tk.768,000k (50,000×Tk.15,360) and the balance represents external sales. Unit variable costs Tk.7,680 (Tk.1,536,000k/200,000).

- (b) (i) Division S is operating at 80% capacity and producing 200,000 components so 250,000 units represents full capacity resulting in Division S having 50,000 units spare capacity. An increase in Division M's capacity by 25% represents 12,500 units which will be sold at the selling price of Tk.60,000.

Division S therefore has sufficient capacity to supply the additional components to division M. Division M's variable cost per unit (including the transfer price) is Tk.28,800 (Tk.1,440,000k/50,000) giving a unit contribution of Tk.31,200, (Tk. 60,000 – Tk. 28,800)

	Tk.000
Present Value (Tk.31,200×12,500units×2.487)	969,930
Present value of residual value of equipment (Tk.400m×0.751)	300,400
Total Present Value	1,270,330
Less: Investment Cost	(1,350,000)
NPV	(79,670)

The manager of division M will not wish to undertake the investment.

- (ii) It is apparent from part (a) that the division S's transfers are at variable cost + 100% markup so the transfer price included in division M's cost is Tk.15,360 full cost and Tk.7,680 variable cost. The variable cost of the component to the group (MS) is Tk.21,120 [(Tk.28,800-Tk.7,680)] giving a revised unit contribution of Tk.38,880. The revised present value of the total contribution is Tk.1,208,682k (Tk.38,880 × 12,500 units × 2.487) representing a contribution increase compared with that in (b)(i) of Tk.238,752k [(1208,682-969,930)k]. The revised positive NPV is Tk.159,082k (Tk.238,752k – Tk.79,670k) so the investment is profitable for the company as a whole.
- (c) The manager of division M would argue that division S has spare capacity and is able to meet all of its external demand. Therefore, variable cost is the opportunity cost to Division S of the transfers since fixed costs would be incurred whether the internal sales take place or not. The manager of Division M will consider that the division is being overcharged with a current transfer price of variable cost plus 100%.

The manager of division S would argue that the full cost of the internal sales is Tk.17,430 per unit based on a unit fixed cost of Tk.9,750 (Tk.1,950,000k/200,000) and a variable cost of Tk.7,680 and that the division would not be able to manufacture the components without incurring the fixed costs. Hence the current transfer price of Tk.15,360 is below full cost. The manager of Division S would also claim that the internal price is significantly below the market price that Division Y is charging on its external sales.

For the company as a whole the transfer price should have no impact unless it changes the decisions being made by the divisional managers so that they become sub-optimal for the group as a whole. This situation occurs in (b) above. Therefore, the transfer price does not encourage optimal decisions and there are strong arguments for setting the transfer price at the unit variable cost of the supplying division plus a lump sum fixed fee.

**ANSWER TO QUESTION 04**

**Req. (a)**

	<b>Total</b>		<b>Line A</b>		<b>Line B</b>		<b>Line C</b>	
	Amount	%	Amount	%	Amount	%	Amount	%
Sales	Tk. <u>1000,000</u>	<u>100.0</u>	Tk. <u>400,000</u>	<u>100.0</u>	Tk. <u>250,000</u>	<u>100.0</u>	Tk. <u>350,000</u>	<u>100.0</u>
Less variable exp:								
Production(Tk.)	242,500	24.3	80,000	20.0	75,000	30.0	87,500	25.0
Selling	50,000	5.0	20,000	5.0	12,500	5.0	17,500	5.0
Total	<u>292,500</u>	<u>29.3</u>	<u>100,000</u>	<u>25.0</u>	<u>87,500</u>	<u>35.0</u>	<u>105,000</u>	<u>30.0</u>
Contribution margin	707,500	70.7	300,000	75.0	162,500	65.0	245,000	70.0
(-) Traceable FC:								
Production	200,000	20.0	107,000	26.8	30,000	12.0	63,000	18.0
Selling	100,000	10.0	40,000	10.0	10,000	4.0	50,000	14.3
Total	<u>300,000</u>	<u>30.0</u>	<u>147,000</u>	<u>36.8</u>	<u>40,000</u>	<u>16.0</u>	<u>113,000</u>	<u>32.3</u>
Product line								
Segment Margin	<b>Tk. <u>407,500</u></b>	<b>40.7</b>	<b>Tk. <u>153,000</u></b>	<b>38.2</b>	<b>Tk. <u>122,500</u></b>	<b>49.0</b>	<b>Tk. <u>132,000</u></b>	<b>37.7</b>
Less Common Fixed Expenses:								
Production*	300,000	30.0						
Administrative	<u>150,000</u>	<u>15.0</u>						
Total	<u>450,000</u>	<u>45.0</u>						
Net Operating Loss	<b>Tk. <u>(42,500)</u></b>	<b>(4.3)</b>						

- Total fixed production costs Tk. 500,000
- Less Traceable fixed production costs 200,000
- Common fixed production costs **Tk. 300,000**

**Req. (b)**

No, Production of Line B, not Line A, should be cut back. Under the conditions posed, it does not appear that the company will be able to avoid any fixed costs (either traceable or common) when production is cut back. Both Line A and B sell for Tk. 100 per unit. Since contribution margin ratio of line A is 75%, its unit contribution margin is Tk.75. And since the contribution margin ratio of Line B is 65%, its unit contribution margin is Tk. 65. Since the company must choose between using a B4 chip to produce one unit of Line A or one unit of Line B, Line A is clearly the better choice since its unit contribution margin is Tk. 10 higher.

Some students will disagree with this analysis and state that Mr. Aiken is correct in cutting back production of Line A. These students will base their argument on Line B's higher segment margin [percentage (notice from the income statement in part (a) that Line B has segment margin ratio of 49%, as compared to only 38,2% for L:ine A. However the segment margin should not be used for decision making. Unlike contribution margin percentages, the segment margin percentages are unstable because fixed cost is included in the segment margin. Thus, as total sales change, the segment margin percentages change also.

**Req. (c)**

Line C should not be eliminated. Notice from the income statement in part (a) that the line is covering all of its own traceable costs, and is generating a segment margin of Tk.132,000 per month. If the line is discontinued, all of this segment margin will be lost to the company and the overall monthly loss will be worsen.

**Req. (d) (i)**

	<b>Total</b>		<b>Home Market</b>		<b>Foreign Market</b>	
	Amount	%	Amount	%	Amount	%
Sales	Tk. <u>350,000</u>	<u>100.0</u>	Tk. <u>300,000</u>	<u>100.0</u>	Tk. <u>50,000</u>	<u>100.0</u>
Less variable expenses:						
Production	87,500	25.0	75,000	25.0	12,500	25.0
Selling	<u>17,500</u>	<u>5.0</u>	<u>15,000</u>	<u>5.0</u>	<u>2,500</u>	<u>5.0</u>
Total	<u>105,000</u>	<u>30.0</u>	<u>90,000</u>	<u>30.0</u>	<u>15,000</u>	<u>30.0</u>
Contribution margin	245,000	70.0	210,000	70.0	35,000	70.0
Less: Traceable Fixed expenses:						
Selling	<u>50,000</u>	<u>14.3</u>	<u>10,000</u>	<u>3.3</u>	<u>40,000</u>	<u>80.0</u>
Market Segment margin	<b>Tk. <u>195,000</u></b>	<b><u>55.7</u></b>	<b>Tk. <u>200,000</u></b>	<b><u>66.7</u></b>	<b>Tk. <u>(5,000)</u></b>	<b><u>(10.0)</u></b>
Less: Common Fixed expenses:						
Production	63,000	18.0				
Product line segment margin	<b><u>132,000</u></b>	<b><u>37.7</u></b>				

**Req. (d) (ii)**

At least the following three points should be brought to the attention of management:

- 1) Compared to the home market, sales in the foreign market are very low.
- 2) Fixed selling expenses are very high in the foreign market, totaling four times as much each month as in the home market. Why?
- 3) The foreign market is not covering all of its own traceable fixed expenses, and thus the market is showing the negative segment margin. If sales cannot be increased sufficiently in future months for the foreign market to cover its own traceable expenses, then consideration should be given to eliminating the market.

**= THE END =**