

**Paper 17 - Strategic Performance Management**

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Time Allowed: 3 Hours

Full Marks: 100

**Sec-A : Question 1 Compulsory and carries 20 Marks**

- 1 (a) The cost function 'c' for the commodity 'q' is given by  $C = q^3 - 4q^2 + 6q$ . Find Average Variable cost and also find the value of q for which average variable cost is minimum. 4

**Answer:**

$$C = q^3 - 4q^2 + 6q$$

$$\text{Average Variable Cost} = q^2 - 4q + 6 \text{ ('y' say)}$$

$$\Rightarrow \frac{d}{dq}(q^2 - 4q + 6) = 0$$

$$\Rightarrow 2q - 4 = 0$$

$$\therefore q = \frac{4}{2} = 2$$

$$\frac{d^2y}{dq^2} = 2 > 0, \text{ positive}$$

$\therefore$  Average Cost is minimum at  $q = 2$

- (b) The following information relates to budgeted operation of Division X of a manufacturing company:

| Particular                         | Amount (₹) |
|------------------------------------|------------|
| Sales: (50,000 units of ₹ 8)       | 4,00,000   |
| Less: Variable cost @ ₹ 6 per unit | 3,00,000   |
| Contribution Margin                | 1,00,000   |
| Less: Fixed Costs                  | 75,000     |
| Divisional Profit                  | 25,000     |

The amount of divisional investment is ₹ 1,50,000 and the minimum desired rate of return on the investment is the cost of capital of 20%.

- Calculate divisional expected ROI
- Calculate divisional expected RI
- Comment on the results of (i) and (ii)
- The divisional manager has the opportunity to sell 10,000 units at ₹ 7.50 per unit. Variable cost per unit would be the same as budgeted, but fixed costs would increase by ₹ 5,000. Additional investment of ₹ 20,000 would also be required. If the manager accepts the special order, by how much and in what direction would his residual income change? [1+1+1+1]

**Answer:**

$$(i) \text{ ROI} = \frac{₹25,000}{₹1,50,000} \times 100 = 16.7\%$$

$$(ii) \text{ RI} = \text{Divisional Profit} - \text{Minimum desired rate of return} \\ = ₹25,000 - (20\% \times ₹1,50,000) \\ \text{RI} = (₹5,000)$$

- (iii) The desired rate of return is 20% but the division X is expecting to achieve an ROI of 16.7%. The expected profit of ₹25,000 is less than the ₹30,000 minimum return required, resulting in the negative of ₹5,000 residual income.

- (iv) Opportunity to sell additional 10,000 unit

| Particulars                 | Original budget<br>₹ | Additional budget<br>₹ | Total<br>₹ |
|-----------------------------|----------------------|------------------------|------------|
| Sales                       | 4,00,000             | 75,000                 | 4,75,000   |
| Less: variable cost         | 3,00,000             | 60,000                 | 3,60,000   |
| Contribution                | 1,00,000             | 15,000                 | 1,15,000   |
| Less: Fixed costs           | 75,000               | 5,000                  | 80,000     |
| Divisional profit           | 25,000               | 10,000                 | 35,000     |
| Less: Cost of capital (20%) | 30,000               | 4,000                  | 34,000     |
| Residual Income             | (5,000)              | 6,000                  | 1,000      |

The target residual income changes from a negative balance of ₹ 5,000 to a positive one of ₹ 1,000 as a result of the new opportunity to sell 10,000 units. This is due to the fact that ₹ 10,000 expected profit from additional order is offset by a further ₹ 4,000 cost of capital, thereby increasing residual income by ₹ 6,000.

**(c) Mention the objectives of Customer Relationship Management?**

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**Answer:**

Objectives for using CRM applications:

- (i) To support the customer services
- (ii) To increase the effectiveness of direct sales force.
- (iii) To support of business to business activities.
- (iv) To support of business to consumer activities.
- (v) To manage the call centre.
- (vi) To operate the In- bound call centre.
- (vii) To operate the Out - bound call centre.

**(d) Explain Systematic Risk and Unsystematic Risk?**

**4**

**Answer:**

**Systematic Risk:** Systematic risk refers to that part of total risk which causes the movement in individual stock price due to changes in general stock market index. Systematic risk arises out of external and uncontrollable factors. The price of individual security reflects the fluctuations and changes of general market. Systematic risk refers to that portion of variation in return caused by factors that affect the price of all securities. The effect in systematic risk causes the prices of all individual shares/bonds to move in the same direction. This movement is generally due to the response to economic, social and political changes. The systematic risk cannot be avoided. It relates to economic trends which affect the whole market. When the stock market is bullish, prices of all stocks indicate rising trend and in the bearish market, the prices of all stocks will be falling. The systematic risk cannot be eliminated by diversification of portfolio, because every share is influenced by the general market trend.

**Unsystematic Risk:** Unsystematic risk is that portion of total risk which results from known and controllable factors. Unsystematic risk refers to that portion of the risk which is caused due to factors unique or related to a firm or industry. The unsystematic risk is the change in the price of stocks due to the factors which are particular to the stock. For example, if excise duty or customs duty on viscose fibre increases, the price of stocks of synthetic yarn industry declines. The unsystematic risk can be eliminated or reduced by diversification of portfolio. Unsystematic risks are those that are unique to a particular company or a particular investment, resulting downward movement in the performance of one company can be offset by an uptrend movement in another and so much of this unsystematic risk can be eliminated through diversification on the part of the shareholders when they hold a portfolio of shares. The systematic risk attached to each of the security is same irrespective of any number of securities

in the portfolio. The total risk of portfolio is reduced, with increase in number of stocks, as a result of decrease in the unsystematic risk distributed over number of stocks in the portfolio.

**(e) Describe the objectives of Management Information systems?**

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**Answer:**

Management Information System (MIS) is a systematic process of providing relevant information in right time in right format to all levels of users in the organization for effective decision making. MIS is also defined to be system of collection, processing, retrieving and transmission of data to meet the information requirement of different levels of managers in an organization.

**According to CIMA-**

MIS is a set of procedures designed to provide managers at different levels in the organization with information for decision making, and for control of those parts of the business for which they are responsible.

MIS comprises of three elements viz., management, information and system.

**Objectives of MIS:**

- To provide the managers at all levels with timely and accurate information for control of business activities
- To highlight the critical factors in the operation of the business for appropriate decision making
- To develop a systematic and regular process of communication within the organization on performance in different functional areas
- To use the tools and techniques available under the system for programmed decision making
- To provide best services to customers
- To gain competitive advantage
- To provide information support for business planning for future.

**Sec-B : Answer any Five questions, each question carries 16 Marks**

2. (a) B manufacturing company sells its product at ₹ 1,000 per unit. Due to competition, its competitors are likely to reduce price by 15%. B wants to respond aggressively by cutting price by 20% and expects that the present volume of 1,50,000 units p.a will increase to 2,00,000 units. B wants to earn at 10% target profit on sales, based on:

| Particulars                     | Existing (₹) | Target (₹) |
|---------------------------------|--------------|------------|
| Direct Material Cost P.U        | 400          | 385        |
| Direct manufacturing labour P.U | 55           | 50         |
| Direct machinery costs P.U      | 70           | 60         |
| Direct manufacturing costs P.U  | 525          | 495        |
| <b>Manufacturing overheads:</b> |              |            |
| No. of orders (₹ 80 per order)  | 22,500       | 21,250     |
| Testing hours (₹ 2per hour)     | 45,00,000    | 30,00,000  |
| Units reworked (₹ 100 per unit) | 12,000       | 13,000     |

Manufacturing overheads are allocated using relevant cost drive ₹ Other operating costs per unit for the expected volume are estimated as follows:

|                        |       |
|------------------------|-------|
| Research and design    | ₹ 50  |
| Marketing and customer | ₹ 130 |
|                        | ₹ 180 |

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**Required:**

- (i) Calculate target costs per unit and target costs for the proposed volume showing break up of different elements.
- (ii) Prepare target product profitability statement. [(4+4)+4]

**Answer:**

(i)

|  |       |
|--|-------|
| Target selling price : ₹1,000 less 20% | ₹ 800 |
| Less: Target profit margin (10%)       | ₹80   |
| Target costs per unit                  | ₹720  |

The break-up of ₹ 720 per unit are as follows:

Target Costs per unit:

| Particulars  | Per unit (₹) |     |
|--|--------------|-----|
| Direct materials                                   |              | 385 |
| Direct manufacturing labour                        |              | 50  |
| Direct machining costs                             |              | 60  |
| Direct manufacturing costs                         |              | 495 |
| Add: Manufacturing overheads:                      |              |     |
| Ordering and receiving (21,250 x ₹80) ÷ 2,00,000   | 8.50         |     |
| Testing and inspection (30,00,000 x ₹2) ÷ 2,00,000 | 30.00        |     |
| Rework (13,000 x ₹100) ÷ 2,00,000                  | 6.50         |     |
|  |              | 45  |
| Total manufacturing costs                          |              | 540 |
| Other operating costs:                             |              |     |
| Research and Design                                | 50           |     |
| Marketing and Customer service                     | 130          | 180 |
| Full Product Costs                                 |              | 720 |

(ii) Target Product Profitability:

| Particulars             | Per unit<br>(₹) | 2,00,000 units<br>(₹) |
|-------------------------|-----------------|-----------------------|
| 1. Sales                | 800             | 16,00,00,000          |
| 2. Costs of goods sold: |                 |                       |
| Direct Materials        | 385             | 7,70,00,000           |
| Direct labour           | 50              | 1,00,00,000           |
| Direct Machining Costs  | 60              | 1,20,00,000           |
|                         | 495             | 9,90,00,000           |
| Manufacturing overheads | 45              | 90,00,000             |
|                         | 540             | 10,80,00,000          |
| 3. Gross margin (1-2)   | 260             | 5,20,00,000           |
| 4. Operating costs:     |                 |                       |
| Research and Design     | 50              | 1,00,00,000           |

|                                |     |             |
|--------------------------------|-----|-------------|
| Marketing and customer service | 130 | 2,60,00,000 |
|                                | 180 | 3,60,00,000 |
| 5. Operating profit (3-4)      | 80  | 1,60,00,000 |

**(b) Describe the Components of Performance Management.****4****Answer:**

Components of Performance Management:

(i) Performance Planning: Performance planning is the first crucial component of any performance management process which forms the basis of performance appraisals. Performance planning is jointly done by the appraiser and also the reviewee in the beginning of a performance session. During this period, the employees decide upon the targets and the key performance areas which can be performed over a year within the performance budget, which is finalized after a mutual agreement between the reporting officer and the employee.

(ii) Performance Appraisal and Reviewing: The appraisals are normally performed twice in a year in an organization in the form of mid reviews and annual reviews which is held in the end of the financial year. In this process, the appraisee first offers the self filled up ratings in the self appraisal form and also describes his/her achievements over a period of time in quantifiable terms. After the self appraisal, the final ratings are provided by the appraiser for the quantifiable and measurable achievements of the employee being appraised. The entire process of review seeks an active participation of both the employee and the appraiser for analyzing the causes of loopholes in the performance and how it can be overcome. This has been discussed in the performance feedback section.

(iii) Feedback on the Performance followed by personal counseling and performance facilitation: Feedback and counseling is given a lot of importance in the performance management process. This is the stage in which the employee acquires awareness from the appraiser about the areas of improvements and also information on whether the employee is contributing the expected levels of performance or not. The employee receives an open and a very transparent feedback and along with this the training and development needs of the employee is also identified. The appraiser adopts all the possible steps to ensure that the employee meets the expected outcomes for an organization through effective personal counseling and guidance, mentoring and representing the employee in training programmes which develop the competencies and improve the overall productivity.

(iv) Rewarding good performance: This is a very vital component as it will determine the work motivation of an employee. During this stage, an employee is publicly recognized for good performance and is rewarded. This stage is very sensitive for an employee as this may have a direct influence on the self esteem and achievement orientation. Any contributions duly recognized by an organization helps an employee in coping up with the failures successfully and satisfies the need for affection.

(v) Performance Improvement Plans: In this stage, fresh set of goals are established for an employee and new deadline is provided for accomplishing those objectives. The employee is clearly communicated about the areas in which the employee is expected to improve and a stipulated deadline is also assigned within which the employee must show this improvement. This plan is jointly developed by the appraisee and the appraiser and is mutually approved.

**3. (a) Reduce the following two- person zero-sum game to 2x2 order, and obtain the optimal strategies for each player and the value of the game:****Player B**

|                 |                      |                      |                      |                      |                      |
|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                 |                      | <b>B<sub>1</sub></b> | <b>B<sub>2</sub></b> | <b>B<sub>3</sub></b> | <b>B<sub>4</sub></b> |
|                 | <b>A<sub>1</sub></b> | <b>3</b>             | <b>2</b>             | <b>4</b>             | <b>0</b>             |
|                 | <b>A<sub>2</sub></b> | <b>3</b>             | <b>4</b>             | <b>2</b>             | <b>4</b>             |
| <b>Player A</b> | <b>A<sub>3</sub></b> | <b>4</b>             | <b>2</b>             | <b>4</b>             | <b>0</b>             |
|                 | <b>A<sub>4</sub></b> | <b>0</b>             | <b>4</b>             | <b>0</b>             | <b>8</b>             |

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**Answer:**

We observe that all entries in the third row of the given matrix are greater than, or equal to, the corresponding entries in the first row. Thus the first row is dominated by the third row and as such can be deleted. The deletion of the first row leads to the following matrix.

|                |                |                |                |                |
|----------------|----------------|----------------|----------------|----------------|
|                | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> |
| A <sub>2</sub> | 3              | 4              | 2              | 4              |
| A <sub>3</sub> | 4              | 2              | 4              | 0              |
| A <sub>4</sub> | 0              | 4              | 0              | 8              |

Next, all elements of the first column are at least equal to their counterparts in the third column. We can, thus, delete the first column to get the following matrix:

|                |                |                |                |
|----------------|----------------|----------------|----------------|
|                | B <sub>2</sub> | B <sub>3</sub> | B <sub>4</sub> |
| A <sub>2</sub> | 4              | 2              | 4              |
| A <sub>3</sub> | 2              | 4              | 0              |
| A <sub>4</sub> | 4              | 0              | 8              |

We notice now that the first column is dominated by a convex linear combination of the second and the third columns because

$$4 > \frac{1}{2}(2) + \frac{1}{2}(4); \quad 2 = \frac{1}{2}(4) + \frac{1}{2}(0); \quad \text{and} \quad 4 = \frac{1}{2}(0) + \frac{1}{2}(8)$$

Its deletion results in the following:

|                |                |                |
|----------------|----------------|----------------|
|                | B <sub>3</sub> | B <sub>4</sub> |
| A <sub>2</sub> | 2              | 4              |
| A <sub>3</sub> | 4              | 0              |
| A <sub>4</sub> | 0              | 8              |

Similarly, the first row is equated to the convex linear combination of the other two rows as shown.

$$2 = \frac{1}{2}(4) + \frac{1}{2}(0); \quad \text{and} \quad 4 = \frac{1}{2}(0) + \frac{1}{2}(8)$$

Hence, we deleted the first row to get the following 2 x 2 matrix which can be solved analytically.

|                |                |                |
|----------------|----------------|----------------|
|                | B <sub>3</sub> | B <sub>4</sub> |
| A <sub>3</sub> | 4              | 0              |
| A <sub>4</sub> | 0              | 8              |

For this game,

$$x = \frac{8-0}{(4+8)-(0+0)} = \frac{8}{12} = \frac{2}{3}; \quad y = \frac{8-0}{(4+8)-(0+0)} = \frac{8}{12} = \frac{2}{3}; \quad \text{and } v = \frac{4 \times 8 - 0 \times 0}{(4+8)-(0+0)} = \frac{32}{12} = \frac{8}{3}.$$

Thus, the optimal strategy for A is (0, 0, 2/3, 1/3), for B it is (0, 0, 2/3, 1/3) and the game value  $v = 8/3$ .

**(b) From the following information calculate EVA:**

|   |                   |
|---|-------------------|
| <b>Equity share capital</b>   | <b>₹ 5,00,000</b> |
| <b>13% preference share capital</b>                                     | <b>₹2,00,000</b>  |
| <b>Reserves and surplus</b>   | <b>₹ 6,00,000</b> |
| <b>None trade investments (Face value ₹ 1,00,000), Rate of interest</b> | <b>10%</b>        |
| <b>20% Debentures</b>   | <b>3,00,000</b>   |
| <b>Profits before tax</b>   | <b>3,00,000</b>   |
| <b>Tax rate</b>   | <b>40%</b>        |
| <b>WACC</b>   | <b>13%</b>        |

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**Answer:**

Economic Value Added (EVA) = NOPAT (Net Operating Profit after Tax) – Capital Cost  
 = NOPAT – [WACC (Weighted Average Cost of Capital) x Capital Employed]

Working Note – 1:

Calculation of NOPAT

|                           | (₹)             |
|---------------------------|-----------------|
| Profit before tax         | 3,00,000        |
| + Interest Expense        | 60,000          |
| - Non operating income    | 10,000          |
| Operating EBIT            | 3,50,000        |
| Less economic taxes @ 40% | 1,40,000        |
| <b>NOPAT</b>              | <b>2,10,000</b> |

Working Note – 2:

Capital Employed

|                              | (₹)              |
|------------------------------|------------------|
| Equity Share capital         | 5,00,000         |
| Reserve and surplus          | 6,00,000         |
| 13% preference share capital | 2,00,000         |
| 20% debenture                | 3,00,000         |
| <b>Total</b>                 | <b>16,00,000</b> |
| Less non operating assets    | 1,00,000         |
| <b>Capital Employed</b>      | <b>15,00,000</b> |

$$EVA = ₹ 2,10,000 - (₹ 15,00,000 \times 13\%) = ₹ 2,10,000 - ₹ 1,95,000 = ₹ 15,000.$$

**4. (a) Define the following terms in the context of supply chain Management:**

**(i) Capacity strategy (ii) Lead Time/Cycle Time, (iii) Preventive Maintenance (iv) Specifications.** **[2×4]**

**Answer:**

**(i) Capacity Strategy:**



This is one of the strategic choices that a firm must make as part of its manufacturing strategy. There are three commonly recognized capacity strategies: lead, lag, and tracking. A lead capacity strategy adds capacity in anticipation of increasing demand. A lag strategy does not add capacity until the firm is operating at or beyond full capacity. A tracking strategy adds capacity in small amounts to attempt to respond to changing demand in the marketplace.

**(ii) Lead Time/Cycle Time:**

1) A span of time required to perform a process (or series of operations). 2) In a logistics context, the time between recognition of the need for an order and the receipt of goods. Individual components of lead time can include order preparation time, queue time, processing time, move or transportation time, and receiving and inspection time.

**(iii) Preventive Maintenance**

The activities, including adjustments, replacements, and basic cleanliness, that forestall machine breakdowns. The purpose is to ensure that production quality is maintained and that delivery schedules are met. In addition, a machine that is well cared for will last longer and cause fewer problems.

**(iv) Specifications**

Specifications are the most detailed method of describing requirements. Various types of design specifications are the detailed descriptions of the materials, parts, and components to be used in making a product. Hence, they are the descriptions that tell the seller exactly what the buyer wants to purchase.

**(b) Describe different types of On-line Analytical Processing.**

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**Answer:**

**Different types of On-line Analytical Processing (OLAP):** OLAP systems have been traditionally categorized using the following taxonomy.

**Multidimensional:** MOLAP is a “multi-dimensional online analytical processing”. ‘MOLAP’ is the ‘classic’ form of OLAP and is sometimes referred to as just OLAP. MOLAP stores this data in optimized multidimensional array storage, rather than in a relational database. Therefore it requires the pre-computation and storage of information in the cube - the operation known as processing. MOLAP tools generally utilize a pre-calculated data set referred to as a data cube. The data cube contains all the possible answers to a given range of questions. MOLAP tools have a very fast response time and the ability to quickly write back data into the data set.

**Relational:** ROLAP works directly with relational databases. The base data and the dimension tables are stored as relational tables and new tables are created to hold the aggregated information. Depends on a specialized schema design. This methodology relies on manipulating the data stored in the relational database to give the appearance of traditional OLAP’s slicing and dicing functionality. In essence, each action of slicing and dicing is equivalent to adding a “WHERE” clause in the SQL statement. ROLAP tools do not use pre-calculated data cubes but instead pose the query to the standard relational database and its tables in order to bring back the data required to answer the question. ROLAP tools feature the ability to ask any question because the methodology does not limit to the contents of a cube. ROLAP also has the ability to drill down to the lowest level of detail in the database.

**Hybrid:** There is no clear agreement across the industry as to what constitutes “Hybrid OLAP”, except that a database will divide data between relational and specialized storage. For example, for some vendors, a HOLAP database will use relational tables to hold the larger quantities of detailed data, and use specialized storage for at least some aspects of the smaller quantities of more-aggregate or less-detailed data. HOLAP addresses the shortcomings of MOLAP and ROLAP by combining the capabilities of both approaches. HOLAP tools can utilize both pre-calculated cubes and relational data sources.

**Other types:**

The following acronyms are also sometimes used, although they are not as widespread as the ones above:

- **WOLAP** - Web-based OLAP
- **DOLAP** - Desktop OLAP
- **RTOLAP** - Real-time OLAP.

**5. (a) Describe the benefits of Risk Mapping.**

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**Answer:**

**Benefits of Risk Mapping:**

- Promotes awareness of significant risks through priority ranking, facilitating the efficient planning of resources.
- Enables the delivery of solutions and services across the entire risk management value chain.
- Serves as a powerful aid to strategic business planning.
- Aids the development of an action plan for the effective management of significant risks.
- Assigns clear responsibilities to individuals for the management of particular risk areas.
- Provides an opportunity to leverage risk management as a competitive advantage.
- Facilitates the development of a strategic approach to insurance programme design.
- Supports the design of the client's risk financing and insurance programmes, through the development of effective/optimal retention levels and scope of coverage etc.

**(b) Mention the Performance related measures in the context of Corporate Risk Management. 8**

**Answer:**

Performance - related measures in the context of Corporate Risk Management are those which concentrate on the mid-region of the probability distribution, i.e., the region near the 'mean' and are relevant for determination of the volatility around expected results. The following are some of the Performance - related measures in the context of Corporate Risk Management.

(i) Return on Equity - Net Income divided by Net Worth.

(ii) Operating Earnings - Net Income from continuing operations, excluding realized investment gains.

(iii) Earnings before Interest - Dividends, Taxes, Depreciation and Amortization (EBITDA). A form of cash flow measure for evaluating the operating performance of companies with high levels of debt.

(iv) Cash Flow Return on Investment (CFROI) - EBITDA divided by tangible assets.

(v) Weighted Average Cost of Capital (WACC) - The sum of the required market returns of each component of corporate capitalization, weighted by that component's share of the total capitalization.

(vi) Economic Value Added (EVA) - A corporate performance measure that stresses the ability to achieve above the firm's cost of capital.

6. Hp Ltd. manufactures two parts 'A' and 'B' for computer industry.

- A: Annual production and sales of 1,00,000 units at a selling price of ₹ 1000.05 per unit.
- B: Annual production and sales of 50,000 units at a selling price of ₹ 150 per unit.

Direct and Indirect costs incurred on these two parts are as follows – (₹ in thousands)

| Particulars                       | A     | B     | Total         |
|-----------------------------------|-------|-------|---------------|
| Direct Material cost (Variable)   | 4,200 | 3,000 | 7,200         |
| Labour cost (Variable)            | 1,500 | 1,000 | 2,500         |
| Direct Machining costs (See note) | 700   | 550   | 1,250         |
| <b>Indirect Costs:</b>            |       |       |               |
| Machine set up cost               |       |       | 462           |
| Testing Cost                      |       |       | 2,375         |
| Engineering cost                  |       |       | 2,250         |
| <b>Total</b>                      |       |       | <b>16,037</b> |

Note: Direct Machining costs represent the cost of machine capacity dedicated to the production of each product. These costs are fixed and are not expected to vary over the long-run horizon.

Additional information is as follows –

| Particular                                | A            | B           |
|---|--------------|-------------|
| Production Batch Size                     | 1,000 units  | 500 units   |
| Set up time per batch                     | 30 hours     | 36 hours    |
| Testing time per unit                     | 5 hours      | 9 hours     |
| Engineering cost incurred on each product | Rs, 8,40,000 | ₹ 14,10,000 |

A foreign competitor has introduced product very similar to 'A' to maintain the company's share and profit, HP Ltd. has to reduce the price to ₹ 86.25. The company calls for a meeting and comes up with a proposal to change design of product 'A'. The expected effect of new design is as follows:

- Direct Material cost is expected to decrease by ₹ 5 per unit.
- Labour cost is expected to decrease by ₹ 2 per unit.
- Machine time is expected to decrease by 15 minutes, previously it took 3 hours to produce 1 unit of 'A'. the machine will be dedicated to the production of new design.
- Set up time will be 28 hours for each set up.
- Time required for testing each unit will be reduced by 1 hour.
- Engineering cost and batch size will be unchanged.

Required:

- (a) Company management identifies that cost driver for machine set-up costs is set up hours used in batch setting and for testing costs is 'testing time' Engineering costs are assigned to products by special study. Calculate the full cost per unit for 'A' and 'B' using Activity-based costing.
- (b) What is the Mark-up on full cost per unit of A?
- (c) What is the target cost per unit for new design to maintain the same mark up percentage on full cost per unit as it had earlier? Assume cost per unit of cost drivers for the new design remains unchanged.
- (d) Will the new design achieve the cost reduction target?

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- (e) List four possible management actions that the HP Ltd. should take regarding new design. [4+4+4+2+2]

Answer:

**(a) Computation of Quantities of Cost Drivers**

| Particulars                                  | A              | B              | Total          |
|--|----------------|----------------|----------------|
| A. Quantity                                  | 1,00,000 units | 50,000 units   |                |
| B. Batch Size                                | 1,000 units    | 500 units      |                |
| C. Number of Batches (A ÷ B)                 | 100 batches    | 100 batches    |                |
| D. Set Up Time per batch                     | 30 hours       | 36 hours       |                |
| E. Total Set Up Time for Production (C × D)  | 3,000 hours    | 3,600 hours    | 6,600 hours    |
| F. Testing Time per unit                     | 5 hours        | 9 hours        |                |
| G. Total Testing Time for Production (A × F) | 5,00,000 hours | 4,50,000 hours | 9,50,000 hours |

**Computation of ABC Recovery Rates**

| Activity               | Activity Cost Pool | Cost Driver   | Cost Driver Quantity   | ABC Rate        |
|------------------------|--------------------|---------------|------------------------|-----------------|
| Machine Set Up Testing | ₹ 4,62,000         | Set Up Hours  | 6,600 Set Up Hours     | ₹70 per hour.   |
|                        | ₹23,75,000         | Testing Hours | 9,50,000 Testing Hours | ₹2.50 per hour. |

Note: Engineering Costs are assigned by special study. Hence ABC Rate is not calculated.

**Computation of Cost per unit using ABC System**

| Particulars              | A                                 | B                               |
|--------------------------|-----------------------------------|---------------------------------|
| <b>Direct Costs:</b>     |                                   |                                 |
| Direct Materials         | 42,00,000 ÷ 1,00,000 = 42.00      | 30,00,000 ÷ 50,000 = 60.00      |
| Direct Labour            | 15,00,000 ÷ 1,00,000 = 15.00      | 10,00,000 ÷ 50,000 = 20.00      |
| Direct Machining         | 7,00,000 ÷ 1,00,000 = 7.00        | 5,50,000 ÷ 50,000 = 11.00       |
| Sub Total Direct Costs   | 64.00                             | 91.00                           |
| <b>Indirect Costs:</b>   |                                   |                                 |
| Machine Set Up           | (₹70 x 30 hrs) ÷ 1,000 uts = 2.10 | (₹70 x 36 hrs) ÷ 500 uts = 5.04 |
| Testing                  | (₹2.5 ph x 5 hours) = 12.50       | (₹2.5 ph x 9 hours) = 22.50     |
| Engineering              | 8,40,000 ÷ 1,00,000 = 8.40        | 14,10,000 ÷ 50,000 = 28.20      |
| Sub Total Indirect Costs | 23.00                             | 55.74                           |
| Total Costs              | 87.00                             | 146.74                          |

- (b) Markup (or) Profit per unit of A = Selling Price - Full Cost = ₹ 100.05 - ₹87.00 = ₹13.05 p.u.  
Percentage of Markup to Full Cost = ₹13.05 ÷ ₹87 = 15% on Cost.

**(c) Computation of Target cost for New Design of A**

|   |        |
|---|--------|
| New Selling Price (given)   | ₹86.25 |
| Less: Target Profit at 15% on Cost i.e. 15/115 on SP = 86.25 x 15/115 | ₹11.25 |
| Target Cost for New Design of A                                       | ₹75.00 |

**(d) Computation of Cost per unit of New Design A**

| Particulars   | A                          |
|---|----------------------------|
| Direct Costs: Direct Materials  | 42.00-5.00 = 37.00         |
| Direct Labour   | 15.00-2.00 = 13.00         |
| Direct Machining (dedicated machine, hence time saved is not relevant, as the costs continue to be fixed) | 7,00,000 ÷ 1,00,000 = 7.00 |
| Sub Total Direct Costs  | 57.00                      |
| Indirect Costs: Machine Set Up (₹70 x 28 hours) ÷ 1,000 units   | 1.96                       |
| Testing (₹2.5 ph x 4 hours)   | 10.00                      |
| Engineering 8,40,000 ÷ 1,00,000 units   | 8.40                       |
| Sub Total Indirect Costs  | 20.36                      |
| Total Estimated Costs of New Design A   | 77.36                      |

Target Cost is ₹75.00 only. Hence, the new design will not achieve the cost reduction target.  
 Note: It is assumed that output of A will remain at 1,00,000 units, in spite of the reduction in machine time. To maintain 15% profit margin, probable SP of New Design A will be ₹77.36 + 15% = ₹88.96.

**(e) Possible management actions for new design**

- (i) Value Engineering and Value Analysis to reduce the Direct Material Costs.
- (ii) Time and Motion Study in order to redefine the Direct Labour time and related costs.
- (iii) Exploring possibility of cost reduction in costs of Direct Machining.
- (iv) Identifying non-value added activities and eliminating them in order to reduce Overheads.
- (v) Analysis of effect of sale of New Design A on sale of B.
- (vi) Analyses of sensitivity of sale quantity of New Design A to price change from ₹86.25 to ₹88.96.

**7. (a) Wipro is examining the profitability and pricing policies of its Software Division. The software Division develops software packages for engineers. It has collected data on three of its more recent packages –**

- (i) ECE package for electronics and communication engineers**
- (ii) CE package for computer engineers and**
- (iii) IE package for industrial engineers.**

**Summary details on each package over their two year cradle to grave product lives are –**

| Package | Selling price | Number of units sold |        |
|---------|---------------|----------------------|--------|
|         |               | Year 1               | Year 2 |
| ECE     | ₹ 250         | 2,000                | 8,000  |
| CE      | ₹ 300         | 2000                 | 3,000  |
| IE      | ₹ 200         | 5,000                | 3,000  |

Assume that no inventory remains on hand at the end of year 2. Wipro is deciding which product line to emphasize in its software division. In the past two years, the profitability of this division has been mediocre.

Wipro is particularly concerned with the increase in R & D costs in several of its divisions. An analyst at the software division pointed out that for one of its most recent packages (IE) major efforts had been made to reduce R & D costs.

Last week, Amit, the Software Division Manger, decides to use life Cycle Costing in his own division. He collected the following Life Cycle revenue and cost information for the packages (in ₹)

## Answer to MTP\_Final\_Syllabus 2012\_December 2016\_Set 1

| Particulars       | Packages ECE |           | Packages CE |          | Package IE |          |
|-------------------|--------------|-----------|-------------|----------|------------|----------|
|                   | Year 1       | Year 2    | Year 1      | Year 2   | Year 1     | Year 2   |
| Revenue           | 5,00,000     | 20,00,000 | 6,00,000    | 9,00,000 | 10,00,000  | 6,00,000 |
| Costs             |              |           |             |          |            |          |
| R&D               | 7,00,000     | -         | 4,50,000    | -        | 2,40,000   | -        |
| Design of product | 1,15,000     | 85,000    | 1,05,000    | 15,000   | 76,000     | 20,000   |
| Manufacturing     | 25,000       | 2,75,000  | 1,10,000    | 1,00,000 | 1,65,000   | 43,000   |
| Marketing         | 1,60,000     | 3,40,000  | 1,50,000    | 1,20,000 | 2,08,000   | 2,40,000 |
| Distribution      | 15,000       | 60,000    | 24,000      | 36,000   | 60,000     | 36,000   |
| Customer services | 50,000       | 3,25,000  | 45,000      | 1,05,000 | 2,20,000   | 3,88,000 |

Present a product Life Cycle Income statement for each software package. Which package is most profitable and which is the least profitable? How do the three packages differ in their cost structure (the percentage of total cost in each category)? [12]

Answer:

### Life cycle Income Statement (₹ in '000s)

| Particulars   | Package ECE |       |            |            | Package CE |     |            |            | Package IE |     |             |            |
|---------------|-------------|-------|------------|------------|------------|-----|------------|------------|------------|-----|-------------|------------|
|               | Y1          | Y2    | Total      | %          | Y1         | Y2  | Total      | %          | Y1         | Y2  | Total       | %          |
| Revenues      | 500         | 2,000 | 2,500      | 100%       | 600        | 900 | 1,500      | 100%       | 1,000      | 600 | 1,600       | 100%       |
| Costs         |             |       |            |            |            |     |            |            |            |     |             |            |
| R&D           | 700         | -     | 700        | 28%        | 450        | -   | 450        | 30%        | 240        | -   | 240         | 15%        |
| Design        | 115         | 85    | 200        | 8%         | 105        | 15  | 120        | 8%         | 76         | 20  | 96          | 6%         |
| Manufacturing | 25          | 275   | 300        | 12%        | 110        | 100 | 210        | 14%        | 165        | 43  | 208         | 13%        |
| Marketing     | 160         | 340   | 500        | 20%        | 150        | 120 | 270        | 18%        | 208        | 240 | 448         | 28%        |
| Distribution  | 15          | 60    | 75         | 3%         | 24         | 36  | 60         | 4%         | 60         | 36  | 96          | 6%         |
| Cust. Service | 50          | 325   | 375        | 15%        | 45         | 105 | 150        | 10%        | 220        | 388 | 608         | 38%        |
| Total Costs   | 1065        | 1,085 | 2150       | 86%        | 884        | 376 | 1260       | 84%        | 969        | 727 | 1696        | 106%       |
| <b>Profit</b> |             |       | <b>350</b> | <b>14%</b> |            |     | <b>240</b> | <b>16%</b> |            |     | <b>(96)</b> | <b>-6%</b> |

**Observation:** Package ECE is most profitable, while package IE is least profitable.

(b) State the limitations of Value Chain Analysis?

4

Answer:

### Limitations of Value Chain Analysis

|  |   |
|--|---|
| (i) <b>Non availability of Data</b>                        | Internal data on costs, revenues and assets used for Value Chain Analysis are derived from financial of a single period. For long term strategic decision- making, changes in cost structures, market prices and capital investments etc. May not readily available.    |
| (ii) <b>Identification of stages</b>                       | Identifying stages in an industry's value chain is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into two or more stages when an outside firm does not compete in these stages is strictly judgment. |
| (iii) <b>Ascertainment of costs of Revenues and Assets</b> | Finding the Costs, Revenues and Assets for each value chain activity poses/gives rise to serious difficulties. There is no specific approach and much depends upon trial and error and  |

|  |  |
|--|--|
|  | experiments methods.   |
| <b>(iv) Identification of cost Drivers</b> | Isolating Cost Drivers for each value creating activity, identifying Value chain Linkages across activities and computing supplier and customer profit margins present serious challenges. |
| <b>(v) Resistance from employees</b>       | Value chain Analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers.   |

**8. Write a Short notes on any four of the below:****[4X4]**

- (i) Objectives of process Analysis**
- (ii) Business applications of Activity Based Management**
- (iii) Objectives of transfer pricing**
- (iv) Price Discrimination under the demand oriented pricing**
- (v) Enterprise Resource Planning (ERP).**

**Answer:****(i)** The objectives of analyzing the process include:

- A. Identify what makes maps difficult to understand and use
- B. Evaluate completeness
- C. Isolate bottlenecks
- D. Find redundancies
- E. Examine resources allocation

**(ii)** Business Applications of Activity Based Management (ABM):

- A. **Cost Reduction:** ABM helps the Firm to identify opportunities in order to streamline or reduce the costs or eliminate the entire activity, especially NVA activities. It is useful in identifying and quantifying process waste, leading to continuous process improvement through continuous cost reduction.
- B. **Activity Based Budgeting:** Activity Based Budgeting analyses the resource input or cost for each activity. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to highlight (both in financial and non-financial terms) those activities with major discrepancies for potential reduction in supply of resources. It is a planning and control system, which supports continuous improvement.
- C. **Business Process Re-Engineering (BPR):** BPR is the analysis and redesign of workflows and processes in a Firm, to achieve dramatic improvement in performance, and operational excellence. A business process consists of linked set of activities, e.g. purchase of materials is a business process consisting of activities like Purchase Requisition, Identifying Suppliers, preparing Purchase Orders, mailing Purchase Orders and follow up. The process can be reengineered by sending the production schedule direct to the suppliers and entering into contractual agreement to deliver materials according to the production schedule.
- D. **Benchmarking:** It involves comparing the Firm's products, services or activities with other best performing organizations, either internal or external to the Firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented.

- E. Performance Measurement: Activity performance measures consist of measures relating to costs, time quality and innovation. For achieving product quality, some illustrative performance measures are -

| Area                           | Measures                         |
|--------------------------------|----------------------------------|
| Quality of purchased component | Zero Defects                     |
| Quality of output              | Percentage yield                 |
| Customer Awareness             | No. of orders, no. of complaints |

- (iii) A transfer price is that notional value at which goods and services are transferred between divisions in a decentralized organization. Transfer prices are normally set for intermediate products which are goods and services that are supplied by the selling division to the buying division.

Objectives:

- Ensure that resources are allocated in an optimal manner.
- Promote goal congruence.
- Motivate divisional managers.
- Facilitate the assessment of management performance.
- Retain divisional autonomy.

- (iv) There are many bases on which the open price discrimination is practiced. These are discussed below:

- A. Time Price Differentials: It is a general practice to use the expression "the demand for a product or service", but it is important to note that demand also has a time dimension. The demand may shift in fairly short-time intervals. For example, demand for telephone facilities is more in the day time rather than at night.
- B. Use Price differentials: Different buyers have different uses of a product or a service. For example railways can be used for long-haul or short-haul freight traffic. Railways can also be used for transporting different types of commodities. Electricity can similarly, be used for industrial or residential purposes.
- C. Quality price Differentials: If the product caters to that group of consumers who are concerned about its quality, then the quality becomes a significant determinant of demand elasticity. The seller has, therefore, to create differences in quality to sell his product. It must be emphasized here that the differences in quality basically depend upon the buyers' understanding of the quality. Sellers use many devices to create quality differences.

**Quantity Differentials:** When the seller discriminates on the basis of the quantity of purchase, it is known as quantity differentials. Quantity discounts are price concessions based on the size of the lot purchased at one time and delivered at one location. These discounts are thus related to size of a single purchase. The size of the lot purchased is measured in terms of either physical units or monetary units. Sometimes, discounts are according to the trade status, i.e., wholesaler, retailer, jobber, etc.

- (v) **Enterprise Resource Planning (ERP):** ERP means the techniques and concepts for integrated management of business as a whole from the view point of the effective use of management resources to improve the efficiency of enterprise management. ERP provides integrated business software modules to support functional units of an enterprise.

Some of the major features of an ERP are:



- It provides multi-platform, multi-facility, multi-mode of manufacturing, multi-currency and multi-lingual facilities.
- It supports strategic and business planning activities, operational planning and execution activities, material and resource planning.
- It has end-to-end supply chain management to optimize the overall demand and supply.
- It facilitates integrated information systems covering all functional areas like manufacturing, procurement, sales, distribution, payables, receivables, human resources, inventory, finance etc.
- It enhances customer services through increased efficiency in core activities thus augmenting the corporate image.
- It bridges the information gap across organization.
- ERP is the solution for better project management.
- It allows introduction of latest technologies like Electronic funds transfer, Electronic data Interchange, Internet, Intranet, E-commerce etc.
- It eliminates business problems like material shortages, productivity, customer service, cash management, quality and prompt delivery.
- It provides intelligent business tools like Decision support system, Executive information system, data mining etc.