PAPER – 17 - STRATEGIC PERFORMANCE MANAGEMENT

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

	Learning objectives	Verbs used	Definition
LEVEL C	KNOWLEDGE What you are expected to know	List	Make a list of
		State	Express, fully or clearly, the details/ facts
		Define	Give the exact meaning of
	COMPREHENSION What you are expected to understand	Describe	Communicate the key features of
		Distinguish	Highlight the differences between
		Explain	Make clear or intelligible/ state the meaning or purpose of
		Identity	Recognize, establish or select after consideration
		Illustrate	Use an example to describe or explain something
	APPLICATION How you are expected to apply your knowledge	Apply	Put to practical use
		Calculate	Ascertain or reckon mathematically
		Demonstrate	Prove with certainty or exhibit by practical means
		Prepare	Make or get ready for use
		Reconcile	Make or prove consistent/ compatible
		Solve	Find an answer to
		Tabulate	Arrange in a table
	ANALYSIS How you are expected to analyse the detail of what you have learned	Analyse	Examine in detail the structure of
		Categorise	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritise	Place in order of priority or sequence for action
		Produce	Create or bring into existence
	SYNTHESIS How you are expected to utilize the information gathered to reach an optimum conclusion by a process of reasoning	Discuss	Examine in detail by argument
		Interpret	Translate into intelligible or familiar terms
		Decide	To solve or conclude
	EVALUATION How you are expected to use your learning to evaluate, make decisions or recommendations	Advise	Counsel, inform or notify
		Evaluate	Appraise or asses the value of
		Recommend	Propose a course of action

Paper – 17 - Strategic Performance Management

Full Marks: 100 **Time Allowed: 3 hours**

This paper contains 10 questions, divided in three sections Section A, Section B and Section C. In total 7 questions are to be answered.

From Section A, Question No.1 is compulsory and answers any two questions from Section A (out of three questions - Questions Nos. 2 to 4). From Section B, Answer any two questions (i.e. out of Question nos. 5 to 7). From Section C, Answer any two questions (i.e. out of Question nos. 8 to 10).

Students are requested to read the instructions against each individual question also. All workings must form part of your answer. Assumptions, if any, must be clearly indicated.

Section –A

[Question 1 is compulsory and answers any 2 from the rest]

1. **Adam, fresh from school was a newly recruited HR practitioner. During his one month into the job, he was asked to be in-charge of the orientation programme for the entire organization. Being new, he followed closely to the processes. Recently, Roy joined the organization and Adam was required to orientate him. On Roy's first day of work, Adam brought him around the organization for introduction to the rest of the staffs. Unfortunately, Roy's assigned mentor was not around hence, Adam was unable to make an official introduction for Roy to meet up with his mentor. In the afternoon, during the HR briefing, Adam mentioned to Roy that there is a buddy system in place but it is only on an opt-in basis. Roy requested to opt for a buddy. Adam was rather surprised by Roy's request as according to Adam's manager-Jean, no one in the organization has requested for a buddy.**

   Hence, Adam checked with Jean on the criteria in getting a buddy for Roy and according to her, Adam found out that it needed to be someone preferably from Roy's department. Having clarified on the criteria, Adam was supposed to get a buddy for Roy, unfortunately, this issue was clearly forgotten by Adam due to his busy schedule as he was involved in other HR matters as well and he did not follow up with Roy's request promptly.

   One week later, Adam met Roy in a lunch gathering and Adam greeted Roy and asked him casually how he is doing and if he has adapted well to his job. Roy, asked Adam blatantly and angrily where is his buddy that he had requested. At that moment, Adam recalled on the existence of this request and unwittingly told Roy that he thought Roy was joking with him on the request for a buddy as he did not want to admit to Roy that he had clearly forgotten about the whole issue. Roy was very angered by Adam's response and told him off that he was very serious in getting a buddy and that its Adam's responsibility to do so. Adam, clearly embarrassed and guilty about his mistake, apologized immediately and promised to get him a buddy. On the very day, a buddy- Sam, was found for Roy. Roy was very unhappy with Adam and confronted Adam and his buddy when he was able to have an official meet up session with his mentor. Adam explained to Roy that the organization has no current practice in place for meet up sessions to be arranged between mentors and mentees and it's a practice for mentees to take self-initiative to do so in arranging for meetings with their mentors and also that his mentor is currently out of town and will only be back the next day. Adam, himself being a new staff also was at that moment in time speaking on personal experience and also based on what Jean had told him. Sam, who was present agreed and helped to explain to Roy on the practice. Roy kept

quiet and Adam unknowingly thought that Roy has understood the organization practice. Hence, Adam did not continue to check with Roy on this aspect.
The following day, Roy had a feedback session with his manager and Adam was called upon to sit in as a part of the orientation programme. Roy brought up the issue on Adam's failure to get him a buddy promptly and that he was not introduced to his mentor at all. He complained about the poor management of the HR mentor and buddy system and that it was not effective at all and that he expressed that he is very unhappy with Adam as he felt that he was not doing his job at all. Adam tried to explain to Roy and his manager about what happened and also reassured Roy that he will take his suggestions of improving on the system and was apologetic about the issue. He told Roy's manager that he will bring Roy to see his mentor after the session as his mentor is back in the office after being on leave for the past week.
Roy was still very unhappy with Adam and continued telling Adam off in front of his manager.

Required:
(a) On an HR practitioner point of view, what should Adam do to resolve the issue?
(b) Describe Roy's reaction towards Adam's way of handling his request.
(c) Roy is very unhappy with Adam and holds it against him even though all has been done and followed up. What should Adam as HR do to resolve this and should Jean, as Adam's manager do something?
(d) What role does Roy's manager play in this issue and should he be implicated?
(e) Discuss the steps in implementing EVA.

[5+5+2+4+4]

Answer:

(a) Adam was new to the job; therefore he himself was in the process of getting oriented to the job. During the HR briefing, Adam mentioned to Roy that there is a buddy system in place but it is only on an opt-in basis. Roy requested to opt for a buddy. Adam was rather surprised by Roy's request as according to Adam's manager-Jean, no one in the organization has requested for a buddy. However he did falter by not taking the buddy request by Roy seriously. This was probably the only mistake that he committed for which he later apologized. On the very day, a buddy- Sam was found for Roy.

(b) Roy was very angered by Adam's response and told him off that he was very serious in getting a buddy. Roy complained to Jean, manager of HR. In a feedback session Adam was called upon to sit in as a part of the orientation programme. Roy brought up the issue on Adam's failure to get him a buddy promptly and that he was not introduced to his mentor at all. He complained about the poor management of the HR mentor and buddy system and that it was not effective at all and that he expressed that he is very unhappy with Adam as he felt that he was not doing his job at all.

(c) As an HR practitioner, Adam should let Roy know the whole situation and apologies, which he does. Fair enough, he complained about Adam, I think Jean should just warn Adam, as he is new. Also, Jean should make sure Adam goes through the necessary procedure and knows them well, lest he should repeat such a mistake.

(d) As far as Roy's manager is concerned, it is upto Roy whether he wants to implicate him or not. Implicating him will only complicate the situation which is not needed. As for Roy, he should get a life and move on in the organization rather than harping on a single fault by Adam. It is understandable that he felt disappointed by the firm, but he should consider the fact that in an organization sometimes these lapses happen. That is not to say it doesn't matter but after Adam apologized, he should forgive.

(e) The implementation of EVA is a four stepped process which include: (i) Measurement, (ii) Management System, (iii) Motivation, and (iv) Mindset.

(i) **Measurement –** Any company that wishes to implement EVA should institutionalize the process of measuring the metric, regularly. This measurement should be carried out after carrying out the prescribed accounting adjustments.

(ii) **Managements System –** The company should be willing to align its management system to the EVA process. The EVA based management system is the basis on which the company should take decision related to the choice of strategy, capital allocation, merger and acquisitions, divesting business and goal setting.

(iii) **Motivation –** The company should decide to implement EVA only if it is prepared to implement the incentive plan that goes with it. An EVA based incentive system, however, encourages managers to operate in such a way as to maximize the EVA, not just of the operations it oversees but of the company as whole.

(iv) **Mindset –** The effective implementation of EVA necessitates a change in the culture and mindset of the company. All constituents of the organization need to be taught to focus on one objective- maximizing EVA. This singular focus leaves no room for ambiguity and also it is not difficult for employees to know just what actions of their will create EVA, and what will destroy it.

2. (a) The following information relates to budgeted operation of Division X of a manufacturing company.

	₹
Sales (50,000 units of ₹ 8)	**4,00,000**
Less: Variable costs @ ₹ 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%.

Required:

(i) Calculate divisional expected ROI.

(ii) Calculate divisional expected RI.

(iii) Comment on the results of (i) and (ii).

(iv) 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+2+6=10]

Answer:

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

(ii) RI = Divisional Profit – Minimum desired rate of return

= ₹ 25,000 – (20% × ₹ 1,50,000)

= 25,000 – 30,000

= (₹ 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 units

Particulars	General Budget (₹)	Additional Budget (₹)	Total (₹)
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.

2. (b) State the strengths of Residual Income. [5]

Answer:

Residual income is net operating income or net earnings after-tax plus interest (net of the tax effect) less the desired rate of return on investment multiplied by the amount of investment.

Residual Income = [Net earnings after tax before Interest – (Desired rate of return × Investment)]

Strengths:

(i) It avoids suboptimal decisions as investments are not rejected merely because they lower the divisional manger's ROI.

(ii) It maximizes growth of the company and increases shareholders' wealth by accepting opportunities which earn a rate of return in excess of the cost of capital.

(iii) The cost of capital charge on divisional investments ensures that divisional managers are aware of the opportunity cost of funds.

(iv) Charging each division with the company's cost of capital ensures that decision taken by different divisions is compatible with the interests of the organization as a whole.

(v) Changes in RI will lead to changes in EPS. Thus, achieving RI objectives will lead to the achievement of desirable levels of total earnings and EPS at the corporate level.

2. (c) Ram is the Managing Partner of a business that has just finished a building. He anticipates that he will rent these rooms for 16,000 room – nights next year. All rooms are similar and will rent for the same price. The following Operating Costs are expected to be incurred for next year –

Variable Operating Costs	**₹ 800 per room night**
Fixed Costs: Salaries and Wages	**₹ 17,50,000**
Maintenance of Building	**₹ 3,70,000**
Other Operating and Administrative	**₹14,00,000**
Total Fixed Costs	**₹ 35,20,000**

The Capital invested is ₹ 60 Lakhs and the Firm expects 25% return on its investment.

(i) What price should be charged for a room-night?

(ii) Market Research indicates that if the Price of a room-night as determined above is reduced by 10%, the number of rooms rented out will increase by 10%. Should the Firm reduce prices by 10%. [2+3]

Answer:

(i) Target Contribution = Fixed Cost + Target Profit = 35,20,000 + (25% on ₹ 60,00,000) = ₹ 50,20,000

$$\text{Target Contribution per Room-Night} = \frac{₹\ 50,20,000}{16,000 \text{ room - nights}} = ₹\ 313.75$$

Target Price per Room-Night = Variable Cost + Target Contribution = ₹ 800 + ₹ 313.75

=₹ 1,113.75

(ii) Revised Contribution with 10% Price Reduction and 10% extra Room-Nights = [(₹ 1,113.75 – 10%) Less ₹ 800] × (16,000 + 10%) Room-Nights

= ₹ 202.375 × 17,600 = ₹ 35,61,800

Comment:

Since Revised Contribution is less than Target Contribution above, rent reduction is not advisable.

3. (a) Pay offs of three acts A, B and C and states of nature X, Y and Z are given below :

Payoff (in ₹)

Acts → **State of Nature ↓**	**A**	**B**	**C**
X	**-20**	**-50**	**200**
Y	**200**	**-100**	**-50**
Z	**400**	**600**	**300**

The probabilities of the states of nature are 0.3, 0.4 and 0.3.

Calculate the Expected Monetary Value (EMV), for the above data and select the best act. Also find the EVPI. [5]

Answer:

Let us find the Expected Monetary Value (EMV) of each act.

Act A = (-20 x 0.3) + 200 x 0.4 +400 x 0.3 = ₹ 194

Act B = (-50 x0.3)+(-100 x 0.4) + 600 x 0.3 = ₹ 125

Act C = 200 x 0.3 - 50 x 0.4 + 300 x 0.3 = ₹ 130

EMV of Act A is highest as seen in the table, so it should be selected.

State of nature	Prob	A	B	C	Max for state of nature	Max pay off × Prob.
X	0.3	-20	-50	200	200	200 × 0.3 = 60
Y	0.4	200	-100	-50	200	200 × 0.4 = 80
Z	0.3	400	600	300	600	600 × 0.3 = 180
Total						320

EVPI = Expected pay-off with perfect information (EPPI) - EVI = 320-194 = ₹ 126

3. (b) Discuss the Principles of Lean. **[5]**

Answer:

The five-step thought process for guiding the implementation of lean techniques is easy to remember, but not always easy to achieve:

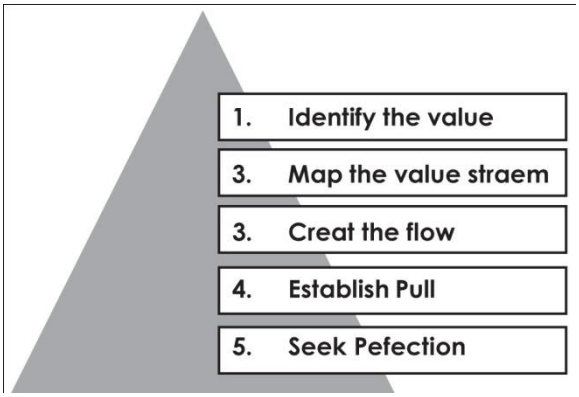
(i) Specify value from the standpoint of the end customer by product family.

(ii) Identify all the steps in the value stream for each product family, eliminating whenever possible those steps that do not create value.

(iii) Make the value-creating steps occur in tight sequence so the product will flow smoothly toward the customer.

(iv) As flow is introduced, let customers pull value from the next upstream activity.

(v) As value is specified, value streams are identified, wasted steps are removed, and flow and pull are introduced, begin the process again and continue it until a state of perfection is reached in which perfect value is created with no waste.



3. (c) Discuss the role of the Management Accountant in ABM. **[5]**

Answer:

The Management Accountant plays a central role in creating and maintaining activity-based cost information to support activity-based management. Serving as the financial expert on cross functional work teams, Management Accountants support analysis of current performance, identification of improvement efforts, and prioritization of potential projects. The role of Management Accountants in ABM efforts comprises the following activities:

(i) Creation of the ABC database;

(ii) Maintenance of the ABM data warehouse;

(iii) Assurance and monitoring of data integrity within the warehouse;

(iv) Analysis of the costs and benefits of improvement projects;

(v) Ongoing audit and analysis of project performance against goals;

(vi) Creation and support of management reporting structures;

(vii) Creation and revision of cost estimates as process changes are made;

(viii) Target and life-cycle cost and profit analysis;

(ix) Strategic and operational budget and planning support; and

(x) Tracking the results/benefits of the ABC/ABM initiative.

In some organizations, Management Accountants are driving process management efforts, but this can result in ABM being seen as another accounting tool rather than as a management technique to improve profitability and performance against customer

expectations. If management accounting does drive the ABM project, it is critical that a strong champion outside the finance group be recruited to support the implementation

3. (d) In Transfer pricing , what is the common conflict between the Division and the company as whole?. [5]

Answer:

(i) **Objectives and Conflicts:** The criteria for fixing Transfer Prices are – (a) Promote Goal Congruence, (b) Ensure that resources are allocated in an optimal manner, (c) Segment Performance Evaluation, (d)Retain divisional autonomy, and (e) Motivate divisional managers. However, no single transfer price can serve all of these criteria. They often conflict and managers are forced to make trade-offs.

Some situations of conflicts between objectives are –

(a) **Goal Congruence vs. Performance Evaluation:** The Transfer Price that leads to the short-run optimal economic decision is Relevant Cost. If the Transferring Division has excess capacity, this cost will be equal to Variable Cost only (since Opportunity Costs are Nil). The Transferring Division will not recover any of its Fixed Costs when transfers are made at Variable Costs, and will therefore, report a Loss.

(b) **Goal Congruence vs. Divisional Autonomy:** In case of failure of a division to achieve the objective of 'Goal Congruence', the Management of the Company may dictate their 'Transfer Price'. If a Transfer Price is imposed on the Manager of the Supplying Division, the concept of divisional autonomy and decentralization is undermined.

(c) **Performance Evaluation vs. Profitability:** A Transfer Price that may be satisfactory for evaluating divisional performance may lead divisions to make sub-optimal decision when viewed from overall Company perspective.

(ii) **Conflicts between Divisions and Company as a whole:** If Divisional Managers are given "absolute free hand" in decision making on Transfer Prices, there is a possibility that divisional goals may be pursued, ignoring overall Company interests. This may force the top Management to interfere in decision-making. however, interference of top Management and "dictating a Transfer Price" on the divisions is usually the main basis of conflict between a Division and the Company as a whole.

(iii) **Conflicts Resolution:** To resolve transfer pricing conflicts, the following transfer pricing methods can be suggested –

(a) Dual – Rate Transfer Pricing System, and / or

(b) Two – Part Transfer Pricing System.

4. (a) (i) The total cost (C) and the total revenue (R) of a firm are given $C(x) = x^3 + 60x^2 + 8x$; $R(x) = 3x^3 - 3x^2 + 656x$, x being output. Determine the output for which the firm gets maximum profit. Also obtain the maximum profit. [5]

Answer:

$C = x^3 + 60x^2 + 8x$

$R = 3x^3 – 3x^2 + 656x$

$\text{Profit} = 3x^3 – 3x^2 + 656x – x^3 – 60x^2 – 8x$

$= 2x^3 – 63x^2 + 648x = (p)$

Derivative w.r.to x

$$\frac{dp}{dx} = 6x^2 – 126x + 648 = 0$$

$x^2 – 21x + 108 = 0$

$x^2 – 9x – 12x + 108 = 0$

$x(x – 9) – 12 (x – 9) = 0$

$(x – 12) (x – 9) = 0; x = 12 \text{ or } 9$

$$\frac{d^2p}{dx^2} = 2x - 21$$

at x = 9

$$\frac{d^2p}{dx^2} = 18 - 21 = -3 < 0$$

∴ P is maximum at x = 9

at x = 12

$$\frac{d^2p}{dx^2} = 24 - 21 = 3 > 0$$

∴ P is minimum at x = 12

$P = 2x^3 - 63x^2 + 648x$

at x = 9

Profit $P = 2 \times (9)^3 - 63(9)^2 + 648(9)$

$729 \times 2 - 63 \times 81 + 648 \times 9 = 2187$

4. (a) (ii) The total revenue from sale of 'x' units is given by the equation $R = 100x - 2x^2$, calculate the point price elasticity of demand, when marginal revenue is 20.

[5]

Answer:

$R = 100x - 2x^2$

Price = 100 – 2x

$$MR = \frac{dR}{dx} = 100 - 4x$$

$$\frac{p}{x} = \frac{100}{x} - 2$$

$$\frac{dp}{dx} = -2 = \frac{dx}{dp} = \frac{1}{2}$$

$$E_p = \frac{1}{2} \times \left(\frac{100}{x} - 2\right)$$

$$= \frac{50}{x} - 1$$

$$= \frac{50}{20} - 1$$

$$= \frac{5}{2} - 1$$

$$= \frac{5-2}{2} = \frac{3}{2}$$

100 – 4x = 20

4x = 80

X = 20.

4. (b) List the general objectives of a Pricing Policies. [5]

Answer:

Each pricing decision of a firm has generally one of the following objectives:

- To achieve a given rate of return for the retire product line;
- To maintain or increase the existing market share of the firm;
- To maintain at least a particular level of price stability;
- To choose and adopt a pricing policy which fits into the market conditions faced by the different products in the product line; or
- To aim at discouraging entry of new firms into the industry.

4. (c) Describe the benefits of adopting a Balanced Scorecard approach to performance management. [5]

Answer:

(i) It creates a longer term strategic view of performance rather than a myopic short term view.

(ii) It broadens the view of divisional managers as to what represents goods performance away from a solely financially orientated view.

(iii) Organizations can develop performance measures that are explicitly aligned to the corporate strategy and in support thereof.

(iv) It considers customer viewpoint which is critical in any business.

(v) It helps to promote accountability as each performance measure could be the responsibility of a nominated individual or individuals.

Section – B

5. (a) Discuss about the Hopfield Artificial Natural Network. [5]

Answer:

A Hopfield artificial neural network is a type of recurrent artificial neural network that is used to store one or more stable target vectors. These stable vectors can be viewed as memories that the network recalls when provided with similar vectors that act as a cue to the network memory. These binary units only take two different values for their states that are determined by whether or not the units' input exceeds their threshold. Binary units can take either values of 1 or -1, or values of 1 or 0. Consequently there are two possible definitions for binary unit activation a_i (equation (6) and (7)):

$$a_1 = \begin{cases} -1 & \text{if } \sum_j w_{ij} s_j > \theta_i, \\ 1 & \text{Otherwise} \end{cases} \qquad (6)$$

$$a_1 = \begin{cases} 0 & \text{if } \sum_j w_{ij} s_j > \theta_i, \\ 1 & \text{Otherwise} \end{cases} \qquad (7)$$

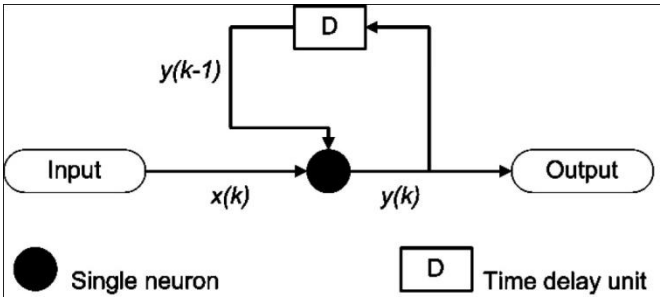
Where:

- w_{ij} is the strength of the connection weight from unit j to unit I,
- S_j is the state of unit j,
- θ_i is the threshold of unit i.

While talking about connections w_{ij} we need to mention that there are typical two

restrictions: no unit has a connection with itself (w_{ij}) and that connections are symmetric $w_{ij}=w_{ij}$.

The requirement that weights must be symmetric is typically used, as it will guarantee that the energy function decreases monotonically while following the activation rules. If non-symmetric weights are used the network may exhibit some periodic or chaotic behaviour. Training a Hopfield artificial neural network involves lowering the energy of states that the artificial neural network should remember.



Simple "one neuron" Hopfield artificial neural network

5. (b) Discuss the Key roles of Six Sigma. [5]

Answer:

- **Executive Leadership**: It includes the CEO and other members of top management who are responsible for setting up a vision for Six Sigma implementation. They also empower the other role holders with the freedom and resources to explore new ideas for breakthrough improvements.
- **Champions:** Champions take responsibility for Six Sigma implementation across the organization in an integrated manner. The Executive Leadership draws them from upper management. Champions also act as mentors to Black Belts.
- **Master Black Belts:** Master Black Belts identified by champions, act as in-house coaches on Six Sigma. They devote 100% of their time to Six Sigma. They assist champions and guide Black Belts and Green Belts. Apart from statistical tasks, they spend their time on ensuring consistent application of Six Sigma across various functions and departments.
- **Black Belts**: Its operate under Master Black Belts to apply Six Sigma methodology to specific projects. They devote 100% of their time to Six Sigma. They primarily focus on Six Sigma project execution, whereas Champions and Master Black Belts focus on identifying projects/functions for Six Sigma.
- **Green Belts**: Green Belts are the employees who take up Six Sigma implementation along with their other job responsibilities, operating under the guidance of Black Belts.

6. Define the following term in the context of Supply Chain Management

(i) Agreement, (ii) Forecast Error , (iii) Inventory Management Systems , (iv) Performance Measurement. 2× 5=10

Answer:

(i) Agreements

An agreement should clearly state what you are buying and its cost. Delivery terms and responsibility, Installation related issues, if applicable, an acceptance provision detailing how and when the buyer will accept the products, warranty issues, and your remedial actions should be clearly spelled out in the agreement. A well-developed agreement can

provide adequate protection against economic opportunism between parties and lead to a positive relationship. Effective long-term agreements generally have specific, measurable objectives stated in them, including pricing mechanisms, delivery and quality standards and improvements, cost savings sharing, evergreen clauses, and termination of the relationship.

(ii) Forecast Error

The difference between actual demand and forecast demand, stated as an absolute value or as a percentage. E.g., average forecast error, forecast accuracy, mean absolute deviation, tracking signal. There are three ways to accommodate forecasting errors: One is to try to reduce the error through better forecasting. The second is to build more visibility and flexibility into the supply chain. And the third is to reduce the lead time over which forecasts are required.

(iii) Inventory Management Systems

Software applications that permit monitoring events across a supply chain. These systems track and trace inventory globally on a line-item level and notify the user of significant deviations from plans. Companies are provided with realistic estimates of when material will arrive. With Inventory visibility, organizations are able to make decisions that optimize supply chain performance. Information is available to reduce costs by removing inventory from the supply chain, reducing obsolescence, decreasing operational assets, lowering network operations cost, and decreasing transportation costs. Visibility also increases competitiveness by improving customer satisfaction and market responsiveness.

(iv) Performance Measurement

Supplier performance measurement and evaluation includes the methods and techniques used to collect information that can be used to measure, rate or rank supplier performance on a continuous basis. The measurement system is a crucial part of supplier management and development.

7. (a) Discuss about the Malm Quist Index (MI). [5]

Answer:

The **Malmquist Index** (MI) is a bilateral index that can be used to compare the production technology of two economies. It is named after Professor Sten Malmquist, on whose ideas it is based. It is also called the Malm quist Productivity Index.

The MI is based on the concept of the Production function. This is a function of maximum possible production, with respect to a set of inputs pertaining to capital and labour. So, if S_a is the set of labour and capital inputs to the production function of Economy A, and Q is the production function of Economy A, we could write $Q = f_a(S_a)$.

While the production function would normally apply to an enterprise, it is possible to calculate it for an entire region or nation. This would be called the aggregate production function.

To calculate the Malmquist Index of economy A with respect to economy B, we must substitute the labour and capital inputs of economy A into the production function of B, and vice versa. The formula for MI is given below.

$$MI = \sqrt{(Q_1Q_2)/(Q_3Q_4)}$$

where

$Q_1 = f_a(S_a)$

$Q_2 = f_a(S_b)$

$Q_3 = f_b(S_a)$

$Q_4 = f_b(S_b)$

Note that the MI of A with respect to B is the reciprocal of the MI of B with respect to A. If the MI of A with respect to B is greater than 1, the aggregate production technology of economy A is superior to that of economy B.

7. (b) Mention the benefits of the TPM. [5]

Answer:

With the adoption of TPM at the enterprise level, your organisation would benefit from the following aspect:

- A set of new management goals will be developed by the Management, using the skills and training provided during the implementation of the TPM
- Team bonding and better accountability
- Improved quality and total cost competitiveness
- Productivity and quality team training for problem solving
- Earlier detection of factors critical to maintaining equipment "uptime"
- Measure impact of defects, sub-optimal performance, and downtime using OEE (Overall Equipment Effectiveness)
- Motivated people function better all the time

Section – C

8. (a) Briefly describe about the Value at Risk. [5]

Answer:

Value at Risk (VaR) is one of the popular methods of measuring financial risks. There are different types of VaR— (i)long-term VaR, (ii)marginal VaR, (iv)factor VaR, and (iv)shock VaR. VaR is also defined as the threshold value such that the probability of a portfolio making a market to a market loss over a specific time horizon exceeds this value. A loss which exceeds VaR threshold is known as 'VaR break'. VaR has applications in financial risk management, risk measurement, control and reporting. It can also be used in calculating regulatory capital.

VaR has the advantage of a structured methodology for critically analysing a risk that is available as part of management function. Daily publication of a number on time and with particular statistical data enables an organization to maintain a high objective standard.

Another advantage of VaR is that it differentiates risks into two regimes, that is, normal days and extreme occurrences. Inside the VaR limit, application of the conventional statistical methods is reliable. Out VaR limit risk should be analyzed with stress testing on the basis of data available on the long-term and in the broad market.

Application of VaR is to segregate extreme occurrences in a systematic way. They can be studied over the long-term in a qualitative manner on the basis of day-to-day movement of prices, both quantitatively and qualitatively.

There has been criticism against VaR. It is said that this concept has led to excessive risk taking and leveraging by financial institutions. Again VaR is not sub-additive which means that VaR of a combined portfolio can be larger than the sum of the VaRs of its components.

8. (b) Describe about the Gambler's Ruin Theory. [5]

Answer:

The basic idea of this theory relates with the game of a gambler, who plays with an arbitrary sum of money. Gambler would play with some probabilities of gain and loss. Game would continue until the gambler loses all his money. Theory would also talk about gambler's ultimate ruin and expected duration of the game.

In context of the firm's failure, firm would take the place of a gambler. Firm would continue to operate until its net worth goes to zero, point where it would go bankrupt. The theory assumes that firm has got some given amount of capital in cash, which would keep entering or exiting the firm on random basis depending on firm's operations. In any given period, the firm would experience either positive or negative cash flow. Over a run of periods, there is one possible composite probability that cash flow will be always negative. Such a situation would lead the firm to declare bankruptcy, as it has gone out of cash. Hence, under this approach, the firm remains solvent as long as its net worth is greater than zero. This net worth is calculated from the liquidation value of stockholders' equity.

9. The balance Sheet of Uncertain Ltd. as on 30.06.2015 is given below:

Balance Sheet
as at 30th June, 2015

Equity & Liabilities	₹	Assets	₹
(1) Shareholder Fund: (a) Share Capital (@ ₹ 100 each)	2,00,000	(1) Non – Current Assets (a) Fixed Assets	10,00,000
(b)Reserves & Surplus	1,75,000	(b) Non Current Investment - Trade Investment	2,00,000
		(2) Current Assets (i) Inventory	1,50,000
(2) Non – Current Liabilities: - 12% Debentures - 10% Bank Loan	 3,00,000 2,00,000	(ii) Book Debts	75,000
(3) Current Liabilities	5,50,000		
	14,25,000		14,25,000

Additional Information:

(i) Net Sales for 2014-15 was ₹ 29,50,000.
(ii) Dividend per share in 2014-15 = ₹ 0.40.
(iii) Dividend Payout Ratio as on 30.06.2015 = 50%.
(iv) Price Earnings Ratio is 15.
(v) Corporate tax rate = 50%.
Using Altman's function, calculate Z score of Uncertain Ltd. and interpret the result. [10]

Answer:

The Z score of Multivariate Model of Altman is

$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$

Where,

$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}} = \frac{(3,25,000)}{14,25,000}$ = (-) 0.2281, i.e. (-) 22.81%

$X_2 = \frac{\text{Retained Earning}}{\text{Total Assets}} = \frac{1,75,000}{14,25,000}$ = 0.1228, i.e. 12.28%

$X_3 = \frac{\text{Earning Before Interest and Tax}}{\text{Total Assets}} = \frac{88,000}{14,25,000}$ = 0.0617, i.e. 6.17%

$X_4 = \frac{\text{Market Value of Equity}}{\text{Book Value of Total Debt}} = \frac{2,40,000}{10,50,000} = 0.2286$, i.e. 22.86%

$X_5 = \frac{\text{Sales}}{\text{Total Assets}} = \frac{₹29,50,000}{₹14,25,000} = 2.07$ times

Putting the values of the variables as derived in the equation we get

Z = - (0.012 × 22.81) + (0.014 × 12.28) + (0.033 × 6.17) + (0.006 × 22.86) + (0.999 × 2.07)

Or, Z = 2.3068

Interpretation: We observe that the value of Z score of Uncertain Ltd. is 2.3068 which falls within the Gery area, i.e., within the cut off range between 1.81 and 2.99. Therefore, it cannot be said whether the firm is going to be bankrupt or non-bankrupt. Further investigation is required to determine its solvency status.

Working Notes:

1. Working Capital = Current Assets – Current Liabilities
   = ₹ (1,50,000 + 75,000) – ₹ 5,50,000
   = (₹ 3,25,000)
2. Total Assets = Balance Sheet Total = ₹ 14,25,000
3. No. of Equity Shares = $\frac{\text{Equity Share Capital}}{\text{Face Value per Equity Share}} = \frac{₹2,00,000}{₹10}$ = 20,000 shares
4. Earnings Before Interest and Tax

   Dividend Payout Ratio = $\frac{\text{Dividend per Share}}{\text{Earning Per Share}}$

   Or, 0.50 = $\frac{₹0.40}{\text{Earning Per Share}}$

   ∴ Earning Per Share (EPS) = $\frac{₹0.40}{0.50}$ = ₹ 0.80

Total earnings available to Equity shareholders (E) [Earning per share × No. per share = ₹ 0.80 × 20,000]	16,000
Tax added back @ 50% $\left[\frac{\text{Tax rate}}{1-\text{Tax rate}} \times E\right] = \left[\frac{0.50}{1-0.50} \times 16,000\right]$	16,000
	32,000
Interest added back:	
Debenture Interest = 3,00,000 × $\frac{12}{100}$ = 36,000	
Interest on loan = 2,00,000 × $\frac{10}{100}$ = 20,000	56,000
Earnings Before Interest & Tax (EBIT)	88,000

5. Market Value of Equity Capital

   We know that Price Earnings Ratio =

   ∴ Market Value of each equity share = Price Earnings Ratio × EPS
   = ₹ 15 [Given]×₹ 0.80 [Calculated under (4) above]
   = ₹ 12

   ∴ Market Value of equity capital = No. of Equity Share × Value per Equity Share
   = 20,000 × ₹ 12 = ₹ 2,40,000

10. (a) Risk management process. **[5]**

Answer:

Risk management process refers to the process of measuring or assessing risk and then developing strategies to manage risk. In the risk management, the following steps are taken up to minimize the risk:

Step 1: Risk Identification and Assessment

This step involves event identification and data collection process. The institution has to put in place a system of capturing information either through key risk drivers (KRIs) or through a rating system. Once risks are identified, combine like risks according to the following key areas impacted by the risks — people, mission, physical assets, financial assets, and customer/stakeholder trust.

Step 2: Risk Quantification and Measurement

The next step is to Quantify and Measure risks-this means Rate risks according to probability and impact. Various standard tools are used by financial institutions to measure risk and understand their impact in terms of capital or its importance to the organization through a scoring technique.

Step 3: Risk Analysis, Monitor and Reporting

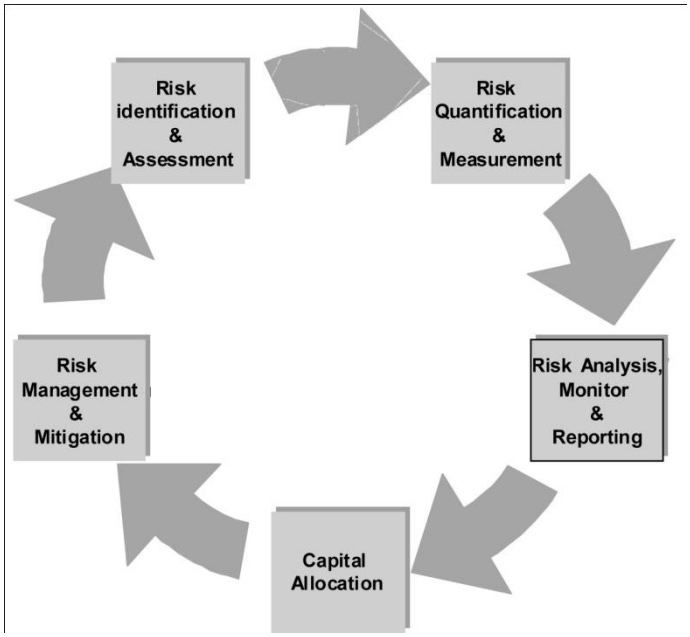
The next step is risk analysis, monitoring and reporting. This will help one to get the big picture and decided on the approach to risk management.

Step 4: Capital Allocation

Risk Analysis, Monitoring & Reporting sends information to the top management of the organization to take strategic decisions. Capital allocation plays key role in management decision making.

Step 5: Risk Management and Mitigation

After the above step, the last step is to make strategic decisions to manage the risk in order to mitigate the risk.



10. (b) Mention the objectives of GACAP. [5]

Answer:

The objectives of this document are:

(i) To codify the GACAP as applied in the Indian industry;

(ii) To narrow down diversities in cost accounting practices facilitating the process of development of cost accounting standards;

(iii) To provide a reference source to industry and practitioners in preparation and attestation of Cost Statements, where specific cost accounting standards are yet to be issued;

(iv) To provide a reference source to all the stakeholders in the understanding and interpreting the cost statement;

(v) To provide a base for monitoring the evaluation of new concepts and practices in cost accounting and to codify them as and when they become generally accepted.