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 analyze the detail of what you have learned	Analyze	Examine in detail the structure of
		Categorize	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritize	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

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.

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

Section –A

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

1. Read the Case let and answer the following questions:

M/s. XYZ Steel Plant is one of the most modern Steel Plants in the country. The plant has a capacity of producing 3 Million tonnes of liquid steel and 2.65 Million tonnes of Saleable Steel. The main products of M/s. XYZ Steel Plant are Angles, Billets, Channels, Beams, Squares, Flats, Round Rebars and Wire Rods. The major units in M/s. XYZ Steel Plant are the Coke Ovens, Sinter Plant, Blast Furnace, Steel Melt Shop. Light and Medium Merchant Mill, Wire Rod Mill and Structural Mill.

The vision of M/s. XYZ Steel Plant is to become a 10 Million tonne World Class integrated Steel Plant by 2019-20. Its mission is to be a continuously growing company through technological upgradation, operational efficiency and expansion, producing steel at international standards of cost and quality, ensuring optimal return on investment to stakeholders and meeting the expectations of the customers. The core values of M/s. XYZ Steel Plant are firm commitment, customer satisfaction, continuous improvement and concern for environment.

Today, M/s. XYZ Steel Plant is moving forward with an aura of confidence with pride to enable the company to reach new heights in organizational excellence. But in the earlier days, the plant could not attain the envisaged capacity levels and financial viability. There were huge cost over-runs and high capital-related charges. High input costs, recession in steel industry, global competition, sluggish economy both in domestic as well as international market, economic crisis-world-wide, the production of steel had declined. M/s. XYZ Steel Plant was labelled as the 'sick child of the industry'. The company had no alternative but to report to BIFR (Board for Industrial and Financial Reconstruction). Following this, the company was directed to formulate a 'turnaround' strategy for long-term financial viability of the plant. The capital restructuring proposal of the company was rejected by the government.

The major step taken by the company was an aggressive treasury management. Rescheduling of high cost loans, obtaining softer interest loans from banks, securing cheaper lines of credit for import of raw materials, issue of non-cumulative preference shares, increasing the authorized share-capital, reduction on long-term loans, generation of wealth, made out of internal generation through various measures-were some of the steps taken to tide over this situation.

The plant had taken innovative steps to operate consistently beyond rated capacities in all the production units. Efficient operation management coupled with optimum waste utilization and improved techno-economic parameters, along with cost reduction

measures have been the major contributing factors that led to the companies' turn-around.

With regard to the techno-economic front, during the period 1998-99 till date, the plant has made a significant improvement in the specific energy consumption, average converter life, rolling rate, total coke rate, and fuel consumption. Thrust was given for recycling of metallurgical waste. Initiatives taken to recycle the solid waste and utilizing them led to a saving of raw material consumption.

Another major strategy of the company that resulted in the turnaround of the company is various cost reduction measures taken in the plant production. Further, the company had laid emphasis on total involvement by workers' participation in management through suggestion schemes, which played a major role in the rapid growth of techno-economic parameter and the labour productivity.

Required:

(a) Mention the principles of Business Process Re-engineering.

(b) State the reasons for which M/s. XYZ Steel Plant faced challenges for implementing the Business Process Re-engineering.

(c) What strategies are taken by M/s. XYZ Steel Plant for facing the challenge?

(d) Describe the objectives of the Business Process Re- Engineering (BPR). [4+4+5+7]

Answer:

(a)The Principles of Business Process Re-engineering:
The following are the principles of Business Process Re-engineering that can be applied to streamline the work process and thereby achieve significant levels of improvement in quality, time management and cost:

- Organize around outcomes, not tasks
- Identify all the processes in an organization and prioritize them in order of redesign urgency
- Integrate information processing work into the real work that produces the information
- Treat geographically dispersed resources as though they were centralized
- Link parallel activities in the workflow instead of just integrating their results.
- Put the decision point where the work is performed and build control into the process.
- Capture information once and at the source.

By the mid-I990's, BPR gained the reputation of being a nice way of "downsizing". But the lack of sustained management commitment and leadership, unrealistic scope and expectations and resistance to change-prompted management to abandon the concept of BPR and embrace the next new methodology-'Enterprise Resource Planning'(ERP).

BPR is also known as Business Process Re-design, Business Transformation or Business Process Change Management.

(b)Reasons for which M/s. XYZ Ltd. faced challenges for implementing the Business Process Re-engineering:
M/s. XYZ Ltd., in its earlier years, could not attain envisaged capacity levels and financial viability. High capital cost, large borrowing, huge cost over-runs, high capital-related charges, high input costs, high raw materials prices, recession in the steel industry, intense global competition, sluggish economy both in the domestic and international markets, reduction in sales turnover, economic crisis in World wide -were the reasons for the poor show by M/s.XYZ Ltd.,

Due to all these constraints faced by M/s.XYZ Ltd., it was written off as the 'sick child of the industry.' M/s.XYZ Ltd., had to report the fact to BIFR (Board for Industrial and Financial Reconstruction) as the accumulated losses were necessitating deportability for potential sickness. M/s.XYZ Ltd., was directed to formulate a turnaround strategy for long-term financial viability of the plant. M/s.XYZ Ltd., had submitted a capital restructuring proposal to the government, which was rejected.

(c) Strategies taken by M/s.XYZ Ltd. for facing the challenge:

The major step taken by the company was an aggressive treasury management. Rescheduling of high cost loans, obtaining softer interest loans from banks, securing cheaper lines of credit for import of raw materials, issue of non-cumulative preference shares, increasing the authorized share-capital, reduction on long-term loans, generation of wealth, made out of internal generation through various measures-were some of the steps taken to tide over the situation.

The plant had taken innovative steps to operate consistently beyond rated capacities in all the production units. Efficient operation management coupled with optimum waste utilization and improved techno-economic parameters, along with cost reduction measures have been the major contributing factors that led to the companies' turn-around.

With regard to the techno-economic front, during the period 1998-99 till date, the plant has made a significant improvement in the specific energy consumption, average converter life, rolling rate, total coke rate, and fuel consumption. Thrust was given for recycling of metallurgical waste. Initiatives taken to recycle the solid waste and utilizing them led to a saving of raw material consumption.

Another major strategy of the company that resulted in the turnaround of the company is various cost reduction measures taken in the plant production. Further, the company had laid emphasis on total involvement by workers' participation in management through suggestion schemes, which played a major role in the rapid growth of techno-economic parameter and the labour productivity.

(d) Objectives of BPR

When applying the BPR management technique to a business organization the implementation team effort is focused on the following objectives:

(i) Customer focus: Customer service oriented processes aiming to eliminate customer complaints.

(ii) Speed: Dramatic compression of the time it takes to complete a task for key business processes. For instance, if process before BPR had an average cycle time 5 hours, after BPR the average cycle time should be cut down to half an hour.

(iii) Compression: Cutting major tasks of cost and capital, throughout the value chain. Organizing the processes a company develops transparency throughout the operational level reducing cost. For instance the decision to buy a large amount of raw material at 50% discount is connected to eleven cross checking in the organizational structure from cash flow, inventory, to production planning and marketing. This checking's become easily implemented within the cross-functional teams, optimizing the decision making and cutting operational cost.

(iv) Flexibility: Adaptive processes and structures to changing conditions and competition. Being closer to the customer the company can develop the awareness mechanisms to rapidly spot the weak points and adapt to new requirements of the market.

(v) Quality: Obsession with the superior service and value to the customers. The level of quality is always the same controlled and monitored by the processes, and does not depend mainly on the person, who servicing the customer.

(vi) Innovation: Leadership through imaginative change providing to organization competitive advantage.

(vii) Productivity: Improve drastically effectiveness and efficiency.

In order to achieve the above mentioned adjectives the following BPR project methodology is proposed.

2 (a) Arnab Ltd. Co. has different divisions which are working as Strategic Business Units. Division A of the company is a profit making centre, which produces four products W, X, Y & Z. Each product is sold in the external market and the company has provided the following information:

	W	X	Y	Z
Market Price per unit (₹)	**150**	**146**	**140**	**130**
Variable cost of production per unit	**130**	**100**	**90**	**85**
Labour Hours required per unit	**3**	**4**	**2**	**3**

Product Z can be transferred to Division B but the maximum quantity that may be required for transfer is 2,500 units of Z.

	W	X	Y	Z
The maximum sales in the external market (units)	**2,800**	**2,500**	**2,300**	**1,600**

Division B can purchase the same product at a price of ₹ 125 per unit from outside instead of receiving transfer of product Z from Division A.

You are required to calculate the transfer price for each unit for 2,500 units of Z, if the total labour hours available in division A are:

(i) 20,000 hours

(ii) 30,000 hours **[10]**

Answer:

(i) Key Factor Allocation for External Sales purposes

	Particulars	W	X	Y	Z	Total
(a)	Sale Quantity	2,800	2,500	2,300	1,600	
(b)	Labour Hours required per unit	3	4	2	3	
(c)	Total Hours required for Sale Quantity (axb)	8,400	10,000	4,600	4,800	27,800
(d)	Selling Price per unit	150	146	140	130	
(e)	Variable Cost per unit	130	100	90	85	
(f)	Contribution per unit (d-e)	20	46	50	45	
(g)	Contribution per hour (f ÷ b)	6.67	11.50	25.00	15.00	
(h)	Rank	IV	III	I	II	
(i)	Allocation of 20,000 hours for production	600 (Bal)	10,000	4,600	4,800	20,000
(j)	Allocation of 30,000 hours for production	8,400	10,000	4,600	4,800	27,800

(ii) Computation of Transfer Prices

Hours Available	20,000 hours	30,000 hours
Int. Tfr Quantity	2,500 units of Z	2,500 units of Z
Time reqd. for Tfr	2500x3=7,500 hours	2500x3=7,500 hours
Time Diversion & Opportunity Costs	First 600 hrs from W at 6.67 per hr = 4,000 6,900 hrs from x at 11.50 per hour = 79,350 83,350	First 2,200 hrs = Spare capacity = Nil Next 5,300 hrs from W at 6.67 per hr = 35,350 35,350
Opp. cost per unit Variable costs per	₹ 33.34 (83,350/2,500)	₹ 14.14 (35,350/2,500)

unit	₹ 85.00 (given)	₹ 85.00 (given)
Minimum Transfer Price	₹ 118.34 per unit	₹99.14 per unit
Maximum Transfer Price	₹ 125.00 per unit.	₹ 125.00 per unit.

(b) Discuss the difference between structural Cost Drivers and Executional Cost Drivers. [3]

Answer:

Structural Cost Drivers	Executional Cost Drivers
They consist of organizational **factors** that determine the economic structure driving the cost of Firm's products.	They capture a Firm's **operational decisions** of how best to employ its resources to achieve its goal and objectives.
These cost drivers reflect a Firm's **long- term decisions,** which position the Firm in its industry and marketplace.	These Cost Drivers are determined by management policy, style and culture. They are comparatively **short-term.**
Structural Cost Drivers **may change.**	Executional Cost Drivers **may improve.**

(c) Yonex India Ltd. is segmented into three divisions A, B and C. All were formed in the same year and now all assets have left exactly one-half of their expected life. Top management is attempting to determine which of the division is the most profitable. The following data have been prepared for your analysis:

Particulars	Division		
	A (₹)	B (₹)	C (₹)
Net income before taxes	**78,000**	**90,000**	**96,000**
Investment base-gross book value	**3,90,000**	**5,00,000**	**6,00,000**
Investment base-net book value	**1,95,000**	**2,50,000**	**3,00,000**

Prepare rankings of the three divisions using ROI and RI with a capital charge of 12.5% that each division manager might use to assert that here is the most profitable division. [7]

Answer:

$$\text{ROI} = \frac{\text{Net income}}{\text{Net investment}}$$

1. ROI (gross book value)

Div A $\frac{78,000}{3,90,000} \times 100 = 20\%$

Div B $\frac{90,000}{5,00,000} \times 100 = 18\%$

Div C $\frac{96,000}{6,00,000} \times 100 = 16\%$

2. ROI (Net book value)

Div A $\frac{78,000}{1,95,000} \times 100 = 40\%$

Div B $\frac{90,000}{2,50,000} \times 100 = 36\%$

Div C $\frac{96,000}{3,00,000} \times 100 = 32\%$

Residual Incomes Basis

RI = Net income – (Interest charge × Investment employed)

Gross Book Value

RI Div A $78,000 - \left(\frac{25}{200} \times 3,90,000\right) = ₹\ 29,250$

RI Div B $90,000 - \left(\frac{25}{200} \times 5,00,000\right) = ₹\ 27,500$

RI Div C $96,000 - \left(\frac{25}{200} \times 6,00,000\right) = ₹\ 21,000$

Net Book Value

RI Div A $78,000 - \left(\frac{25}{200} \times 1,95,000\right) = ₹\ 53,625$

RI Div B $90,000 - \left(\frac{25}{200} \times 2,50,000\right) = ₹\ 58,750$

RI Div C $96,000 - \left(\frac{25}{200} \times 3,00,000\right) = ₹\ 58,500$

Ranking

ROI	RI (Gross Value)	RI (Net Value)
A	A	B
B	B	C
C	C	A

3 (a) Explain the steps in implementing EVA. [4]

Answer:

The implementation of EVA is a four stepped process which include: (a) Measurement, (b) Management System, (c) Motivation, and (d) Mindset.

(a) **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.

(b) **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.

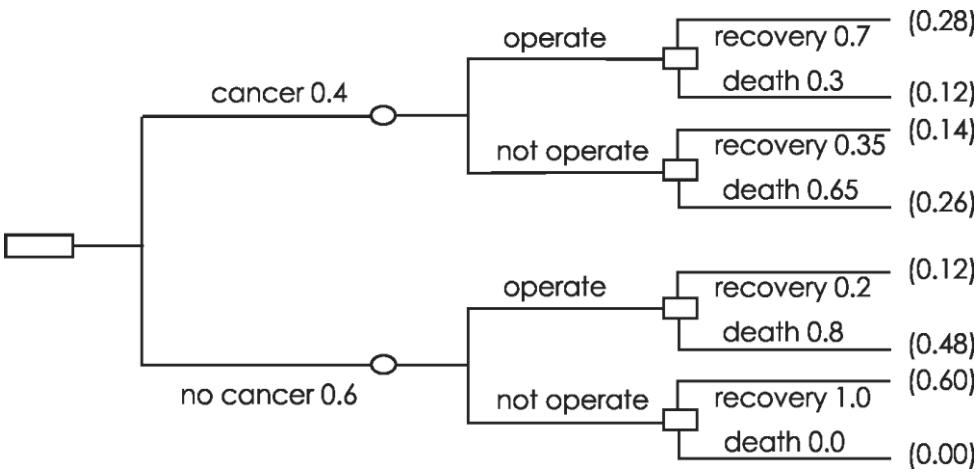
(c) **Motivation –** The company should decide to implement EVA only if it is prepared to implement the incentive plan that goes with it. An EVA based incentive system, however, encourages managers to operate in such a way as to maximize the EVA, not just of the operations it oversees but of the company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

(d) **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.

(b) There is 40% chance that a patient admitted to the hospital is suffering from Cancer. A doctor has to decide whether a serious operation should be performed or not. If the patient is suffering from Cancer and the serious operation is performed, the chance that he will recover is 70%, Otherwise it is 35%. On the other hand, if the patient is not suffering from Cancer and the serious operation is performed, the chance that he will recover is 20%, otherwise it is 100%. Assume that recovery and death are the only possible results.

Construct an appropriate decision tree. What decision should the doctor take? [5+5]

Answer:



The decision tree has been constructed as per the problem.
Probability of recovery on operation = 0.28 + 0.12 = 0.40
Probability of recovery for no operation = 0.14 + 0.60 = 0.74
As 0.74 is >0.40, so the operation should not be done for recovery.

(c) Discuss the difference between Traditional Management Accounting and Value chain Analysis. [6]

Answer:

Difference between Traditional Management Accounting and Value Chain Analysis

Particulars	Traditional Management Accounting	Value Chain Analysis
Focus	Internal	External
Perspective	Seeks cost reduction in "value added" process , i.e. Sale Price less Cost of Raw material	Seeks competitive advantage based on entire set of linked activities from suppliers to end-use customer.
Number of cost Driver	Cost is generally based on volume of production and sales	Multiple Cost Drivers are adopted ,i.e. – •**Structural Drivers** (e.g. scale, scope, experience, technology and complexity) •**Executional drivers** (e.g. participative management and plant lay out)

Use of cost Driver	Application at the overall firm level (Cost – Volume – Profit analysis)	A set of unique Cost Drivers is used for each value activity.
Cost Preferences	Focus on control of manufacturing costs.	Focus on gaining advantage and not only on cost control and cost reduction.
Benchmarking	Partially present. Inter Firm comparison, if any is generally restricted to financial and not operational information.	Focus on full – fledge benchmarking, "Learning from competitors", but exploiting one's own strengths to gain advantage.

4(a) (i) The cost function 'c' of a firm = $\frac{1}{3}X^3 - X^2 + 5x + 3$, find the level at which the marginal cost and the average variable cost attain their respective minimum. [5]

Answer:

$C = \frac{1}{3}x^3 - x^2 + 5x + 3$

Marginal Cost = $\frac{dc}{dx} = \frac{1}{3}3x^2 - 2x + 5$

$= x^2 - 2x + 5$ ('y' say)

$\frac{dy}{dx} = 2x - 2 = 0$

$\therefore x = 1$

$\frac{d^2y}{dx^2} = 2$, which is positive

$\therefore$ Marginal cost is minimum at x = 1

Average variable Cost = $\frac{1}{3}x^2 - x + 5$ (y say)

$\frac{d}{dx}$ {Average variable cost} = $\frac{1}{3}\ 2x - 1 = 0$

$=> \frac{2}{3}x = 1$

$\therefore x = \frac{3}{2}$

$\frac{d^2y}{dx^2} = \frac{2}{3}$, positive

$\therefore$ Average variable cost is minimum at output x = $\frac{3}{2}$

(ii) The total cost (C) and the total revenue ® 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. [6]

Answer:

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

$R = 3x^3 - 3x^2 + 656x$

Profit = $3x^3 - 3x^2 + 656x - x^3 - 60x^2 - 8x$

$= 2x^3 – 63x^2 + 648x = (p)$

Derivative w. r. to x

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

$X^2 – 21x + 108 = 0$

$X^2 – 9x\text{-}12x + 108 = 0$

$x(x – 9) – 12(x – 9) = 0$

$(x – 12)\ (x – 9) = 0;$

$X = 12 \text{ or } 9$

$\frac{d^2p}{dx^2} = 2x – 21$

At x = 9

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

$\therefore$ P is maximum at x = 9

At x = 12

$\frac{d^2p}{dx^2} = 24 – 21 = 3 > 0$

$\therefore$ P is minimum at x = 12

$P = 2x^3 – 63x^2 + 648x$

At x = 9

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

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

(b) Explain the advantages and disadvantages of EBITDA. [3]

Answer:

Advantages	Disadvantages
It is a proxy for cash flow from operations and is therefore a measure of underlying performance.	It ignores changes in working capital and their impact on cash flow.
Tax and interest are externally generated and therefore not relevant to the underlying success of the business.	It fails to consider the amount of fixed asset replacement needed by the business.
Depreciation and amortization represent a write off of expenditure over a number of years and might therefore be excluded when examining the performance of a particular year.	It can easily be manipulated by aggressive accounting policies related to income recognition and capitalization of expenses.

(c) Discuss the benefits of Branding. **[6]**

Answer:
Branding provides benefits to both the Buyers and Sellers.
To Buyer:
- Help buyers identify the product that they like/dislike.
- Identify marketer.
- Helps reduce the time needed for purchase.
- Helps buyers evaluate quality of products especially if unable to judge the product characteristics.
- Helps reduce buyer's perceived risk of purchase.

To Seller:
- Differentiate product offering from competitors.
- Helps segment market by creating tailored images.
- Reduces price comparisons.
- Brand identifies the companies' products making repeat purchases easier for customers.

Section – B
[Answer any two questions]

5 (a) Explain the concept of DATA WAREHOUSES. **[5]**

Answer:

Data Warehousing (DW): Data Warehousing is the science of storing data for the purpose of meaningful future analysis. It deals with the mechanism of electronically storing and retrieving data so that some analysis can be performed on that data to corroborate and support a business decision or to predict a business outcome. DW technologies provide historical, current and predictive views of business operations by analyzing the present and historical business data. Data analysis is often done using visualization techniques that turn complex data into images that tells compelling story. Raw data by this process of analysis help management take right decisions.

Once the data is there in Data Warehouse, business intelligence techniques can be applied to that data for analysis and reporting.

A DW is a subject oriented, non-volatile, integrated, time-variant collection of data, in support of management's decisions. Thus DW is an electronically stored collection of integrated data that can be used for the purpose of intelligent analysis.

Although the existence of a DW is not a pre-requisite for data-mining, in practice, the task of data mining, especially for large companies, is made a lot easier by having access to a data warehouse. A primary goal of a DW is to increase the "intelligence" of a decision process and the knowledge of the people involved in this process.

A DW can be viewed as an organization's repository of data, set up to support strategic decision-making. The function of the DW is to store the historical data of an organization in an integrated manner that reflects the various facets of the organization and business. The data in a warehouse are never updated but used only to respond to queries from end users who are generally decision-makers.

Typically, a DW's are huge, storing billions of records. In many instances, an organization may have several local or departmental DW s often called as Data Marts. A Data Mart is a DW that has been designed to meet the needs of a specific group of users. It may be large or small, depending on the subject area.

(b) Discuss the importance of Decision Support Systems for gaining the Competitive Advantage. [5]

Answer:

Decision Support Systems (DSS):
In a world of constant flux, informed and thoughtful decision-making is the cornerstone of business success. As a manager, you must make decisions that affect your business every day, some critical and some not so important. DSS allow faster decision-making, identification of negative trends and better allocation of business resources all to the benefit of you and your organization. DSS are a specific class of computer-based information systems that support your decision-making activities. A DSS analyses business data and provides inter-active information support to managers and business professionals during the decision-making process, from problem recognition to implementing your decision.

DSS use:
(i) Analytical models
(ii) Specialized databases
(iii) A Decision maker's own insights and judgments and
(iv) An interactive, computer-based modeling process to support semi-structured business decisions.

A key component to any DSS is Business Intelligence reporting tools and methodologies. These provide us with rich reporting, monitoring and data analysis, which are necessary for effective and fast decision-making.

Gain Competitive Advantage with DSS:
One way of gaining competitive advantage is through the use of Computerized DSS.
The other benefits of DSS are:

- Speeding up process of decision-making
- Increasing organizational control
- Speeding up problem-solving in an organization
- Helping automate managerial processes
- Improving personal efficiency
- Eliminating value chain activities.

6(a) "Data Mining is a process of discovering various models, summaries and derived values from a given collection of data." Discuss it and state the problem of adoption of Data Mining Process. [4]

Answer:
Data Mining: Data Mining is a process of discovering various models, summaries and derived values from a given collection of data. Data Mining is not simply a collection of isolated tools, each completely different from the other and waiting to be matched to the problem. In practice, Data Mining becomes an iterative process. One studies the data, examines it using some analytic technique, decides to look at it another way, perhaps modifying it and then goes back to the beginning and applies another data - analysis tool, reaching either better or different results. This can go round and round many times.

The general experimental procedure adapted to data -mining problems involves the following steps:

(i)Collect the data: This step is concerned with how the data are generated and collected.

(ii)Pre -processing the data: In the observational setting, data are usually 'collected' from the existing data - bases, data warehouses and Data Marts.

(iii)Estimate the model: The selection and implementation of the appropriate data - mining technique is the main task in this phase.

(iv)Interpretation of the model and drawing conclusions: In most cases, Data - mining models should help in decision - making.

All phases, separately and the entire data - mining process, as a whole, are highly iterative. A good understanding of the whole process is important for any successful application. No matter, how powerful the data -mining method are, the resulting model will not be valid if the data are not collected and pre processed correctly or if the problem formulation is not meaningful.

(b) Explain the term "Business Intelligence". How you would choose the right business solution? [4+2]

Answer:

Business Intelligence (BI) is the ways in which we store and use business information. It encompasses the technologies, applications, and means for collecting, integrating, analyzing, and presenting business data. Using data that has been stored in a data warehouse, software applications are able to use this data to report past business information as well as predict future business information, including trends, threats, opportunities and patterns. Popular BI applications are very complex and experts in this field are in high demand. Some of the currently popular enterprise level systems, which can manage information about all of the business functions and systems, are sold and implemented by Oracle, SAP, IBM, and Hewlett Packard (H.P). Companies often need in - house experts in these systems to assist with the implementation and the on-going use of these systems, which are quite complex! Business Intelligence is becoming a critically important tool that can allow your company to better understand your customers and suppliers, or measure the efficiency of your own internal operations. If you are new to BI, try reading our Business Intelligence Overview first. Now, it's time to start planning a new BI project. You will need to design the right BI solution for the kind of analysis you plan to do, and evaluate your existing IT infrastructure to ensure that it can support this kind of solution.

Choosing the Right BI Solution:

BI tools offer functionality ranging from simple reports to drill - down analytical solutions targeted at specific industries and operational environments. When choosing a Business Intelligence solution, firms need to ask two key questions; (i) What kind of data needs to be analyzed and where does it come from? Many packaged application and database vendors include some BI functionality in their core product, and if you plan to source all of your data from the same application or database, you may not need to buy additional products. However, this strategy may also limit the analytical range, (ii) who will be doing the analysis and how do they need to receive the results? Historically, report or analysis requests would be sent to the IT department, which would then code and generate the report. Today, BI is on the front lines of business and the tools may well be used by executives or sales and marketing professionals. As a result, firms need to know the technical capabilities of the end user upfront.

7. Define the following terms in the context of Supply Chain Management: [5×2]
(i) Quality
(ii) Promotions
(iii) Strategic Alliance
(iv) Agreement
(v) Forecast Error

Answer:
(i) Quality:
It stands for conformance to requirements or fitness for use. Quality can be defined through five principal approaches:

- Transcendent quality is an ideal condition of excellence.
- Product-based quality is based on a product attribute.
- User-based quality is fitness for use.
- (iv)Manufacturing-based quality is conformance to requirements.
- Value-based quality is the degree of excellence at an acceptable price.

Also, quality has two major components:

- Quality of conformance-quality is defined by the absence of defects and
- (ii)Quality of design-quality is measured by the degree of customer satisfaction with a product's characteristics and features.

(ii) Promotions
It is one amongst the 4 P's viz., Product, Price, Place and Promotion that constitute the set of tools used to direct the business offering to the customer. Promotion is the mechanism whereby information about the product offering is communicated to the customer and includes public relations, advertising, sales promotions and other tools to persuade customers to purchase the product offering.

(iii) Strategic Alliance
It is a relationship formed by two or more organizations that share (proprietary), participate in joint investments and develop linked and common processes to increase the performance of both companies. Many organizations form strategic alliances to increase the performance of their common supply chain.

(iv) 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. Arbitration and conflict resolution mechanisms should also be included in the contract because even the best written agreements are subject to misinterpretation. 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.

(v) 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.

Section – C
[Answer any two questions]

8 (a) Describe the stagnation Risk in the context of Corporate Risk. [4]

Answer:

Stagnation Risk
This risk is associated with the stagnation of a company caused by a sudden fall in demand due to a recession. This risk has to be faced by almost all industries in the country. The unexpected nature of such a risk has left many companies high and dry as shown by the 2008 financial meltdown. When a company is exposed to such a risk, even fixed/committed costs cannot be recovered as the level of operations is usually far below the breakeven point.
Stagnation risk, due to its suddenness, has also left many companies with high inventory holdings of raw materials and components. Some companies have even had high product inventories due to earlier commitments that were subsequently not met because of recession. The unevenness of the stagnation risk is another feature and compounds the risk of an inability to meet commitments to vendors and labour.
The impact of this risk is heightened as the time frame of a recession is not finite especially if it aggravates into a depression, compounding into a chain reaction that will necessitate layoffs, temporary suspension of production etc. For example, when an automobile company is affected by stagnation, all the components manufacturers that are supplying the products to the company also suffer because the derived demand unexpectedly comes under pressure. These components manufacturers essentially are small-medium enterprises and do not have the resilience or the staying power required to fight out a recession.

(b) Explain about the Systematic Risk and Unsystematic Risk. [6]

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.

9 (a) Explain about the Multiple Discriminant Analysis (MDA). [4]

Answer:

The discriminant analysis is a type of multivariate technique that allows differentiating between two or more groups of objects with respect to several variables simultaneously. MDA is used to classify an observation (the firm here) into one of several a priori groupings (the bankrupt and non-bankrupt, in our case) dependent upon the observation's individual characteristics.

Under usual assumptions of regression analysis, the MDA model is a linear combination of the discriminatory variables of the following form:

$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots \beta_n X_n$ ..... [A]

Where Z is a transformed value (score) of [A] used to classify the object, α is a constant, β_n are discriminant coefficients, and X_n are values of independent discriminatory variables.

Due to the nature of Z that is actually a resultant score of linear combination of X variables in [A], estimates of discriminant coefficients are obtained following a specialized discriminant model estimation procedure. The classification typically involves defining some notion of distance between the case and each group centroids with the case being classified into the closest group. The results are, usually, presented in a classification matrix (also called accuracy matrix), which is often used to test the accuracy of the classification procedure too. The percentage of the known cases, which are correctly classified, is an additional measure of group differences. As a direct measure of predictive accuracy, this percentage is the most intuitive measure of discrimination and can be used to test the power of classification procedure.

As with any inferential technique based on sample data, the percent correct prediction overestimates the power of the classification procedure. A remedy is to use a hold out sample. One can validate the classification procedure by randomly splitting the sample into two subsets. One subset is used to derive the function and the other to test the classification.

(b) Explain about the Asset Liability Management. [6]

Answer:

Risks encountered in portfolio management need to be addressed more emphatically. In passive portfolio management, normally the mean variance and mean absolute deviation are employed to arrive at an optimal fixed mix strategy. However, this method does not recognize the high volatility in financial markets and as such the volatility risk is not addressed. However, active portfolio management is more aggressive, and involves reviewing the initial investment strategy every time rebalancing of the portfolio is required. Carino and Turner (1998) present the superiority of dynamic asset allocation framework using stochastic programming applications. Any financial planning strategy should be such that the mix of asset classes in a portfolio is able to grow and satisfy future goals with the best possible returns. This is the crux of asset liability management.

Asset liability management applications with the aid of stochastic programming conceptualize the problem of creating a portfolio by allocating a set of assets. The investor needs to decide the three factors, namely:

- Amount of assets to buy
- Amount of assets to sell

• Amount of assets to hold

The indices are defined and the problem parameters and decision variables are set out so that the stochastic programming model can develop a solution.

In this deterministic model, uncertainty is introduced to take care of risk. A refinement to the deterministic model is to apply a more sophisticated technique for estimation of asset prices that takes into consideration any unusual occurrence in the market as well as volatility. Sub-models based on randomness are introduced into the programming to take care of the risk as well. The randomness introduced is able to generate a set of scenarios which can be incorporated into the optimization model.

This model can be further improved using a two-stage stochastic program because an investor tries to use this model for making a contingent decision involving future risk. The first stage involves fixing a time period for stage two observation followed by finally taking a decision. The observation part of it can be likened to a 'wait and see' period of observation.

Asset liability management model can also be conceptualized as a method to compute the matching of assets and liabilities to generate a cautious investment portfolio. The purpose of this model is to optimize risk-adjusted returns to the shareholders over a long run. Two approaches for matching assets and liabilities are as follows:

Duration: This is defined as a measure of price sensitivity in relation to interest rates. It refers to the weighted average maturity where the weights are applied in terms of present value. This can be represented by the following formula:

Modified duration =Duration / [1+ (Yield to maturity/Number of coupon payments per year)]

Convexity: This is defined as the change in duration corresponding to changes in yield as follows:

Convexity = $(P_+ + P_- - 2P_0)/ 2P_o ((\Delta i)_2)$

where

Δ i = Change in yield (in decimals)

P_o = Initial price

P_+ = Price if yields increase by Δi

P_- =Price if yields decline by Δi

Combining convexity and duration is a good approach to examining the influence on change in yield on the market values of assets and liabilities.

The asset management model can also be employed to manage liquidity risk. Assets and liabilities can be arranged according to their maturity pattern in a time frame. Applying gap analysis, the differential between maturing assets and maturing liabilities are computed. If the gap is positive, then assets exceed liabilities; if it is negative, infusion of funds would be necessary either through sale of assets or creating new liabilities or a rollover of existing liabilities.

This model can also be applied to exchange rate risk management. Financial institutions match their assets and liabilities at a particular exchange rate. Fluctuations in the exchange rate obviously disturb the balance. This risk is corrected by matching the assets and liabilities in the same currency. The risk of foreign exchange borrowings can also be passed on to the lenders through foreign currency loans. The uncovered borrowings can be hedged through forward covers for the entire amount.

10. Following is the Balance Sheet of a company as on 31st March, 2015:

Equity & Liabilities	₹	Assets	₹
(1) Shareholder Fund:		**(1) Non – Current Assets**	
(a) Share Capital (@₹ 100 each)	**4,00,000**	**(a) Fixed Assets**	**10,00,000**
(b) Reserves & Surplus	**2,00,000**	**(b) Non Current Investment**	**2,00,000**
		- Trade Investment	
		(2) Current Assets	
		(i)Inventory	**1,25,000**
(2) Non – Current Liabilities:		**(ii) Book Debts**	**75,000**
- 12% Debentures	**3,00,000**		
- 10% Bank Loan	**2,00,000**		
(3) Current Liabilities	**3,00,000**		
	14,00,000		**14,00,000**

Additional Information:

(i) Net sales for 2014-15 were ₹20,00,000.

(ii) Price-Earnings Ratio is ₹10.

(iii) Dividend Pay-out Ratio is 50%.

(iv) Dividend per Share in 2014-15 is ₹20.

(v) Corporate Tax Rate is 50%.

Using Altman's Model, calculate the Z-score of the company and interpret the result. [10]

Answer:

As per Altman's Model of Corporate Distress Prediction

$Z\text{-score} = 1.2\ X_1 + 1.4\ X_2 + 3.3\ X_3 + 0.6\ X_4 + 1.0\ X_5$

Here, the five variables are as follows:

X_1 = Working Capital to Total Assets = $\frac{(1,00,000^{1})}{14,00,000^{2}}$ = (0.07143)

X_2 = Retained Earnings to Total Assets = $\frac{2,00,000^{3}}{14,00,000^{2}}$ = 0.1428

X_3 = EBIT to Total Assets = $\frac{3,76,000^{4}}{14,00,000^{2}}$ = 0.2686.

X_4 = Market Value of Equity to Book Value of Total Debt = $\frac{16,00,000^{5}}{8,00,000^{6}}$ = 2

X_5 = Sales to Total Assets = $\frac{20,00,000}{14,00,000^{2}}$ = 1.4286

Therefore, Z-score = {1.2 × (-) 0.07143} + (1.4 × 0.1428) + (3.3 × 0.2686) + (0.6 × 2) + (1 × 1.4286)

= -0.0857 + 0.1999 + 0.8864 + 1.2 + 1.4286 = 3.6292

Working Notes

(i) Calculation of Working Capital
Working Capital = Current Assets – Current Liabilities
Here, Working Capital = (Stock + Debtors) – Current Liabilities
= (1,25,000 + 75,000) – 3,00,000
= (₹ 1,00,000)

(ii) Calculation of Total Assets
Total Assets = Fixed Assets + Investments + Current Assets
Here, Total Assets = 10,00,000 + 2,00,000 + (1,25,000 + 75,000) = ₹ 14,00,000.

(iii) Calculation of Earnings before Interest & Tax (EBIT)

$$\text{Dividend Payout Ratio} = \frac{\text{Dividend per Share (DPS)}}{\text{Earnings per Share (EPS)}}$$

Here, Dividend Payout Ratio = 50% and DPS in 2014 - 15 = ₹ 20.

$$\textbf{Hence, EPS} = \frac{\text{DPS}}{\text{Dividend payout Ratio}} = \frac{₹20}{50\%} = ₹\ 40$$

$$\textbf{Here, Number of Equity Shares} = \frac{₹4,00,000}{₹100} = 4,000$$

Particulars	₹
∴ Earnings available to equity shareholders = 4,000 × ₹ 40 =	1,60,000
Add: Corporate tax added back ($\frac{50}{50}$ × 1,60,000) =	1,60,000
Earnings Before Tax (EBT)	3,20,000
Add: Interest on loan added back:	
On Debentures (12% on 3,00,000) = ₹ 36,000	
On Bank Loan (10% on 2,00,000) = ₹ 20,000	56,000
Earnings Before Interest & Tax (EBIT)	3,76,000

(iv) Calculation of Market Value of Equity Shares

$$\text{Price Earnings Ratio} = \frac{\text{Market Value per Equity Share (MPS)}}{\text{Earnings per Share (EPS)}}$$

Here, Price Earnings Ratio = 10 and EPS in = ₹ 40

Hence, market Value per Equity Share (MPS) = Price Earnings Ratio × EPS
= 10 × 40 = ₹ 400
Market Value of Equity Shares = 4,000 shares × ₹ 400 = ₹ 16,00,000

(v) Calculation of Book Value of Total Debts
Book Value of Total Debts = Long–term Debts + Current Liabilities
Here, Book Value of Total Debts =12% Debentures + 10% Bank Loan + Current Liabilities
= 3,00,000 + 2,00,000 + 3,00,000 = ₹ 8,00,000

Comment:
As the calculated value of Z-score is much more greater than 2.99, it can be strongly predicted that the company is a non-bankrupt company (i.e., non-failed company).