Paper-17: Strategic Performance Management

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

Whenever necessary, suitable assumptions should be made and indicate in answer by the candidates.
Working Notes should be form part of your answer

Section –A
[Question 1 and 2 are compulsory and answer any 3 from the rest]

1 Read the following case study and answer the following questions:

The Royal Bank of Canada (RBC) is one of Canada's largest banks as measured by assets and market capitalization, and is among the largest 20 banks globally by market capitalization. RBC provides personal and commercial banking, wealth management services, insurance, corporate, investment banking and transaction processing services on a global basis. The bank currently employs some 74,000 full- and part-time employees who serve more than 15 million personal, businesses, public sector and institutional clients through offices in Canada, the US and 56 other countries. RBC holds strong market positions in the following business segments: Canadian Banking, Wealth Management, International Banking, Capital Markets and Insurance. RBC has long been regarded as a leading pioneer and best-practice exemplar in CRM.

RBC's business philosophy focuses on always earning the right to be its clients' first choice. In the competitive world of financial services, RBC knew that it needed to have a vision and methodology to drive its customer first mission and meet the ever-changing business needs of its customers. When it was looking at methods for improving customer experience, RBC focused on making it easier for clients to get rapid and predictable responses to their inquiries and requests.

This initiative focused on increasing the productivity and improving the efficiency of RBC's inquiry management processes. Client requests arrive in RBC's service centers through multiple channels, including phone, branch, fax, e-mail and mail. Within RBC's Canadian Operations, requests are sent in from staff in eight different geographic regions to 14 different service fulfillment groups. Each group uses different systems and processes to manage its work, which raises the question of 'which operations team do I need to contact to help resolve this issue and how do I best engage them for a quick turnaround?' With such a complex web of fulfillment options, customer service representatives were challenged to find the right path for specific client inquiries, how to accurately set client expectations on response times, and provide updates on existing requests.

A key business issue for RBC was that its large, diverse customer support staff, distributed over diverse geographies, had to address the high service experience demands of its customers. This needed to be achieved while reducing operational costs, increasing organizational transparency and complying with regulatory mandates

Management is using the CRM system tools. RBC identified Smart BPM as the key technology to deliver an end-to-end rebuild of their client inquiry and problem resolution process, creating a single system across channels and lines of business. Smart BPM would serve as the backbone for their 'new client action and request tool' (CART).

This was delivered so successfully that when the system was first rolled out there was no need for any formalized end-user training. The field service staffs were able to click on the 'create a new client request' button and successfully drive the process through to resolution. Additionally, it helped to determine that many cases were requests that could be resolved

right at the point of contact and also avoided doubling effort. Once requests were captured into, the system, the process automation capabilities of the Smart BPM start it's servicing. This involved:

- **automatically looking up supporting customer information to enrich the request with required data to help resolve it;**
- **automatically determining the correct support group, location and even individual for routing and presentation;**
- **automatically generating supporting forms and correspondence as well as receiving inbound materials supplied by the customer or other support groups.**

Required:

(a) Define the Customer Relationship Management.

(b) What are the steps taken by the Bank to face the challenge?

(c) If you are appointed as a CEO of this Bank, would you agree the implementation of systems?

(d) Mention the objectives of the using of CRM applications. [5+5+3+2]

Answer 1:

(a) There are as many definitions for CRM and opinions, at its more formal definition, CRM is a business strategy comprised of process, organizational and technical change whereby a company seeks to better manage its enterprise around its customer behaviors. It entails acquiring and deploying knowledge about customers and using this information across the various customers touch points to increase revenue and achieve cost reduction through operational efficiencies.

CRM is often thought of as a business strategy that enables businesses to:

- Understand the customer
- Retain customers through better customer experience
- Attract new customer
- Win new clients and contracts
- Increase profitably
- Decrease customer management costs

CRM is an integrated approach to identifying, acquiring and retaining customers. By enabling organizations to manage and coordinate customer interactions across multiple channels, departments, lines of business and geographies, CRM helps organizations maximize the value of every customer interaction and drive superior corporate performance.

(b) RBC identified Smart BPM as the key technology to deliver an end-to-end rebuild of their client inquiry and problem resolution process, creating a single system across channels and lines of business. Smart BPM would serve as the backbone for their 'new client action and request tool' (CART).

This was delivered so successfully that when the system was first rolled out there was no need for any formalized end-user training. The field service staffs were able to click on the 'create a new client request' button and successfully drive the process through to resolution. Additionally, it helped to determine that many cases were requests that could be resolved right at the point of contact and also avoided doubling effort. Once requests were captured into, the system, the process automation capabilities of the Smart BPM servicing backbone drove higher rates of straight-through-processing. Once requests were captured into, the system, the process automation capabilities of the Smart BPM start it's servicing.

This involved:

- automatically looking up supporting customer information to enrich the request with required data to help resolve it;

- automatically determining the correct support group, location and even individual for routing and presentation;
- automatically generating supporting forms and correspondence as well as receiving inbound materials supplied by the customer or other support groups.

(c) As a C.E.O, I agree with the changes. Before, Customer request are processing in manual and began prone to error. It gives following benefits:
significant reduction in time to resolution of basic inquiries; predictable, accurate and consistent client service commitments at point of service and reduction in user training time, With the automated processes in place, the support staffs were able to focus their time, on just the steps that required their skills and judgment, not the menial tasks that added little value to the process. As a result, reduction in total elapsed time to resolve core processes, reduce headcount in the support organization.

(d) **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 center.
(vi) To operate the In- bound call centre.
(vii) To operate the Out - bound call centre.

2. The Royal Botanical Gardens has been established for more than 120 years and has the following mission statement: "The Royal Botanical Gardens belongs to the nation. Our mission is to increase knowledge and appreciation of plants, their importance and their conservation, by managing and displaying living and preserved collections and through botanical and horticultural research."

Located towards the edge of the city, the gardens are visited regularly throughout the year by many local families and are an internationally well known tourist attraction. Despite charging admission, it is one the top five visitor attractions in the country. Every year it answers many thousands of inquiries from universities and research establishments, including pharmaceutical companies from all over the world, and charges for advice and access to its collection. Inquiries include requests for access to the plant collection for horticultural work, seeds for propagation or samples for chemical analysis to seek novel pharmaceutical compounds for commercial exploitation. It receives an annual grant in aid from central government, which is fixed once every five years. The grant is due for review in three years' time.

The finance director has decided that, in order to strengthen its case when meeting the government representatives to negotiate the grant, the management board should be able to present a balanced scorecard demonstrating the performance of the gardens. He has asked you, the senior management accountant, to help him. Many members of the board, which consists of eminent scientists, are unfamiliar with the concept of a balanced scorecard.

Required:

(a) Describe the benefit of the Balanced Scorecards.
(b) Discuss the process you would employ to develop a suitable balanced scorecard for the Royal Botanical Gardens and give examples of measures that would be incorporated within it. [5+10]

Answer of 2:

(a) The benefits of adopting a Balanced Scorecard approach to performance management may include:

(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 good 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.

The implementation of the Balanced Scorecard should be relatively simple and understandable.

(b) We should look at the specific measures that the Royal Botanical Gardens could introduce. As well as considering the organization from a financial viewpoint, Kaplan and Norton discussed three new perspectives that businesses should consider: the customer perspective, the internal business perspective and the learning and growth perspective. We should start the task of developing a balanced scorecard by looking at the organization from all of these perspectives. The customer perspective considers areas such as customer satisfaction and how the organization adds value to these customers. In the Royal Botanical Gardens' case this would include everyone who makes an inquiry as well as all of its Visitors. The internal business perspective considers the internal processes that the organization needs to perform well in order to be successful. For the Royal Botanical Gardens these would include the procedure it goes through to reply to a query from a university. The learning and growth perspective considers areas that require constant improvement. For the Royal Botanical Gardens this would include staff training and investment in modern equipment. The organization could then look at a range of measures for each area mentioned in the mission statement. For example, one of the aspects was "displaying living and preserved collections". The balanced scorecard could turn these into specific measures:

- **Financial Perspective:** Budget for the cost of adding new preserved collections.
- **Customer Perspective:** Attractiveness of displays. Quality of information provided about displays.
- **Internal Business Perspective:** Time spent on maintaining preserved collections.
- **Learning and growth Perspective:** Number of new displays presented during the year. Number of visits made to overseas equivalents of the Royal Botanical Garden.

3 (a) ABC Ltd has two divisions A and B. A division is currently operating at full capacity. It has been asked to supply its product to division B. Division A sells its product to its regular customers for ₹ 30 each. Division B (currently operating at 50 per cent capacity) is willing to pay ₹ 20 each for the component produced by division A (this represents the full absorption cost per component at division A). The components will be used by division B in supplementing its main product to conform to the need of special order. As per the contract terms of sale, the buyer calls for of full cost to division B, plus 10 per cent. Division A has a variable cost of ₹ 17 per component. The cost per unit of division B subsequent to the buying part from division A is estimated as follows:

Particulars	Amount (₹)
Purchased parts - outside vendors	**90.00**

Purchased part - division A	**20.00**
Other variable costs	**50.00**
Fixed overheads and administration	**40.00**
	200.00

Required:

(i) As manager of division A would you recommend sales of your output to division B at the stipulated price of ₹ 20?

(ii) Would it be in the overall interest of the company for division A to sell its output to division B?

(iii) Suggest an alternative transfer price and show how could it lead to goal congruence?

(b) Explain the strengths of the ROI. [(1+3+2)+4]

Answer of 3 (a) :

(i) As manager of division A, I would not recommend sales at ₹ 20 per unit to division B. The division is already operating at its full capacity and the market is presumably absorbing all its output at ₹ 30 per unit. The internal transfer made to division B, hence, would reduce its profit (by ₹ 10 per unit) as well as the ROI.

(ii) Decision Analysis (whether to transfer part from division A to division B at ₹ 20 per unit or not).

Particulars	**Sold externally**	**Transferred to division**
Sale price (division A)	30.00	
Sale price (division. B) (₹ 200 + 10%)		220.00
Less relevant/incremental cost:		
For part of division A	17.00	17.00
Purchased parts from outside		90.00
Other variable costs		50.00
Profit per unit	13.00	63.00

Yes it will be in the overall interest of the company that transfer takes place, as it would augment the company's profit by ₹ 50 per unit.

(iii) Dual price basis of effecting transfer is the most appropriate. In this case, the relevant transfer price will be ₹ 30.00 (sale) so far as division A is concerned, and ₹ 20 (purchase) so far as division B is concerned. It will keep the profits of division unaffected and will facilitate the utilization of the idle capacity of division B, as also increase its profit:

Particulars	₹
Sale price (₹ 210 + 10 per cent)	231.00
Less: costs (₹ 90 + ₹ 30 + ₹ 50)	170.00
	61.00

Answer of 3 (b) :

Strengths:

(i) The amount of return (earnings) is related to the investment base required to generate that return. Thus, the emphasis is on the rational allocation of scarce capital resources.

(ii) ROA normalizes the size effect since it is a ration. This, we can compare entities of different sizes.

(iii) As a percentage-return measure, ROA is comparable to cost-of-capital and market rate of return measures.

(iv) Changes in ROA will lead to changes in EPS. Thus, achieving ROA objectives consistent with a firm's cost of capital will lead to the achievement of desirable levels of total earnings, EPS and corporate ROA.

4. The Oil India Corporation is considering whether to go for an offshore oil drilling contract to be awarded in Bombay High. If they bid, value would be ₹ 600 million with a 65% chance of gaining the contract. They may set up a new drilling operation or move already existing operation, which has proved successful, to the new site. The probability of success and expected returns are as follows:

Outcome	New Drilling Operation		Existing Operation	
	Probability	Expected Revenue (₹ in millions)	Probability	Expected Revenue (₹ in millions)
Success	0.75	800	0.85	700
Failure	0.25	200	0.15	350

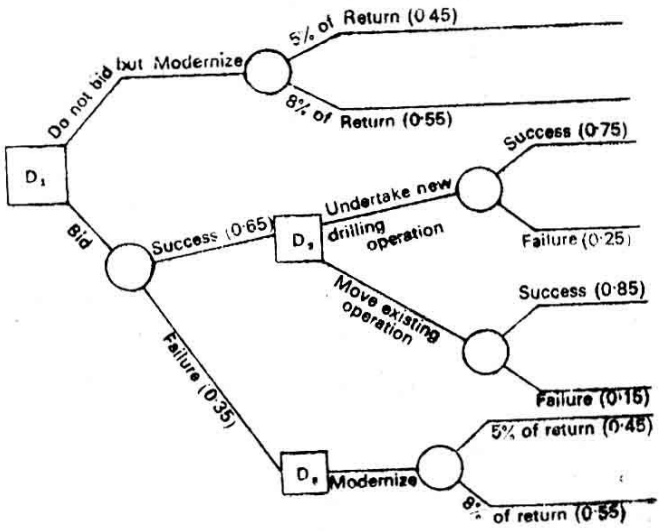
If the Corporation do not bid or lose the contract, they can use the ₹600 million to modernize their operation. This would result in a return of either 5% or 8% on the sum invested with probabilities 0.45 and 0.55.

(Assume that all costs and revenue have been discounted to present value)

(i) Construct a decision tree for the problem showing clearly the course of action.

(ii) By applying an appropriate decision criterion recommended whether or not the Oil India Corporation should bid the contract. [10]

Answer 4:



Evaluation of Decision Points

Decision Points	Outcome	Probability	Conditional Values (₹)	Expected Values (₹)
D_3 (i) Modernize	5% of Return 8% of Return	0.45 0.55	600 x 0.05 600 x 0.08	13.5 26.4
				39.9
D_2 (i) Undertaken new Drilling new	Success Failure	0.75 0.25	800 200	600 50
				650
(ii) Move Existing Operation	Success Failure	0.85 0.15	700 350	595 52.5
				647.5
D_1 (i) Do not bid	5% of return 8% of return	0.45 0.55	600 x 0.05 600 x 0.08	13.5 26.4
				39.9
(ii) Bid	Success Failure	0.65 0.35	650 +647.5 39.9	843.37 13.97
				857.34
			Less:	600.00
			Total	257.34

The decision on the basis of EMV will be to bid and if successful establish a new drilling operation.

5.(a) 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.

(b) List a few business applications of ABM. [5+5]

Answer 5(a) :

$R = Px = 100x – 2x^2$

Where, P = price and x = units.

Price (P) = 100 – 2x

Now, MR = $\frac{dR}{dx} = 100 – 4x$

Again P = 100 - 2x

or, $\frac{p}{x} = \frac{100}{x} – 2$

If P = 100 - 2x

Then, $\frac{dp}{dx} = –2$

or, $\frac{dx}{dp} = \frac{1}{2}$

Now,

$E_p = \frac{1}{2} \times (\frac{100}{x} – 2)$

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

$$= \frac{50}{20} - 1 \text{ (from equation (i) x = 20 , putting here)}$$

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

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

As, per question:
MR =20
100 - 4x =20
or, 4x = 80
or, x = 20…… (i)
Therefore the Price of elasticity is $\frac{3}{2}$

Answer 5(b) :

Business Applications of ABM

(i) 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.

(ii) 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.

(iii) 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.

(iv) 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.

(v) 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	Measure
• Quality of purchased component	• Zero defects
• Quality of output	• Percentage yield
• Customer awareness	• No. of orders, no. of complaints

6 (a) State the steps to be considered in strategies Bench Trending

(b) Describe the Normal Profit

(c) W 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 - (1) EE Package for Electricals Engineers, (2) BCA Package for Computer Engineers, and (3) 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	2,000	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 lines 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, Sandeep the Software Division Manager, decides to use Life Cycle Costing in his own division. He collects the following Life Cycle Revenue and Cost information for the packages (in ₹)-

Particulars	Package EE		Package BCA		Package IE	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Revenues	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	2,75,000	4,25,000	1,05,000	15,000	65,000	20,000
Manufacturing	15,000	2,75,000	1,10,000	1,00,000	1,76,000	43,000
Marketing	-	-	1,50,000	1,20,000	2,08,000	2,40,000
Distribution	25,000	60,000	24,000	36,000	60,000	36,000
Customer Service	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 costs in each category) [3+3+4]

Answer 6(a):

The Steps in Strategies Bench Trending are as follows:

(i) Firstly the market is defined by determining its size, customer preferences, competitors and relative business position of the company within the market.

(ii) The industry direction, technology shifts, geopolitical changes, customer changes and potential threats from outside sources are assessed.

(iii) The strongest current and potential competitors are then determined by evaluating the trends in industry.

(iv) Data on performance of competitors is gathered and the current and future performance of the unit is compared with that of its competitor.

(v) A performance baseline for the business units is then established and the relative performance of current and projected competition is estimated.

(vi) A set of initiatives which form the basis of an improvement plan are identified to maintain strengths while reducing projected gaps.

Answer 6(b):

Normal Profit

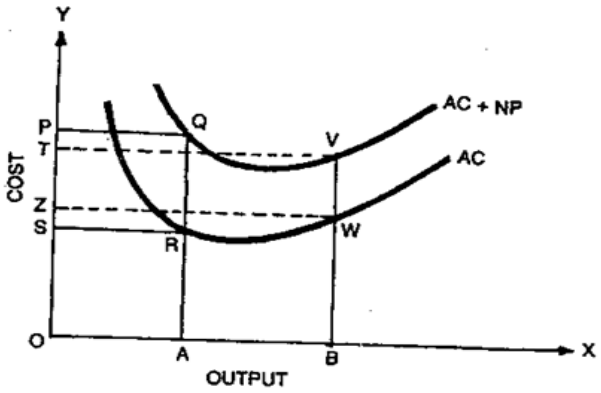
It refers to that amount of earnings which is just sufficient to induce the firm to stay in the industry. Normal profit is, thus, the minimum reasonable level of profit which the entrepreneur must get in the long run, so that he is induced to continue the employment of his resources in its present form.

Normal profit is the opportunity cost of entrepreneurship. It is equivalent to the transfer earnings of the entrepreneur. That means, if the entrepreneur fails to earn the normal rate of profit in the long run, he will close down the operation of his firm and quit the industry in order to shift his resources elsewhere.

Normal profit is considered as the least possible reward which in the long run must be earned by the entrepreneur, as compensation for his organizational services as well as for bearing the insurable business risks.

Normal profit is always regarded as a part of factor costs. Since entrepreneurial service is a factor of production, the price paid for it is the normal profit and it is to be incorporated while calculating the total cost. Of course, normal profit is the implicit money cost. Thus, in the economic sense, when the total cost (Q) is measured, it also covers the normal profit of the firm. As such, when $R = C$, ordinarily it will be inferred that there is no profit. In the economic sense, though we may say, there is no pure business profit, but there is normal profit, which is already embedded in the total cost.

It must be remembered that the entrepreneur desires a fixed amount as normal profit, which is independent of the output. So, normal profit as a factor cost is a fixed implicit cost element. Evidently, when output expands, total normal profit like *TFC* gets spread over the range of output. This has a bearing on the shape of the average cost curve (AC), as shown in following Figure.



In above Figure, we have drawn two AC curves, one excluding normal profit-cost element **(AC)** and another by including it **(AC + NP)**. It may be observed that as we move from left to right, the vertical distance between AC and **AC + NP** curves tend to become narrow in a steady manner. This implies that as output increases, normal profit per unit of output diminishes.

However, the total normal profit at all levels of output remains the same. Geometrically, thus, when output is **OA**, the average normal profit is QR. When output rises to OB, the average normal profit diminishes to VW. Total normal profit is PQRS in the former case and TVWZ in the latter case. However, **PQRS = TVWZ.**

Normal profit is measured by the difference between **AC + NP** and AC curves.
In economic theory, thus, whenever the average cost curve is drawn, the normal profit as the factor cost element of a fixed nature is always included; hence, ATC curve means AC + NP curve.
A theoretical importance of the concept of normal profit is for determining the industry's equilibrium. When only normal profit is earned by the existing firms there will be no new entry in the competitive market or the industry.

Answer 6(c):
Life cycle Income Statement (in ₹000s)

Particulars	**Package EE**				**Package BCA**				**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	275	425	700	28%	105	15	120	8%	65	20	85	5.31%
Manufacturing	15	275	300	12%	110	100	210	14%	176	43	219	13%
Marketing	-	-	-	-	150	120	270	18%	208	240	448	28%
Distribution	25	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%
Profit			**350**	**14%**			**240**	**16%**			**(96)**	**-6%**

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

Section –B
[Answer any one]

7(a) Discuss the importance of Decision Support Systems for gaining the Competitive Advantage.
(b) Describe the Technical and Operational factors of E-commerce.
(c) State the following terms:
(i) Data Availability, (ii) Data Envelopment Analysis. [5+ 6 (3 + 6)]

Answer 7 (a):

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. Decision Support Systems allow faster decision making, identification of negative trends, and better allocation of business resources all to the benefit of you and your organization.

Decision Support Systems (DSS): DSS are a specific class of computer-based information systems that support your decision-making activities. A decision support system analyzes business data and provides interactive information support to managers and business professionals during the decision-making process, from problem recognition to implementing your decision. Decision Support Systems use (1) Analytical models, (2) specialized databases, (3) a decision maker's own insights and judgments, and (4) an interactive, computer-based modeling process to support semi-structured business decisions.

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

Gain competitive advantage with Decision Support Systems In today's competitive business environment, what you need for maximum performance is to achieve competitive advantage. Without competitive advantage, your company will not be able to operate and will eventually cease to exist.

One way of gaining competitive advantage is through the use of computerized Decision Support Systems. The simplest and most tangible benefit of a Decision Support System is the ability to help you toward making better decisions. Your decisions are better in the sense that, once they are implemented, they have such effect as reducing costs, using assets more efficiently, increasing revenue, reducing risks, improving customer service, and so on.
However, Decision Support Systems can provide your company with many other benefits including:

- 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

Answer 7 (b):

Technical and Operational Factors of E-commerce:

(i) Protocol (Standards) Making Process

A well-established telecommunications and Internet infrastructure provides many of the necessary building blocks for development of a successful and vibrant e-commerce marketplace.

(ii) Delivery Infrastructure

Successful e-commerce requires a reliable system to deliver goods to the business or private customer.

(iii) Availability of Payment Mechanisms

Secure forms of payment in e-commerce transactions include credit cards, checks, debit cards, wire transfer and cash on delivery.

(iv) General Business Laws

The application of general business laws to the Internet will serve to promote consumer protection by insuring the average consumer that the Internet is not a place where the consumer is a helpless victim.

(v) Public Attitude to E-commerce

The public attitude toward using e-commerce in daily life is a significant factor in the success of ecommerce.

(vi) Business Attitude to E-commerce

The willingness of companies to move away from traditional ways of doing business and develop methods and models that include e-commerce is essential.

Answer 7 (c):

(i) Data Availability

Data Availability is a term used by some computer storage manufacturers and Storage Service Providers (SSPs) to describe products and services that ensure that data continues to be available at a required level of performance in situations ranging from normal through "disastrous." In general, data availability is achieved through redundancy involving where the data is stored and how it can be reached. Some vendors describe the need to have a data center and a storage-centric rather than a server-centric philosophy and environment.

In large enterprise computer systems, computers typically access data over high-speed optical fiber connection to storage devices. Among the best-known systems for access are ESCON and FIBRE Channel. Storage devices often are controlled as a redundant array of independent disks (RAID). Flexibility for adding and reconfiguring a storage system as well as automatically switching to a backup or failover environment is provided by a programmable or manually-controlled switch generally known as a director.

Two increasingly popular approaches to providing data availability are the Storage Area Network (SAN) and Network-Attached Storage (NAS). Data availability can be measured in terms of how often the data is available (one vendor promises 99.999 per cent availability) and how much data can flow at a time (the same vendor promises 3200 megabytes per second).

(ii) Data Envelopment Analysis (DEA)

DEA is today one of the most successful methods of operational research with a wide range of applications and an extensive bibliography is available. For instance, Emrouznejad, Parker, and Tavares (2008), in their extensive searches, have identified more than 4000 research articles published in journals or book chapters. They also enlightened that the evolution of DEA as a worldwide accepted operations research / management science tool and has been tracked in terms of the increases of publications and applications. The results of DEA are relative performance measures. With respect to the efficiency frontier, which is

built by the efficient DMUs, the amount of improvement required for the inefficient DMUs are determined. The flexibility of DEA has been demonstrated successfully in numerous performance appraisals in real environments.

- Assess the performance of police forces in England and Wales
- Performance appraisal of engineering design personnel
- Performance appraisal of primary care physicians

Data envelopment analysis (DEA) is a linear programming methodology to measure the efficiency of multiple decision-making units (DMUs) when the production process presents a structure of multiple inputs and outputs.

"DEA has been used for both production and cost data. Utilizing the selected variables, such as unit cost and output, DEA software searches for the points with the lowest unit cost for any given output, connecting those points to form the efficiency frontier. Any company not on the frontier is considered inefficient. A numerical coefficient is given to each firm, defining its relative efficiency. Different variables that could be used to establish the efficiency frontier are: number of employees, service quality, environmental safety, and fuel consumption. An early survey of studies of electricity distribution companies identified more than thirty DEA analyses—indicating widespread application of this technique to that network industry. A number of studies using this technique have been published for water utilities. The main advantage to this method is its ability to accommodate a multiplicity of inputs and outputs. It is also useful because it takes into consideration returns to scale in calculating efficiency, allowing for the concept of increasing or decreasing efficiency based on size and output levels. A drawback of this technique is that model specification and inclusion/exclusion of variables can affect the results."

Some of the advantages of DEA are:

- No need to explicitly specify a mathematical form for the production function.
- Proven to be useful in uncovering relationships that remain hidden for other methodologies.
- Capable of handling multiple inputs and outputs.
- Capable of being used with any input-output measurement.
- The sources of inefficiency can be analyzed and quantified for every evaluated unit.

Some of the disadvantages of DEA are:

- Results are sensitive to the selection of inputs and outputs.
- You cannot test for the best specification.
- The number of efficient firms on the frontier tends to increase with the number of inputs and output variables.

DEA measures efficiency by estimating an empirical production function, which represents the highest values of outputs that could be generated by relevant inputs, as obtained from observed and input output vectors for the analyzed Decision Making Units (DMU). The efficiency of a DMU is then measured by the distance from the point representing its input and output values to the corresponding reference point on the production function.

8 (a) After adopting Total Productivity Maintenance, what types of benefit will your organization get?

(b) Define the following terms in the context of Supply Chain Management:

(i)Activity Based Management, (ii) Capacity Management, (iii) Customer Relationship Management, (iv) Customer Value, (v) Information Sharing, (vi) Lean Manufacturing.

[8+ 12]

Answer 8 (a):

With the adoption of TPM at the enterprise level, your organization 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

Answer 8 (b):

(i) Activity-Based Management (ABM)

The use of activity-based costing information about cost pools and drivers, activity analysis, and business processes to identify business strategies; improve product design, manufacturing, and distribution; and remove waste from operations.

(ii) Capacity Management

The function of establishing, measuring, monitoring, and adjusting limits or levels of capacity in order to execute all manufacturing schedules; i.e., the production plan, master production schedule, material requirements plan, and dispatch list. Capacity management is executed at four levels: resource requirements planning, rough-cut capacity planning, capacity requirements planning, and input/output control.

(iii) Customer Relationship Management (CRM)

A marketing philosophy based on putting the customer first. It involves the collection and analysis of information designed for sales and marketing decision support to understand and support existing and potential customer needs. It includes account management, catalog and order entry, payment processing, credits and adjustments, and other functions.

(iv) Customer Value

The customer value approach focuses on how people choose among competing suppliers, customer attraction and retention, and market-share gains.

By highlighting the best performer on each key buying factor, marketers obtain a market derived, empirical aggregate of each supplier's customer value proposition. Often the view from the marketplace differs from the organization's internally developed customer value proposition.

(v) Information Sharing

A strategic partnering relationship between suppliers and buyers is characterized by a willingness to be open, and to share forecasted demand and cost data as well as the benefits resulting from the information sharing. Both parties in the relationship generally follow

a continuous improvement philosophy towards total cost of material acquisition and ownership along with quality and service. Cost, quality and schedule information that is confidential is shared both ways between firms during the early and ongoing stages of design and during the production life-cycle of the supplying relationship. This openness exists because of the high degree of trust earned through multiple successful interactions between the two organizations.

(vi) Lean Manufacturing

A philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities of the enterprise. It involves identifying and eliminating non-value-adding activities in design, production, supply chain management, and dealing with the customers. Lean producers employ teams of multi skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety. It contains a set of principles and practices to reduce cost through the relentless removal of waste and through the simplification of all manufacturing and support processes.

Section – C
[Answer any one]

9.(a)"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"- Discuss the steps which are taken to minimize the risk.

(b) There are various Strategic Decisions for Managing Risk. Describe those strategic decisions.

(c) Describe the Asset Liability Management Model in the perspective of Corporate Risk Management. [5+9+6]

Answerf 9(a) :

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 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.

Answer 9(b) :
Strategic Decision for Risk Management:

(i) Risk Handling: In ideal risk management, a prioritization process is followed whereby risks with the greatest loss and the greatest probability of occurring are handled first, and risks with lower probability loss are handled later.
(ii) Risk Reduction: This strategy is attempted to decrease the quantum of losses arising out of a risky happening e.g. earthquake, storm, flood etc. It involves methods that reduce severity of the loss arising from risk consequences. Risk reduction can be achieved through (a) loss prevention, and (b) loss control.
(iii) Risk Avoidance: This is prevention and a proven strategy. This strategy results in complete elimination of exposure to loss due to a specific risk. It may involve avoidance of an activity, which is risky. It includes deliberate attempt on part of the person taking risk decision not to perform an activity or not to accept a proposal, which is risk prone. This strategy can be approached in two ways: (a) Don't assume risk, and (b) Discontinue of an activity to avoid risk.
(iv) Risk Retention: This strategy is adopted when risk cannot be avoided, reduced or transferred. It involves accepting the loss when it occurs by taking risky proposal or risky assignment where there are no other alternatives to avoid risk. It can be a voluntary or involuntary action. When it is voluntary, it is retained through implied agreements. Involuntary retention occurs when the organization is unaware of the risk and faces it when it comes up.
(v) Risk Transfer: It means causing another party to accept the risk, typically by contract. It involves a process of shifting risk responsibility on others. Insurance is one type of risk transfer, which is widely used in common parlance.
(vi) Risk Hedging: It is a systematic process of reducing risk associated with an investment proposal or in some other assignments where risk is inevitable i.e. the risk is of such nature that it cannot be avoided altogether.
(vii) Risk Diversification: It involves identifying both systematic and unsystematic risks. Systematic risk is inherent and is peculiar to the type of business/firm and can be reduced or diversified

through functional level strategy. The unsystematic risk is external to the organization and is termed as 'market risk'. The identification of characteristics of market risk through statistical correlation 'beta, which is a measure of market risk, lends itself for manipulation through portfolio management. This strategy is followed in reduction of risk of single portfolio by investing in shares, debentures, bonds, treasury bills etc. to reduce overall risk of the portfolio.

(viii) Risk Sharing: Taking an insurance coverage for the exposure is the common method of sharing risk. By paying insurance premium, the company shares the risk with an insurance company. The insurance company can also share its risk with other insurance companies by doing reinsurance.

(ix) Risk Pooling: It is the process of identification of separate risks and put them all together in a single blanket, so that the monitoring, integrating or diversifying risk can be implemented.

Answer 9(c) :

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.(a)"Symptoms are interrelated. The classic path to corporate failure starts with the company experiencing low profitability. This may be indicated by trends in the ratios for: (i) Profit margin,(ii) Return on Capital Expenditure and (iii) Return on Net Assets" – Discuss it.

(b) "Several techniques have been developed to help in prediction why companies fail." – Describe the Altman: Z Score Model in this regard.
(c) Explain the Neural Network (NN) under the Corporate Bankruptcy Prediction Models.

[5+10+5]

Answer 10 (a):
There are three classic symptoms of corporate failure. These are namely:

a. **Low profitability**
b. **High gearing**
c. **Low liquidity**

Each of these three symptoms may be indicated by trends in the company's accounts. Symptoms are interrelated. The classic path to corporate failure starts with the company experiencing low profitability. This may be indicated by trends in the ratios for:

- **Profit margin**
- **Return on Capital Expenditure**
- **Return on Net Assets**

A downward trend in profitability will raise the issue of whether and for how long the company can tolerate a return on capital that is below its cost of capital. If profitability problems become preoccupying, the failing of the company may seek additional funds and working capital by increasing its borrowings, whether in the form of short term or long-term debt. This increases the company's gearing, since the higher the proportion of borrowed funds, the higher the gearing within the capital structure. The increased debt burden may then aggravate the situation, particularly if the causes of the decreasing profitability have not been resolved.

The worsening profit situation must be used to finance an increased burden of interest and capital repayments. In the case of a publicly quoted company, this means that fewer and fewer funds will be available to finance dividend payments. It may become impossible to obtain external credit or to raise further equity funds.

Answer 10 (b):

The Z-Score model is a quantitative model developed by Edward Altman in 1968, to predict bankruptcy or financial distress of a business. The Z-score is a multi variate formula that measures the financial health of a company and predicts the probability of bankruptcy within 2years. This model involves the use of a specified set of financial ratios and a statistical method known as a Multiple Discriminant Analysis. (MDA). The real world application of the Altman score successfully predicted 72% of bankruptcies two years prior to their failure.

The model of Altman is based on a linear analysis in which five measures are objectively weighted and summed to arrive at an overall score that then becomes the basis for classification of companies into one of the two a priori groupings that is bankrupt or non-bankrupt. These five indicators were then used to derive a Z-Score. These ratios can be obtained from corporations' financial statements.

The five Z-score constituent ratios are:

(i) Working Capital/Total Assets (WC/TA):- a firm with negative working capital is likely to experience problems meeting its short-term obligations.

(ii) Retained Earnings/Total Assets: - Companies with this ratio high probably have a history of profitability and the ability to stand up to a bad year of losses.

(iii) Earnings Before Interest & Tax/ Total Assets: - An effective way of assessing a firm's ability to profit from its assets before things like interest and tax are deducted.

(iv) Market Value of Equity/ Total Liabilities: - A ratio that shows, if a firm were to become insolvent, how much the company's market value would decline before liabilities exceed assets.

(v) Sales/Total Assets: - A measure of how management handles competition and how efficiently the firm uses assets to generate sales.

Based on the Multiple Discriminant Analysis, the general model can be described in the following form:

$Z=1.2WC/TA + 1.4\ RE/TE + 3.3\ EBIT/TA + 0.6\ MVE/TL + 1.0\ SL/TA$

Probability of failure according to the Z-Score result:

Z-Score	Probability of Failure
Less than 1.8	very High
Greater that 1.81 but less than 2.99	Not Sure
Greater than 3.0	Unlikely

Calculation of the Z-Score for a fictitious company where the different values are given to calculate the Z-Score.

Sales	25,678
Total Assets	49,579
Total liabilities	5,044
Retained earnings	177
Working Capital	-1,777
Earnings before interest and tax	2,605
Market value of Equity	10,098
Book value of Total Liabilities	5,044

The calculations of the ratios are as follows:

1. Working Capital/Total Assets (-1,777/ 49579) = -0.036

2. Retained Earnings/Total Assets (177/ 49579) =0.004
3. Earnings Before Interest & Tax/ Total Assets (2605/ 49579)= 0.053
4. Market Value of Equity/ Total Liabilities (10098/ 5044)= 2.00
5. Sales/Total Assets (25978/ 49579)=0.52

Thus according to the formula the answer should be:

Z=1.2(-0.036) + 1.4 (0.004) + 3.3 (0.053) + 0.6 (2.0) + 1.0(0.52)

Z= -0.04+ 0.01+0.17+1.20+0.52

Z=1.86

According to Altman, this company may or may not fail as it is greater than 1.81 but less than 2.99, which situates it neither on the safe side nor on the failure side.

Answer 10 (c):

Although capable of outperforming human brain in basic arithmetic calculations, computers are certainly inferior when it comes to tasks involving symbolic recognition like signs of bankruptcy in a firm. Neural networks are enthused by biological works related to brain and its nervous system to triumph over this lack of computational efficiency in computers. Neural networks perform the classification task, in response to impending signals of financial health of a firm, in the way a brain would do for example in deciding whether the food is salty or sweet by its taste signal.

Human brain is made up of certain types of neurons (nerve cells), which is the base of neuroscience. Neurons, in neural networks, are called 'processing elements' or 'nodes'. Like real neurons, these nodes are connected to each other through 'weighted interconnections' (synapses in neuroscience terms). Nodes are organized in layers. Each node takes delivery of, joins, and converts input signals into a single output signal via weighted interconnections. This output signal is accepted as the classifying decision if it satisfies the researcher; otherwise it is transmitted again as an input signal to many other nodes (possibly including itself). Process keeps going until satisfaction is gained from researchers' point of view.

Perhaps the major task of any neural network is to determine appropriate weights to interconnections of different nodes. Neural networks perform this task by a training process in which knowledge about the relationship between input and output signals is learned following certain principle. This knowledge produces a distinct structure of nodes (in one of the network layers called 'hidden layer') and connection weights, which correctly classifies the objects into their respective known groups. Technically, this process of mapping is termed as 'convergence'. Following a mathematical theorem, the network is always able to converge.

While predicting corporate bankruptcy, NN would take information on explanatory variables at input nodes via input layer. The hidden layer nodes, connected to input nodes through weighted interconnections, collect and process this information to suggest a probability of a firm getting failed or succeeded.