Paper – 17 - Strategic Performance Management

This paper contains 10 questions, divide 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 answer any two questions from Section A (out of three questions – questions Nos. 2 to 4). From Section B, Answer any two questions (i.e. out of Question nos. 5 to 7). From Section C, Answer any two questions (i.e. out of question nos.8 to 10).

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

Section –A

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

1. **Read the following case study and answer the following questions:**
   While the Whirlpool brand has long been associated with reliable household appliances, its delivery performance in 2000 was anything but reliable. In every measurable way, the old system was failing to meet expectations – inventory quantities were either too low or too high, or they had the wrong items in inventory, or they had the right inventory delivered to the wrong place. These inconsistencies were frustrating to retail partners and customers alike, and it was clear to executive leadership that these supply chain management issues had to be fixed.
   Of course, this situation that Whirlpool found itself in did not come about overnight. In fact, many of problems that led to this crisis were a result of the company's geographic expansion and business acquisitions. With many different systems and procedures cobbled together into an unwieldy mess, the supply chain management team found that this complex, patchwork reporting made it exceedingly difficult to track and control all of Whirlpool's production and distribution processes.
   Due to these old system issues, the company's overall availability rate – which measures how often a product is in the right place at the right time – was only 83% in 2000.* Relative to industry standards, this was considered a dismal failure. The unfortunate irony of the situation is that availability was low even while total inventory levels were often too high. In terms of supply chain management, Whirlpool was at a competitive disadvantage.
   To remedy these extensive problems, the Whirlpool supply chain management and IT teams took on the massive task of replacing their myriad production scheduling and distribution systems with a streamlined, standardized solution. The new system had a central platform for master scheduling, inventory planning and deployment planning, plus collaborative tools for forecasting and replenishment. This foundation allowed for great strides in supply chain management, with greater efficiency and cost savings across the board.
   While the system improvements were rolled out in phases – staring in North America – the initial enhancements led to dramatic advances in supply chain management. Shortly after the new system went live, Whirlpool was able to reduce forecasting errors by 50% and inventories of finished appliances by more than 20%, while saving 5% on warehouse and transportation costs. Furthermore, its overall availability rate rose from 83% to 93%, and reached 97% within five years of implementation.* These accomplishments demonstrate the impact skilled supply chain management personnel can have on a company's system-wide performance and profitability.
   Required:

(i) Discuss the challenges face the Whirlpool Company before implementing the Supply Chain Management systems
(ii) Describe the benefits get after implementing the Supply Chain Management systems.
(iii) Describe the strategy taken by the whirlpool company.
(iv) List the component of supply chain Management. **[5+5+5+5]**

Answer of 1:

(i) Whirlpool brand has long been associated with reliable household appliances. In every measurable way, the supply chain was failing to meet expectations – inventory quantities were either too low or too high, or they had the wrong items in inventory, or they had the right inventory delivered to the wrong place. These inconsistencies were frustrating to retail partners and customers alike, and it was clear to executive leadership that these supply chain management issues had to be fixed.
Due to these supply chain issues, the company's overall availability rate – which measures how often a product is in the right place at the right time – was only 83% in 2000. Relative to industry standards, this was considered a dismal failure. The unfortunate irony of the situation is that availability was low even while total inventory levels were often too high. In terms of supply chain management, Whirlpool was at a competitive disadvantage.

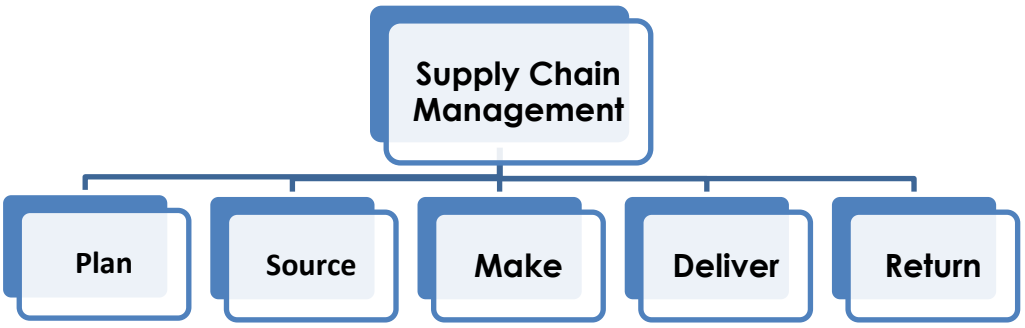
(ii) While the system improvements were rolled out in phases the initial enhancements led to dramatic advances in supply chain management. Shortly after the new system went live, the following advantages are getting:

- Reduce forecasting errors by 50%
- Inventories of finished appliances by more than 20%,
- While saving 5% on warehouse and transportation costs.
- Furthermore, its overall availability rate rose from 83% to 93%, and reached 97% within five years of implementation.

These accomplishments demonstrate the impact skilled supply chain management personnel can have on a company's system-wide performance and profitability.

(iii) The first aspect of Whirlpool's strategy was the order process. Process, technology and inventory changes were made. Systems required replacement and integration with old systems. Overall, there was a need to improve visibility within the supply chain. Secondly, the company rationalized facilities;
Thirdly, they optimized supply and demand with changes to demand planning models and software and integration with upstream suppliers.

(iv) There are five basic components of Supply Chain Management. These are showing in the diagram:



- **Plan:** This is the strategic portion of SCM. You need a strategy for managing all the resources that go toward the meeting customer demand for your product and services.

- **Source:** Choose the suppliers that will deliver the goods and services you need to create your product. Develop a set of pricing, delivery and payment processes with suppliers and create metrics for monitoring and improving the relationships.
- **Make:** This is the manufacturing step. Schedule the activities necessary for production, testing, packaging and preparation for delivery.
- **Deliver:** This is the part that many insiders refer to as logistics. Coordinate the receipt of orders from customers, develop a network of warehouses, pick carriers to get products to customers and set up an invoicing system to receive payments.
- **Return:** The problem part of the supply chain. Create a network for receiving defective and excess products back from customers and supporting customers who have problems with delivered products.

2. (a) R Enterprise is considering to replace or repair a particular machine, which has just broken down. Last year this machine costed ₹ 20,000 to run and maintain. These costs have been increasing in real terms in recent years with the age of the machine. A further useful life of 5 years is expected, if immediate repairs of ₹ 19,000 are carried out. If the machine is not repaired it can be sold immediately to realize about ₹ 5,000 (Ignore loss/gain on such disposal).

Alternatively, the company can buy a new machine for ₹ 49,000 with an expected life of 10 years with no salvage value after providing depreciation on Straight line basis. In this case, running and maintenance costs will reduce to ₹ 14,000 each year and are not expected to increase much in real terms for a few years at least. R Enterprise regard a normal return of 10% p.a. after tax as a minimum requirement on any new investment. Considering Capital Budgeting Techniques, which alternative will you choose? Take corporate tax rate of 50% and assume that depreciation will be accepted for tax purpose also.

Given cumulative present value of Re 1 p.a.at 10% for 5 years ₹ 3.791 ,10 years ₹ 6.145

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

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

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

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

(c) State the objectives of Transfer Pricing.

(d) Discuss about the Limitations of the Value Chain Analysis [6+6+3+5]

Answer of 2:

(a) Evaluation of the Proposals

Alternative I : Repairs to existing machine:

Particulars	Calculation	Amount (₹)
Cost of Repairs	19,000 x 50/100 = 9,500	-
Equivalent annual cost for 5 years	(9,500 /3.791)	2,506
Add: Running and Maintenance cost p.a. net of tax	(20,000 x 50/100)	10,000
Present value of cash Outflows		12,506

Alternative II: Replace the old machine:

Particulars	Calculation	Amount (₹)
Purchase cost of new machine		49,000
Less: sale proceeds of old machine		5,000
Net Cash Outflow		44,000
(a) Equivalent annual cost for 10 years	(44,000 /6.145)	7,160
Add: Running and maintenance cost p.a. net of tax	(14,000 x 50/100)	7,000
		14,160
Less: Tax Saving on depreciation	(49,000 /10)x50/100	2,450
Present value of cash outflows		11,710

Analysis: From the above analysis it is observed that alternative II i.e. replacement of old machine with a new machine is more profitable, since the cash outflow p.a. will decrease by ₹ 796 i.e.(12,506 – 11,710) if old machine is replaced with new machine.

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

(ii) RI = Divisional Profit – Minimum desired rate of return
= ₹25,000 – (20% × ₹1,50,000)
RI = (₹5,000)

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

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

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

The target residual income changes from a negative balance of ₹5,000 to a positive one of ₹1,000 as a result of the new opportunity to sell 10,000 units. This is

due to the fact that ₹10,000 expected profit from additional order is offset by a further ₹4,000 cost of capital, thereby increasing residual income by ₹6,000.

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

Objectives:

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

(d) Limitations of Value Chain Analysis

(i) Non availability of Data

Internal data on costs, revenues and assets used for Value Chain Analysis are derived from financial report of a single period. For long term strategic decision-making, changes in cost structures, market prices and capital investments etc. may not readily available.

(ii) Identification of Stages

Identifying stages in an industry's value chain is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into two or more stages when an outside firm does not compete in these stages is strictly judgmental.

(iii) Ascertainment of Costs of Revenues and Assets

Finding the Costs, Revenues and Assets for each value chain activity poses/gives rise to serious difficulties. There is no specific approach and much depends upon trial and error and experiments methods.

(iv) Identification of Cost Drivers

Isolating Cost Drivers for each value creating activity, identifying Value Chain Linkages across activities and computing supplier and customer profit margins present serious challenges.

(v) Resistance from Employees

Value Chain Analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers.

3 (a) Discuss the role of the Management Accountant in Activity Based Management (ABM).

(b) State the Importance of the Product Life Cycle Costing.

(c) The Parker Flower Shops promises its customers delivery within four hours on all flower orders. All flowers are purchased on the prior day and delivered to parker by 8.00 the next morning. Parker's daily demand for roses are as follows :

Dozens of Roses	7	8	9	10
Probability	0.1	0.2	0.4	0.3

Parker purchases roses for ₹ 10.00 per dozen and sells them for ₹30.00. All unsold roses are donated to a local hospital. You are required to calculate the dozens of roses should order by Parker in the evening to maximize the profits and Optimal expected profits. [7+7+6]

Answer of 3:

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

- Creation of the ABC database;
- Maintenance of the ABM data warehouse;
- Assurance and monitoring of data integrity within the warehouse;
- Analysis of the costs and benefits of improvement projects;
- Ongoing audit and analysis of project performance against goals;
- Creation and support of management reporting structures;
- Provision of cost estimates and reports to meet management's decision-making needs;
- Participation on cross-functional teams at all levels of the organization;
- Education of line managers on the economics of business within process settings;
- Participation in the development of desktop decision support tools for line managers;
- Creation and revision of cost estimates as process changes are made;
- Target and life-cycle cost and profit analysis;
- Strategic and operational budget and planning support; and
- Tracking the results/benefits of the ABC/ABM initiative.

(b) Importance

Product Life Cycle Costing is considered important due to the following reasons-

(i) **Time based analysis:** Life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their life cycle. Costs and revenues can be analyzed by time periods. The total magnitude of costs for each individual product can be reported and compared with product revenues generated in various time periods.

(ii) **Overall Cost Analysis:** Production Costs are accounted and recognized by the routine accounting system. However non-production costs like R&D, design, marketing, distribution, customer service etc. are less visible on a product-by-product basis. Product Life Cycle Costing focuses on recognizing both production and non-production costs.

(iii) **Effective Pricing Decisions:** Pricing Decisions, in order to be effective, should include market considerations on the one hand and cost considerations on the other. Product Life Cycle Costing and Target Costing help analyze both these considerations and arrive at optimal price decisions.

(iv) **Better Decision Making:** Based on a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage, better decisions can be taken.

(v) **Long Run Holistic view:** Product life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding. It provides an overall framework for considering total incremental costs over the entire life span of a product, which in turn facilitates analysis of parts of the whole where cost effectiveness might be improved.

(vi) **Life Cycle Budgeting:** Life Cycle Budgeting, i.e. Life Cycle Costing with Target Costing principles, facilitates scope for cost reduction at the design stage itself. Since costs are avoided before they are committed or locked in the Company is benefited.

(vii) **Review:** Life Cycle Costing provides scope for analysis of long term picture of product line profitability, feedback on the effectiveness of life cycle planning

and cost data to clarify the economic impact of alternatives chosen in the design, engineering phase etc.

(c) Since number of roses (in dozen) purchased is under control of decision maker, purchases per day is considered as on 'act' or 'course of action' (decision choice) and the daily demand of the flowers is uncertain and only known with probability, it is considered as an 'event' or 'state of nature'. From the data, it is clear that the flower shop must not purchase less than 7 or more than 10 dozen per day. Also each dozen roses sold within a day yields a profit of ₹ (30 – 10) = ₹ 20 and otherwise it is a dead loss of ₹ 10. Thus

Marginal profit (MP) = Selling price – Cost = 30 – 10 = ₹ 20

Marginal loss (ML) = Loss on unsold roses = ₹ 10

Using the information given in the problem, the various conditional profits (payoff) values for each combination of act – event are given by:

Conditional profit = MP x roses sold – ML x roses not sold

$$= \begin{cases} 20D, \text{if } D \geq S \\ 20D-10(S-D)=30D-10S, \text{if } D<S \end{cases}$$

Where D denotes the number of roses sold within a day and S the number of roses stocked.

The resulting conditional profit values and corresponding expected payoffs are computed as follows:

Computation of expected pay-offs

Event (demand per day)	Probability	Conditional payoff (₹) Act (Purchase per day)				Expected payoff (₹) Act (Purchase per day)			
		7	8	9	10	7	8	9	10
7	0.1	140	130	120	110	14	13	12	11
8	0.2	140	160	150	140	28	32	30	28
9	0.4	140	160	180	170	56	64	72	68
10	0.3	140	160	180	200	42	48	54	60
Expected Monetary Value (EMV):						140	157	**168***	167

Since the act 'Purchase 9 dozen roses' yields the highest EMV of ₹ 168, the optimum act for Parker would be to purchase 9 dozen of roses every day.

4. (a) Discuss the parameters to measure the performance of Public Undertakings.

(b) A radio manufacturer produces 'x' sets per week at total cost of ₹ X^2+ 78x + 2500. He is a monopolist and the demand function for his product is $x = \frac{(600 - P)}{8}$, when the price is 'p' per set. Show that maximum net revenue is obtained when 29 sets are produced per week. What is the monopoly price?

(c) A monopolist has demand curve x = 106 – 2p and average cost curve (AC) = 5 + x/50. The total revenue is (R) = *xp*, determine the most profitable output and maximum profit.

(d) Distinguish between Total Quality Management (TQM) and Business Process Re-Engineering (BPR). [6+5+5+4]

Answer of 4:

(a) A basic problem in the management of public undertaking is the measurement of their efficiency. Evaluation of efficiency is necessary in both public and private enterprises. However, the problem is more sensitive in public undertaking due to lack of a single criteria and due to multiplicity of objectives.

Efficiency is basically the ratio between inputs and outputs. It may be defined as the relationship between the results achieved and the means used to produce the results. In other words, efficiency is the capacity to obtain the desired results with minimum of cost, time, and effort. Efficiency is a relative term. It can be measured with reference to predetermined standards or degree of efficiency. The degree of efficiency of an enterprise depends upon the extent to which established standards or targets of performance have been achieved.

Public undertakings are supposed to exist for achieving both economic and social objectives. Therefore, the efficiency of undertaking can be measured on the basis of their achievements in economic and social fields. Economic performance of Public undertaking can be judged in terms of:-

(i) Profitability;
(ii) Capacity utilization; and
(iii) Quality of products and services.

(i) Profitability : Profitability of public undertakings can be measured in terms of rate of return on capital employed, which means net profits divided by long-term' capital investment. However, profitability is not a valid test of efficiency of public undertakings due to the following reasons:

- Many public undertakings enjoy monopoly power and they can charge high prices to keep the profits high.
- In many cases, public undertakings adopt subsidized prices. For example, electricity and fertilizers are supplied to farmers at subsidized rates. In such cases, profitability cannot measure efficiency.
- In many public undertakings, government is both the producer and the consumer. There is no market mechanism and, therefore, profitability is not the true indicator of efficiency.
- Profit is affected by several factors beyond the control of the management of public undertakings. For example, location of plant, price policy, staffing, etc is decided by the Government.
- Public undertakings have to bear huge social cost by way of longer gestation period, obligations as model employer, investment in townships, research and development, etc.

(ii) Capacity Utilization: The economic use of resources and per unit cost of production depends to a great extent on the degree of utilization of installed capacity. However, capacity utilization often depends upon factors beyond the control of an individual public undertaking. Availability of power, political interference, export policy etc., are such factors.

(iii) Quality of Products and Services: Quality of products and services and profitability are interrelated. Therefore, maintenance of quality may be used as a criterion to measure the performance of public undertakings. However, there can be conflict between the quality and profit criteria after a certain point improvement in quality might impose upon the profit objective.

Rationalization of social objectives:

As business enterprise public undertakings should be run on commercial lines but public undertaking are established to fulfill certain objectives, which are less financial and more social. Therefore, the performance of the public undertakings cannot be judged on the basis of financial objectives alone. Financial objectives must necessarily be subordinated to social objectives like development of backward areas, generation of employment opportunities, welfare of weaker

section of the society, import substitution, self-reliance etc. Therefore, profitability cannot be the sole criteria for measuring the performance of the public undertaking. To conclude public undertakings have multiple objectives and their performance cannot be judged by the criteria used by the private enterprises like net profits in a narrow commercial sense. Nevertheless, public undertakings should generate surplus for investment. Such surplus or profits can be tested to the managerial efficiency provided they are earned through better utilization of the capacity and resources higher productivity, cost reduction and labour management cooperation.

(b) Cost (C) = $x^2 + 78x + 2500$

Demand (D) X = (600 – P) / 8

$8x = 600 - P$

$\therefore \quad P = 600 - 8x$

Total Revenue for 'x' sets

Price x Quantity i.e., $600x - 8x^2$

Maximum revenue is obtains at MC = MR

Marginal Cost = $\frac{dc}{dx} = 2x + 78$ – (i)

Marginal Revenue = $\frac{dr}{dx} = 600 - 16x$ – (ii)

Equity (i) & (ii)

$2x + 78 = 600 - 16x$

or, $18x = 522$

$\therefore x = \frac{522}{18} = 29$

Monopoly price $600 - 8x$

$600 - 8 \times 29$

$= 600 - 232 = 368$

(c) $x = 106 - 2p \Rightarrow x - 106 = -2p$

$P = \frac{x-106}{-2} = \frac{106-x}{2}$

$R = \frac{106x - x^2}{2}$

Total Cost = $5x + \frac{x^2}{50}$

Profit = $\frac{106x - x^2}{2} - 5x - \frac{x^2}{50}$

$\frac{dp}{dx} = \frac{(106-2x)}{2} - 5 - \frac{2x}{50} = 0$

$\frac{dp}{dx} = 53 - x - 5 - \frac{2x}{50} = 0$

$$48 = x\left(1+\frac{1}{25}\right)$$

$$X = \frac{1200}{26}$$

$$\frac{d^2p}{dx^2} = \frac{-26}{25} < 0$$

$\therefore$ P is maximum at $x = \frac{1200}{26}$

(d) Differences Between Total Quality Management(TQM) and Business Process Reengineering (BPR)

Major Factor	TQM Approach	BPR
Senior-management involvement	Hands-on initially, and becoming more reinforcement-oriented	Hands-on, active involvement throughout the effort
Intensity of team-member involvement	Ongoing involvement on an as-needed, part-time basis	Ongoing involvement for a specified duration on a full-time basis
Improvement goals	Focus on incremental improvements over a period of time	Focus on dramatic improvements in a short time frame
Implementation approach	Emphasis on improving current work processes	Emphasis on creating new ways of doing things
Magnitude of organizational change	Limited disruption to existing systems and structures	Radical changes to existing systems and structures
Breadth of focus	Addresses narrowly defined work processes	Addresses processes that span entire business units
Use of benchmark data	Used after process improvement, to compare data	Used on front end, to assist with process selection
Dependence on information systems	Information systems used for data collection and interpretation	Information systems used as a central enabler with on-line access

Section – B
[Answer any 2]

5. (a) State the Technological and Operational factors of E-commerce.
(b) Discuss about the Data Availability. [6+4]

Answer of 5:

(a) 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.

(b) 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).

6. (a) Describe about the Long Short Term Memory of Recurrent Artificial Neural Networks Topologies.
(b) Describe about the different types of On-Line Analytical Processing.

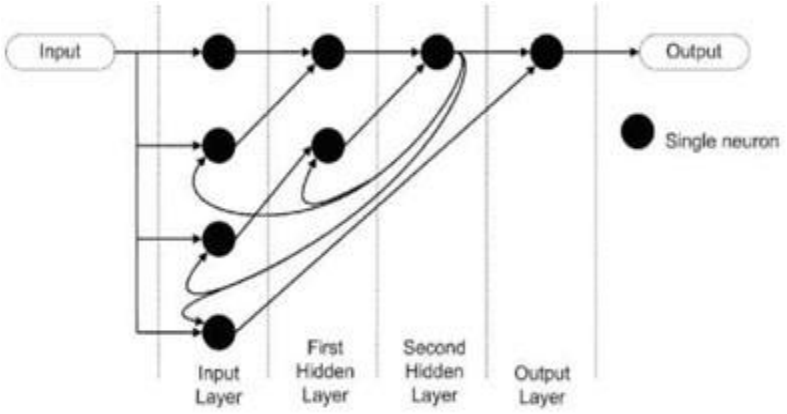
[5+5]

Answer of 6:

(a) Long Short Term Memory

Long Short Term Memory is one of the recurrent artificial neural networks topologies. In contrast with basic recurrent artificial neural networks it can learn from its experience to process, classify and predict time series with very long time lags of unknown size between important events. This makes Long Short Term Memory to outperform other recurrent artificial neural networks. Long Short Term Memory artificial neural network is build from Long Short Term Memory blocks that are capable of remembering value for any length of time. This is achieved when the input is significant enough remembering.

Architecture of Long Short Term Memory block is shown in the following figure where input layer consists of sigmoid units. Top neuron in the input layer process input value that might be sent to a memory unit depends on computed value of second neuron from the top in the input layer. The third neuron from the top in the input layer decide how long will memory unit hold (remember) its value and the bottom most neuron determines when value from memory should be released to the output. Neurons in first hidden layer and in output layer are doing simple multiplication of their inputs and a neuron in the second hidden layer computes simple linear function of its inputs. Output of the second hidden layer is fed back into input and first hidden layer in order to help making decisions.



(b) Types

OLAP systems have been traditionally categorized using the following taxonomy.

Multidimensional

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

Relational

ROLAP works directly with relational databases. The base data and the dimension tables are stored as relational tables and new tables are created to hold the aggregated information. Depends on a specialized schema design. This methodology relies on manipulating the data stored in the relational database to give the appearance of traditional OLAP's slicing and dicing functionality. In essence, each action of slicing and dicing is equivalent to adding a "WHERE" clause in the SQL

statement. ROLAP tools do not use pre-calculated data cubes but instead pose the query to the standard relational database and its tables in order to bring back the data required to answer the question. ROLAP tools feature the ability to ask any question because the methodology does not limit to the contents of a cube. ROLAP also has the ability to drill down to the lowest level of detail in the database.

Hybrid

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

Other types

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

- **WOLAP** - Web-based OLAP
- **DOLAP** - Desktop OLAP
- **RTOLAP** - Real-Time OLAP

7. Define the following terms in the context of Supply chain Management:
(a) Capacity Strategy,(b) Lead Time/ Cycle Time, (c) Preventative Maintenance , (d) Specifications. [2.5 x4]

Answer of 7:

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

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

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

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

Section C
[Answer any 2]

8. (a) "Risk Management Process refers to the process of measuring or assessing risk and then developing strategies to manage risk. In the risk management, some steps are taken up to minimize the risk"- Discuss the steps taken to minimize the risk.
(b) List the objectives of Generally Accepted Cost Accounting Principles [GACAP]. [5+5]

Answer of 8:

(a) Risk Management Process

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

Step 1: Risk Identification and Assessment

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

Step 2: Risk Quantification and Measurement

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

Step 3: Risk Analysis, Monitor and Reporting

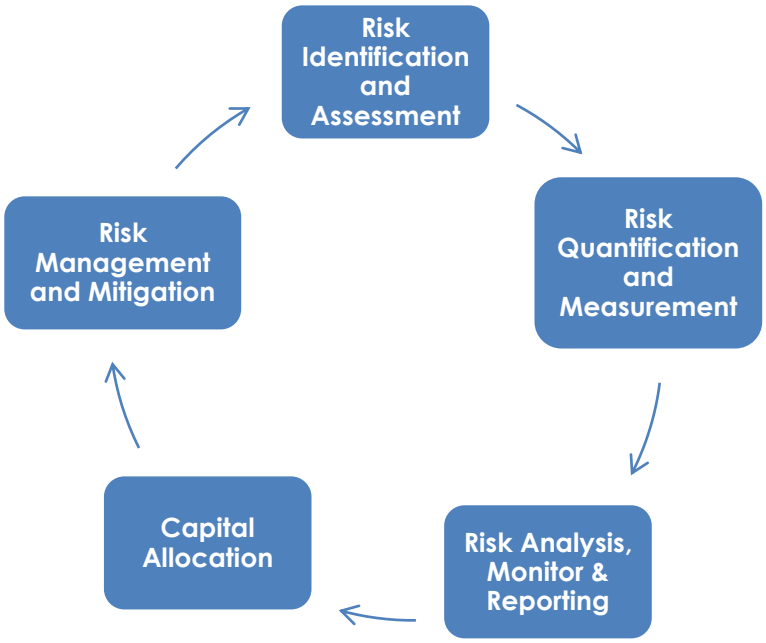
The next step is risk analysis, monitoring and reporting. This will help one to get the big picture and decided on the approach to risk management.

Step 4: Capital Allocation

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

Step 5: Risk Management and Mitigation

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



(b) The objectives of GACAP are:

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

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

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

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

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

9. (a) Describe about the Partial Adjustment Process under the Corporate Bankruptcy Prediction Models.

(b) Discuss the benefits of Risk Mapping. [6+4]

Answer of 9:

(a) Partial Adjustment Process

Partial adjustment models are a theoretic rationale of famous Koyck approach to estimate distributed-lag models. Application of partial adjustment model in bankruptcy prediction can best be explained by using cash management behaviour of the firms as an example.

According to Laitinen and Laitinen (1998), cash management refers to the management of cash from the time it starts its transit to the firm until it leaves the firm in payments. Failure of the cash management can be defined as an imbalance between cash inflows and outflows. This leads to failure usually defined as the inability of the firm to pay its financial obligations as they mature.

Traditionally, cash management behaviour of a firm is described by different models of demand for money, e.g., the quantity theory of demand for money, which assumes that the demand for money does not differ from the demand for any funds in the firm. The most popular and simple approach to the demand for money in this

framework is that followed by the inventory cash management approach, where demand for money by a firm is assumed to depend on the volume of transactions. The idea may be summarized as follows.

The actual cash balance of a firm in period *t* is a multiplicative function of *S* and *i* as follows:

$\ln M(t) = \ln D + e_s \ln S(t) + e_i \ln i(t) + u(t)$..... [1]

Where;

ln: natural logarithm

M(t): actual cash balance in period t

D: a scale constant

S(t): the volume of transactions

i(t): the opportunity cost

e_s : the elasticity of cash balance with respect to S

e_i : the elasticity of cash balance with respect to i

u(t): a random error variable with standard autoregressive property

Equation [1] is static in nature whose dynamic version presented in partial adjustment form is as below:

$\ln M(t) = y\{\ln D + e_s \ln S(t) + e_i \ln i(t) + u(t)\} + (1-y)M(t-1) + yu(t)$..... [2]

Where y and (1-y) are the weights representing adjustment rate.

The overall classification and prediction process, in this particular example of partial adjustment model, follows the following criterion:

- For a failing firm, absolute values of the elasticity's of cash balance with respect to the motive factors (volume of transactions and the opportunity cost here) will be smaller than for a similar healthy firm;
- For a failing firm, the rate of adjustment *y* may be even greater than unity and will certainly exceed the rate for healthy firm;
- Validity of the results can be tested by any appropriate technique like Lachenbruch procedure.

(b) Benefits of risk mapping

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

10 (a) Explain about the Risk Retention.
(b) Discuss the steps to be taken for preventing the Corporate Failures.

[6+4]

Answer of 10:

(a) This denotes acceptance of the loss or benefit arising out of a risk when it takes place. In short, it is also termed as self insurance. This strategy is viable when the risks are small enough to be transferred at a cost that may be higher than the loss arising out of the risk itself. On the other hand, the risk can be so big that it cannot be transferred or insured. Such risks will have to be phased out when the eventuality occurs. War is an example as also are 'Acts of God' such as earthquakes and floods. The reasons for risk retention can be cited as follows:

(i) While risk in a business is taken to increase its return, risk retention relates to such risks which have no relation to return but are part of an individual's life or organization or a company operational risk can be cited as such a risk that is inherent and needs to be accepted for retention.

(ii) Sometimes, such risks are so small that they are ignored and/or phased out when they surface.

(iii) This method is also useful when the probability of occurrence is very low and a reserve built within the system over a period can take care of such losses arising out of risk retention. This is normally resorted to in businesses against credit risks that are inherent due to marketing on credit basis.

(iv) In some cases, the subject, who is susceptible to risk, also becomes fully aware of the nature of risk. In these situations, there is a certain amount of preparedness in the system due to risk retention.

Certain guidelines relating to risk retention should be followed:

- Determine the risk retention level through proper estimation of risk using sales projections, cash flows, contracts, liquidated damages, and guarantees.
- Though there is no precise formula for estimation of risks to be retained, statistical averages of such losses over a period of time give an indication to estimate such losses. For instance, bad debts occurring over a period of time are taken into consideration as an estimate to create a reserve for doubtful debts.
- It is also necessary to ascertain the capacity for funding a loss arising out of retained risk that is the measure for transferring the risk beyond that level.

Risk retention as an exercise and a strategy is attempted mainly in the case of operational risk in business.

(b) It is a fact that some companies perform well and that some underperform and some fails. In many, if not most cases, these companies are led by executives that are quite experienced. Below are some recommendations that can help to reduce the risk of failures of organizations:

(i) **Appointment of non-executive directors**

The non-executive directors will bring their special expertise and knowledge on strategies, innovative ideas and business planning of the organization. They will monitor the work of the executive management and will help to resolve situations where conflict of interest arises. Overall, the non-executive directors will act as a Cross Check.

(ii) **Audit committees**

Very often, there is occurrence of fraud in management and financial reporting. The presence of the audit committees will help to resolve this problem. Audit committees have the potential to reduce the occurrence of fraud by creating an environment where there is both discipline and control.

(iii) **Development of environment learning mechanism**

Some organizations fail because they lose touch with their environment. Therefore, to counter this problem, there is a need to develop the environmental learning mechanism. Through it, new information can be brought on continuous basis. This is mainly done by carrying customer-feedback surveys. In this way, the organization can realign itself with the new needs and challenges.

(iv) **Focus on research and development**

Organizations can generate new knowledge by investing and focusing more on research and development. Thus, there will be more ideas how to make the products much better than that of their competitors.

It can be deducted that a director has a big responsibility that he has to assume there commendations mentioned above can help directors to reduce corporate failure, provided that the directors abide. Proper planning also is critical to the success of a business.