

Roll No.....

Total No. of Questions – 7

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Time Allowed – 3 Hours

Maximum Marks – 100

Ans-PEE-IT SM-1

Answers to questions are to be given only in English except in the case of candidates who have opted for Hindi Medium. If a candidate has not opted for Hindi medium, his/her answers in Hindi will not be valued.

(Section-A)

Question No.1 is compulsory

Candidates are also required to answer any five questions from the remaining six questions.

| | | Marks |
|----------|---|--------------|
| 1 | i) A block of space which helps computer in processing arithmetical and logical operations by holding programs and data being manipulated. | 1 |
| | ii) A combination of computers those are capable of inputting and outputting in both digital and analog signals. | 1 |
| | iii) Magnetic tape is an external storage device that can be used for making copies of audio, video, and data. It is a secondary storage device that is capable of storing and accessing data sequentially. | 1 |
| | iv) Integrates all data and process of organization into a single unified system that covers wide range of applications in the organization such as Manufacturing, Supply chain, Financials, CRM, HRM and Warehouse management. | 1 |
| | v) Views all records in sets and each set is composed of an owner record and one or more member records that implements one-to-one, one-to-many and many-to-many record structure. | 1 |
| | vi) Data, Hardware, Software, Users- Application Programmer, End User, Database Administrator, Database Designer. | 1 |
| | vii) DDL Compiler, Data Manager, File Manager, Disk Manager, Query Manager, Data Dictionary. | 1 |
| | viii) Uses long distance telephone services and satellite transmission. It operates at lower link speeds of about 1 Mbps. | 1 |
| | ix) It is a flexible data communication systems that uses radio waves, micro waves and infrared waves to transmit and receive data over the air with minimizing the need for wired connections. | 1 |
| | x) The protocols used on the Internet are called TCP/IP (Transmission Control Protocol/Internet Protocol). A TCP/IP protocol has two parts which create packet switching network: (a) TCP deals with exchange of sequential data (b) IP handles packet forwarding and is used on the Internet. | 1 |

- 2 a) Salient features of Hierarchical Database are as follows: 4
- In a hierarchical database, records are logically organized into hierarchy of relationship. It is arranged in an inverted tree pattern. The following are salient features:
- (i) Database structure is less flexible as relationships between records are relatively fixed by the structure.
 - (ii) It requires that hierarchy of records must be determined and implemented before a search.
 - (iii) Ad hoc queries are difficult and time consuming to accomplish.
 - (iv) Frequent management queries may not be supported as effectively.
 - (v) Day to day operational data can be processed rapidly.
 - (vi) Any group of records with natural relation may fit nicely.
 - (vii) Records are logically structured in inverted tree pattern.
 - (viii) It provides the parent – child relationship amongst the nodes.
 - (ix) It implements one-to-one and one-to-many relationship.
- b) The transmission of data from one computer to another, or from one device to another is known as data communication. A communications device, therefore, is any machine that assists data transmission. For example, modems, cables, and ports are all communications devices. All of the interconnected data communication devices can form a wide area network, a local area network, or a metropolitan area network, or virtual private network. 4
- (i) Local Area Networks (LAN):** A Local Area Network (LAN) covers a limited geographical area. A typical LAN connects as many as hundred or so microcomputers that are located in a relatively small area, such as a building or several adjacent buildings.
- (ii) Metropolitan Area Networks (MAN):** A Metropolitan Area Network (MAN) is somewhere between a LAN and a WAN. The terms MAN is sometimes used to refer to networks which connect systems or local area networks within a metropolitan area (roughly 40 km in length from one point to another). MANs are based on fiber optic transmission technology and provide high speed (10 Mbps or so), interconnection between sites. A MAN can support both data and voice. Cable television networks are examples of MANs that distribute television signals. A MAN just has one or two cables and does not contain switching elements.
- (iii) Wide Area Networks (WAN):** A Wide Area Network (WAN) covers a large geographic area with various communication facilities such as long distance telephone service, satellite transmission, and under-sea cables. The WAN typically involves different types of communication hardware and software. Examples of WANs are interstate banking networks and airline reservation systems. Wide area networks typically operate at lower link speeds (about 1 Mbps).
- 3 a) OSI or the Open System Interconnection Model of Communication has been outlined by International Organization for Standardization (ISO) to facilitate communication among the various hardware and software platforms which are heterogeneous in 4

nature. It consists of following seven layers of functions:

(i) Layer 7 or Application Layer: This layer is closest to the end user through which the user interacts directly with the software application. Database concurrency and deadlock situation controls are undertaken at this layer and also provides services for file transfer, file sharing, etc.

(ii) Layer 6 or Presentation Layer: This layer controls on screen display of data, transforms data to a standard application interface, encrypt or compress the data as per requirement.

(iii) Layer 5 or Session Layer: This layer establishes, maintains and terminates sessions (dialogues) between user processes. Identification and authentication are undertaken at this layer level.

(iv) Layer 4 or Transport Layer: This layer ensures reliable and transparent transfer of data between user processes, assembles and disassembles message packets, provides error recovery and flow control. At this layer, multiplexing and encryption take place.

(v) Layer 3 or Network Layer: This layer makes a choice of the physical route of transmission, creates a virtual circuit for upper layers to make them independent of data transmission and switching, establishes, maintains, terminates connections between the nodes and ensure proper routing of data.

(vi) Layer 2 or Data Link Layer: This layer is a hardware layer which specifies channel access control method and ensures reliable transfer of data through the transmission medium.

(vii) Layer 1 or Physical Layer: This layer is a hardware layer which specifies mechanical features as well as electromagnetic features of the connection between the devices and the transmission.

- b) **Message Switching:** In message switching, end-users communicate by sending each other a message, which contains the entire data being delivered from the source to destination node. As a message is routed from its source to its destination, each intermediate switch within the network stores the entire message, providing a very reliable service. In fact, when congestion occurs, the message-switched network will store and delay the traffic until sufficient resources are available for successful delivery of the message. There is no direct connection between the source and destination nodes. The intermediary nodes (switches) have the responsibility of conveying the received message from one node to another in the network. Therefore, each intermediary node within the network must store all messages before retransmitting them one at a time as proper resources become available. This characteristic is often referred to as store-and-forward. 4
- 4 a) **Data warehouse:** It is a computer database that collects, integrates and stores an organization's data with the aim of producing accurate and timely management information and supporting data analysis. It was developed to meet a growing demand for management information and analysis that could not be met by operational systems. Operational systems were unable to meet this need for a range of reasons: 4
- ◆ The processing load of reporting reduced the response time of the operational systems.

- ◆ The database designs of operational systems were not optimized for information analysis and reporting.
- ◆ Most organizations had more than one operational system, so company-wide reporting could not be supported from a single system.
- ◆ Development of reports in operational systems often requires writing specific computer programs, which is slow and expensive.

As a result, separate computer databases began to be built that were specifically designed to support management information and analysis purposes. These data warehouses were able to bring in data from a range of different data sources.

The advantages of using a data warehouse are:

- Enhanced end-user access to a wide variety of data.
- Increased data consistency.
- Increased productivity and decreases computing costs.
- It is able to combine data from different sources, in one place.
- It provides an infrastructure that could support changes to data and replication of the changed data back into the operational systems.

- b)** Customer Relationship Management (CRM) includes the methodologies, technology and capabilities that help an enterprise manage customer relationships. The general purpose of CRM is to enable organizations to manage their customers in a better way through the introduction of reliable systems, processes and procedures. CRM is a corporate level strategy which focuses on creating and maintaining lasting relationships with its customers. 4
- To be effective, the CRM process needs to be integrated end-to-end across marketing, sales, and customer service. A good CRM program needs to:

- (i) Identify customer success factors
- (ii) Create a customer-based culture
- (iii) Adopt customer-based measures
- (iv) Develop an end-to-end process to serve customers
- (v) Recommend what questions to ask to help a customer solve a problem
- (vi) Recommend what to tell a customer with a complaint about a purchase
- (vii) Track all aspects of selling to customers and prospects as well as customer support.

- 5 a)** Data Center is a centralized repository for the storage, management and dissemination of data and information. Data centers can be defined as highly secure with fault-resistant facilities and hosting computer equipment that connects to telecommunication networks. 4

Features of Data Centers

- (i) **Size:** Data centers are characterized foremost by the size of their operations and require a minimum area of around 5,000 to 30,000 square meters. A financially viable data center could comprise of a hundred to several thousand servers.
- (ii) **Data Security:** It should ensure maximum data security and 100 per cent

availability. Data centers have to be protected against intruders by controlling access to the facility and by video surveillance. They should be able to withstand natural disasters and calamities, like fire and power failures. Recovery sites must be well maintained.

(iii) **Availability of Data:** The goal of a data center is to maximize the availability of data, and to minimize potential downtime. To do this, redundancy has to be built into all the mission critical infrastructure of the data center, such as connectivity, electrical supply, security and surveillance, air conditioning and fire suppression.

(iv) **Electrical and power systems:** A data center should provide the highest power availability with uninterrupted power systems (UPS).

(v) **Security:** Physical security and systems security are critical to operations. Thus, it should provide both types of security measures to ensure the security of equipments and data placed at the data center.

b) EFT stands for "Electronic Funds Transfer" that represents the way the business can receive direct deposit of all payments from the financial institution to the company bank account. This payment mechanism moves money between accounts in a fast, paperless way. The different EFT systems in operation are as follows:

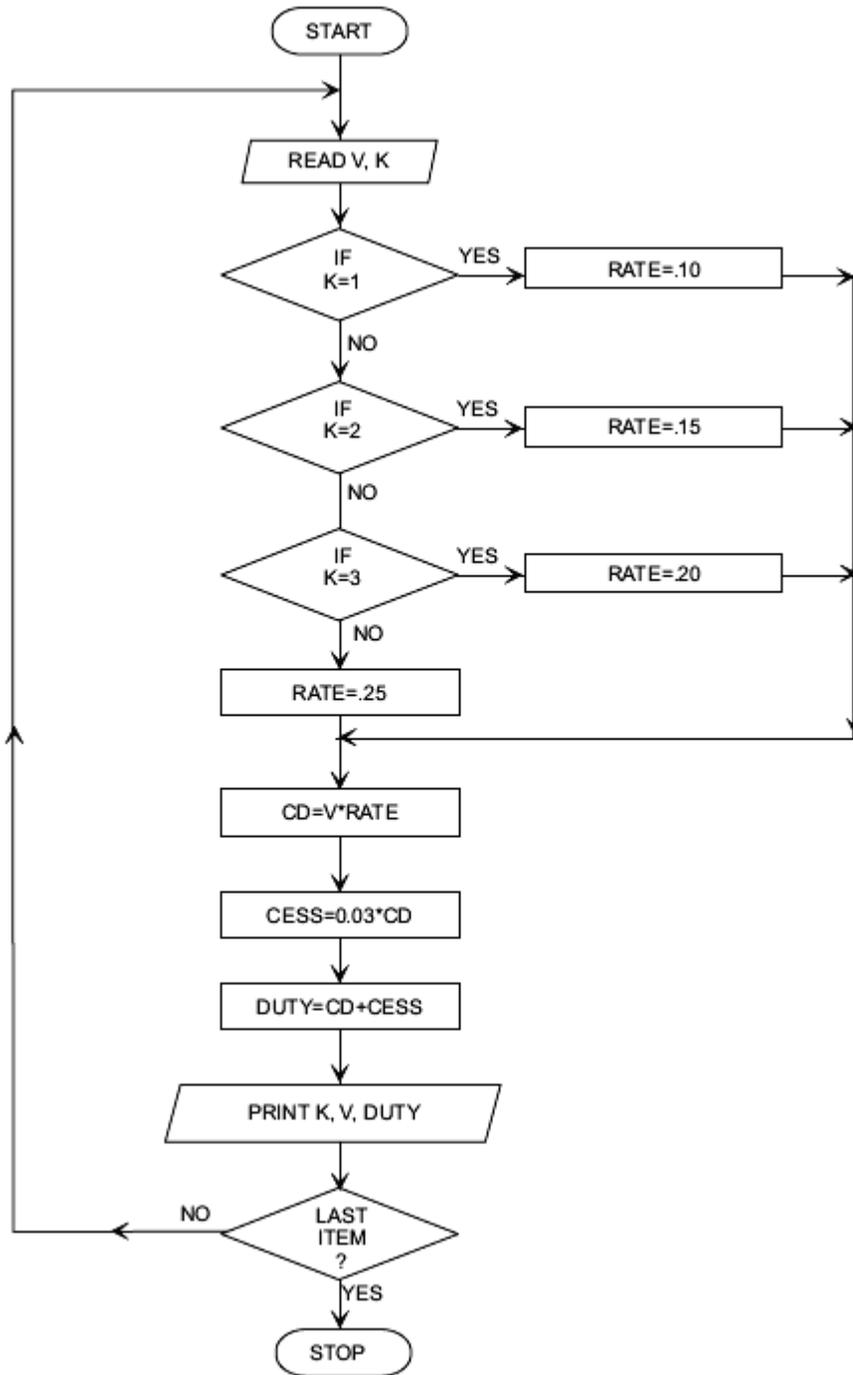
4

(i) **Automated Teller Machines (ATMs):** This allows the consumer to do their banking without assistance of a human teller. These machines are used with a debit or EFT card and a code, which is often called a Personal Identification Number or "PIN."

(ii) **Point-of-Sale (PoS) Transactions:** Some debit or EFT cards allow transfer of funds electronically from the consumer's account to the merchant's account while shopping.

(iii) **Preauthorized Transfers:** The account holder authorizes the bank or a third party to withdraw or deposit the funds from or into his account.

(iv) **Telephone Transfers:** Consumer can transfer funds from one account to another account by telephonic instructions



7 a) (i) The output sequence will be :
0 1 4 25 676

2

(ii) The output sequence in this case will be:
0 0 0 0 0

Being in loop, the program will continue to write 0 endlessly.

b) **Program Debugging:** It is a process of finding errors in program and rectifying them by using diagnostic routine before putting the program into use. There is a

2

real necessity to debug a program, i.e. to cleanse it from errors. Towards this purpose, the programmers device a set of test data transactions to test the various alternative branches in the program. The results got from the computer are compared with one derived manually prior to computer processing. If the results do not match for any reasons, the programmer then verifies the flowchart and coding sheet to hunt for the bugs. This process is called program debugging.

- c) **OMR:** Optical Mark Recognition is a technique most commonly used for scoring test marks. This technology can also be used for such applications as order writing, Payroll, inventory control, insurance, questionnaires, etc. 2
- d) A language translator or language processor is a general term used for any assembler, compiler or other routine that accepts statements in one language and produces equivalent statements in another language. The language processor reads the source language statements one at a time and prepares a number of machine instructions to perform the operations specified or implied by each source statement. The three most widely used types of language translators are compiler, interpreter, and assembler. 2
- e) **Expert System:** An expert system (ES) is a computerized information system that allows nonexperts to make decisions comparable to those of an expert. Expert systems are used for complex or ill-structured tasks that require experience and specialized knowledge in narrow, specific subject areas. 2
- 8 a) Value chain analysis has been widely used as a means of describing the activities within and around an organization, and relating them to an assessment of the competitive strength of an organization (or its ability to provide value-for-money products or services). Value analysis was originally introduced as an accounting analysis to shed light on the 'value added' of separate steps in complex manufacturing processes, in order to determine where cost improvements could be made and/or value creation improved. These two basic steps of identifying separate activities and assessing the value added from each were linked to an analysis of an organization's competitive advantage by Michael Porter. 3
 One of the key aspects of value chain analysis is the recognition that organizations are much more than a random collection of machines, money and people. These resources are of no value unless deployed into activities and organised into routines and systems which ensure that products or services are produced which are valued by the final consumer/user.
- b) Diversification endeavours can be related or unrelated to existing businesses of the firm. Based on the nature and extent of their relationship to existing businesses, diversification endeavours have been classified into four broad categories: 3
 (i) Vertically integrated diversification
 (ii) Horizontally integrated diversification
 (iii) Concentric diversification
 (iv) Conglomerate diversification

- c) The term strategic management refers to the managerial process of forming a strategic vision, setting objectives, crafting a strategy, implementing and executing the strategy, and then subsequently initiating whatever corrective adjustments in the vision, objectives, strategy, and execution are deemed appropriate. The strategy-making/strategy-implementing process consists of five interrelated managerial tasks. These are 3
- Setting vision and mission.
 - Setting objectives.
 - Crafting a strategy.
 - Implementing and executing.
- Evaluating performance and initiating corrective adjustments.

- d) In order to analyse the current business portfolio, the company must conduct portfolio analysis (a tool by which management identifies and evaluates the various businesses that make up the company). In portfolio analyses top management views its product lines and business units as a series of investments from which it expects returns. The General Electric Model uses two factors in a matrix / grid situation as shown below: 3

| | | Business Position | | |
|-----------------------|--------|-------------------|---------|---------|
| | | High | Medium | Low |
| Market Attractiveness | High | Invest | Invest | Protect |
| | Medium | Invest | Protect | Harvest |
| | Low | Protect | Harvest | Divest |

- e) The term strategic management refers to the managerial process of forming a strategic vision, setting objectives, crafting a strategy, implementing and executing the strategy, and then initiating whatever corrective adjustments in the vision, objectives, strategy, and execution are deemed appropriate. 3
- The basic framework of strategic process can be described in a sequence of five stages as follows:
- Stage one - Where are we now? (Beginning)
 - Stage two: - Where are we want to be? (Ends)
 - Stage three - How might we get there? (Means)
 - Stage four - Which way is best? (Evaluation)
 - Stage five - How can we ensure arrival? (Control)

- 9 a) An important component of strategic thinking requires the generation of a series of strategic alternatives, or choices of future strategies to pursue, given the company's internal strengths and weaknesses and its external opportunities and threats. The comparison of strengths, weaknesses, opportunities, and threats is normally referred to as SWOT analysis. 4
- **Strength:** Strength is an inherent capability of the organization which it can use to gain strategic advantage over its competitors.
 - **Weakness:** A weakness is an inherent limitation or constraint of the organization

which creates strategic disadvantage to it.

- **Opportunity:** An opportunity is a favourable condition in the organisation's environment which enables it to strengthen its position.

- **Threat:** A threat is an unfavourable condition in the organisation's environment which causes a risk for, or damage to, the organisation's position.

SWOT analysis helps managers to craft a business model (*or* models) that will allow a company to gain a competitive advantage in its industry (*or* industries). Competitive advantage leads to increased profitability, and this maximizes a company's chances of surviving in the fast-changing, competitive environment. Key reasons for SWOT analyses are:

- It provides a logical framework.
- It presents a comparative account.
 - It guides the strategist in strategy identification.

- b) Micro environment affects business and marketing at routine and operating levels. Whereas the changes in the macro environment affect business in the long run, the effect micro environment changes are noticed immediately. Organizations have to closely analyse and monitor all the elements of micro environment in order to stay competitive. Micro environment can be broadly classified as:
- Consumers/customers
 - Competitors
 - Organization
 - Market
 - Suppliers
 - Intermediaries

- 10 (a) Relationship marketing is the process of creating, maintaining, and enhancing strong, value-laden relationship with customers and other stakeholders, thus, providing special benefits to select customers to strengthen bonds. It will go a long way in building relationship. 7

(b) Supply chain management is a tool of business transformation and involves delivering the right product at the right time to the right place and at the right price. It reduces costs of organisations and enhances customer service by linkages between suppliers, manufacturers and customers. Supply chain management is an extension of logistics management.

(c) A joint venture is a business agreement in which parties agree to develop, for a finite time, a new entity and new assets by contributing equity. They exercise control over the enterprise and consequently share revenues, expenses and assets.

(d) Service Marketing is applying the concepts, tools, and techniques, of marketing to services. Service is any activity or benefit that one party can offer to another that is essentially intangible and non-perishing. These may be from business to consumer and from business to business.

(e) Enlightened Marketing helps a company to support the best long-run performance of the marketing system. It is based on five principles – customer-

oriented marketing, innovative marketing, value marketing, sense-of-mission marketing, and societal marketing.

(f) Person marketing consists of activities undertaken to create, maintain or change attitudes or behavior towards particular people. For example, politicians, sport stars, film stars, professionals market themselves to get votes or promote their careers and income.

(g) Logistics is a process that integrates the flow of supplies into, through and out of an organization to achieve a level of service that facilitate movement and availability of materials in a proper manner. When a company creates a logistics strategy it is defining the service levels at which its logistics is smooth and is cost effective.

- 11 a)** The human resource strategy of business should reflect and support the corporate strategy. An effective human resource strategy includes the way in which the organization plans to develop its employees and provide them suitable opportunities and better working conditions so that their optimal contribution is ensured. Strategic human resource management may be defined as the linking of human resource management with strategic goals and objectives to improve business performance and develop organizational culture that fosters innovation and flexibility. The success of an organization depends on its human resources. The prominent areas where the human resource manager can play strategic role are as follows **4**
- (i) Providing purposeful direction.
 - (ii) Creating competitive atmosphere.
 - (iii) Facilitation of change.
 - (iv) Diversion of workforce.
 - (v) Empowerment of human resources.
 - (vi) Building core competency.
 - (v) Development of works ethics and culture.
- b)** Environment is sum of several external and internal forces that affect the functioning of business. Businesses function as a part of broader environment. The inputs in the form of human, physical, financial and other related resources are drawn from the environment. The business converts these resources through various processes into outputs of products and/or services. The latter are partly exchanged with the external client groups, say customers. The extent to which the business thrives depends on the manner in which it interacts with its environment. Macro environment is explained as one which is largely external to the enterprise and thus beyond the direct influence and control of the organization, but which exerts powerful influence over its functioning. Important elements of macro environment are: **3**
- Demographic environment.
 - Economic environment.
 - Political-Legal Environment.
 - Socio-Cultural environment.

- Technological environment.
- Global environment.

- 12 a) Using the BCG approach, a company classifies its different businesses on a two dimensional growth-share matrix. In the matrix, the vertical axis represents market growth rate and provides a measure of market attractiveness. The horizontal axis represents relative market share and serves as a measure of company strength in the market. With the given data on market share and industry growth rate of Soorya Ltd, its four products are placed in the BCG matrix as follows: 4

| | | | |
|---------------------------|-------------|---|--|
| | | Relative Market Share | |
| | | | Low |
| Market Growth Rate | High | Product A [80% Market Share +15% Growth Rate] Stars | Product B [40%Market Share +10%Growth Rate] Question Marks |
| | Low | Product C [60% Market Share -20% Growth Rate] Cash Cows | Product D [05% Market Share -10% Growth Rate] Dogs |

Product A is in best position as it has a high relative market share and a high industry growth rate. On the other hand, product B has a low relative market share, yet competes in a high growth industry. Product C has a high relative market share, but competes in an industry with negative growth rate. The company should take advantage of its present position that may be difficult to sustain in long run. Product D is in the worst position as it has a low relative market share, and competes in an industry with negative growth rate.

- b) Six sigma is explained in the answer to question 6. 3
 For implementing six sigma for new products, processes and services we use DMADV: DMADV is acronym for the steps followed in implementing six sigma. They are:
- Define.
 - Measure.
 - Analyze.
 - Design.
 - Verify.
- 13 a) **Distinction between strategy formulation and strategy implementation:** 4
 Although inextricably linked, strategy implementation is fundamentally different from strategy formulation in the following ways:
- (i) Strategy formulation is positioning forces before the action. Strategy implementation is managing forces during the action.
 - (ii) Strategy formulation focuses on effectiveness whereas strategy implementation focuses on efficiency.
 - (iii) Strategy formulation is primarily an intellectual process whereas implementation of strategy is primarily an operational process.
 - (iv) Strategy formulation requires good intuitive and analytical skills while strategy implementation requires special motivation and leadership skills.
 - (v) Strategy formulation requires coordination among a few individuals while strategy implementation requires organization wide coordination.
- b) The human resource strategy of business should reflect and support the corporate strategy. An effective human resource strategy includes the way in which the organization plans to develop its employees and provide them suitable opportunities and better working conditions so that their optimal contribution is ensured. Strategic human resource management may be defined as the linking of human resource management with strategic goals and objectives to improve business performance and develop organizational culture that fosters innovation and flexibility. The success of an organization depends on its human resources. The prominent areas where the human resource manager can play strategic role are as follows: 3
- (i) Providing purposeful direction.
 - (ii) Creating competitive atmosphere.
 - (iii) Facilitation of change.
 - (iv) Diversion of workforce.
 - (v) Empowerment of human resources.
 - (vi) Building core competency.
 - (v) Development of works ethics and culture.
- 14 a) Business Process Reengineering (BPR) is an approach to unusual improvement in operating effectiveness through the redesigning of critical business processes and supporting business systems. It is revolutionary redesign of key business processes that involves examination of the basic process itself. It looks at the minute details of the process, such as why the work is done, who does it, where is it done and when it is done. BPR refers to the analysis and redesign of workflows and processes both 4

within the organization and between the organization and the external entities like suppliers, distributors, and service providers. The orientation of redesigning efforts is basically radical. In other words, it is a total deconstruction and rethinking of business process in its entirety, unconstrained by its existing structure and pattern. Its objective is to obtain quantum jump in process performance in terms of time, cost, output, quality, and responsiveness to customers. BPR is a revolutionary redesigning of key business processes

BPR involves the following steps:

1. Determining objectives and framework: Objectives are the desired end results of the redesign process which the management and organization attempts to achieve. This will provide the required focus, direction, and motivation for the redesign process. It helps in building a comprehensive foundation for the reengineering process.

2. Identify customers and determine their needs: The designers have to understand customers – their profile, their steps in acquiring, using and disposing a product. The purpose is to redesign business process that clearly provides added value to the customer.

3. Study the existing process: The existing processes will provide an important base for the redesigners. The purpose is to gain an understanding of the 'what', and 'why' of the targeted process. However, some companies go through the reengineering process with clean perspective without laying emphasis on the past processes.

4. Formulate a redesign process plan: The information gained through the earlier steps is translated into an ideal redesign process. Formulation of redesign plan is the real crux of the reengineering efforts. Customer focused redesign concepts are identified and formulated. In this step alternative processes are considered and the best is selected.

5. Implement the redesign: It is easier to formulate new process than to implement them. Implementation of the redesigned process and application of other knowledge gained from the previous steps is key to achieve dramatic improvements. It is the joint responsibility of the designers and management to operationalise the new process

- b) Value chain analysis has been widely used as a means of describing the activities within and around an organization, and relating them to an assessment of the competitive strength of an organization (or its ability to provide value-for-money products or services). Value analysis was originally introduced as an accounting analysis to shed light on the 'value added' of separate steps in complex manufacturing processes, in order to determine where cost improvements could be made and/or value creation improved. These two basic steps of identifying separate activities and assessing the value added from each were linked to an analysis of an organization's competitive advantage by Michael Porter. One of the key aspects of value chain analysis is the recognition that organizations are much more than a random collection of machines, money and people. These resources are of no value unless deployed into activities and organised into routines and systems which ensure that products or services are produced which are valued by the final consumer/user. 3

Or

According to Porter, strategies allow organizations to gain competitive advantage from three different bases: cost leadership, differentiation, and focus. Porter calls these bases as generic strategies. Cost leadership emphasizes producing standardized products at a very low per-unit cost for consumers who are price-sensitive. Differentiation is a strategy aimed at producing products and services considered unique industry wide and directed at consumers who are relatively price-insensitive. Focus means producing products and services that fulfill the needs of small groups of consumers. 3

Porter stresses the need for strategists to perform cost-benefit analyses to evaluate "sharing opportunities" among a firm's existing and potential business units. Sharing activities and resources enhances competitive advantage by lowering costs or raising differentiation. In addition to prompting sharing, Porter stresses the need for firms to "transfer" skills and expertise among autonomous business units effectively in order to gain competitive advantage. Depending upon factors such as type of industry, size of firm and nature of competition, various strategies could yield advantages in cost leadership differentiation, and focus.
