

Information Technology

Question Bank for ICWA Exam

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➤ Information System Analysis And Design

1. **Define Information.**

Ans: Information is nothing but refined data. Data before processing is said to be raw data. Raw data are collected, screened and processed to make it organized for effective use. Data after processing become linked with other data and carry meanings and, strictly speaking, to be termed as information. Information is data that has been processed into a form that is meaningful to the user in effective interpretation and decision making. Information involves communication and reception of intelligence. Information consists of data, text, images, voice etc

2. **Characteristics of useful information or Attributes.**

Ans: The following are the characteristics of information. These characteristics determine the quality and usefulness of information :

- **Timeliness** - This parameter is important to increase effectiveness in the use.
- **Accuracy** - The most important ingredient for quality of information.
- **Comprehensive** - Information should be integrated one with all other related issues to make it more meaningful.
- **Relevance** - The need for type of information differs from user to user. Relevant information filtered for a purpose ensures its effective and best use.
- **Understandability** - The information must be presented in a form that users can interpret the same for decision making.

3. **Types of Information.**

Ans: Information, broadly can be divided into two different types: Internal Information and External Information

- a) **Internal Information:** The Internal Information is generated and summarised within the organization. Examples of internal information would be production figures, sales figures, information about personnel, accounts, material etc.
- b) **External information:** The external information is collected from the external environment of the business organization. For example, Information such as Government, policies, competition, economic status etc.

4. **System & types of System.**

Ans: A system is a collection of inter-related and interdependent elements or components that operate collectively to achieve some common purpose or goal. A computer based information system is also a system consist of collection of people, hardware, software, data and procedures that interact to provide timely information to authorized people for such decision making and for the other purposes.

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- **Types of System**

- 1) **According to Elements:**

- a) **Abstract System:** Abstract System are Conceptual System which are just an orderly arrangement of interdependent ideas. Ideas here mean just the idea which does not contain any physical place.
- b) **Physical System:** A physical system is a collection of tangible elements. The equipment which function, together to accomplish Computer Processing.

- 2) **According to Interactive Behaviour:**

- a) **Open Systems:** Open systems actively interact with their environment. Such systems regularly get inputs and give outputs to its environment. Open systems are also able to adapt to environmental changes for their survival and growth. Business organization is an example of such system. Marketing System is an open system. The system takes inputs/feedbacks and gives outputs to its environment by way of giving products of the company and also creates new customers.
- b) **Closed Systems:** A closed system is self contained and does not interact or make exchange across its boundaries with its environment. Closed systems do not get the feedback they need from the external environment and tend to deteriorate eventually. For example, if a marketing system does not get feedback from the market, its efficiency will gradually continue to decrease.

It is not subject to disturbances from its environment. A computer program can be taken as an example of relatively closed system because, it accepts only previously defined inputs, processes them and provides previously defined outputs and it does not change with the change in environment.

- 3) **According to Degree of Human Intervention**

- a) **Manual Systems:** Manual Systems are the systems where data collection, manipulation, maintenance and final reporting are carried out absolutely by human efforts.
- b) **Automated Systems:** Automated Systems are the systems where computers or microprocessors are used to carry out all the tasks of data collection, manipulation, maintenance and final reporting.

- 4) **According to Working/Output:**

- a) **Deterministic System :** A deterministic system operates in a predictable manner wherein the interaction among the parts is known with certainty. An example is a correct computer program, which performs exactly according to a set of instructions.
- b) **Probabilistic System:** The probabilistic system can be described in terms of probable behavior, but, a certain degree of error is always attached to the prediction. Where a set of instructions given to a human who, for a variety of reasons, may not follow the instructions exactly as given. Forecasting is also a Probabilistic System.

5. **Define Entropy.**

Ans: Entropy is the quantitative measure of disorder in a system. Entropy requires inputs of energy to repair replenish and maintain the system. This maintenance input is termed as Negative Entropy. Open systems require more negative entropy than relatively closed systems for keeping at a steady state.

6. Information System & its features.

Ans: An Information System is designed by an user according to the business operation involved and the need for his decision making. It is a vehicle which supplies necessary information for decision making. Before computer being used in an business environment, Information System also existed in some form to support management in decision making. In today's business environment computer has become a must for an information system. The information system is to feed the management for control purpose. This is why Information System is generally called as Management Information System (MIS) or Computer Based Information System (CBIS).

- The following are the general characteristics of an Information system :
- a) **Specific objective :** The information system should have some specific objective. An Information System in highly scientific research centre will have an objective to accumulate data from different activities, display of some information instantly for controlling activities and so on. In a business environment, the objective will be sharing information from different functional areas and smooth flow of information for management decision making.
- b) **Structured :** An information system should have a definite structure with all modules of sub-systems. The structure depends on the sub-modules, their interactions and integration requirements, operational procedure to be followed and the solution sets. The structure of the information system refers to diagrammatic representation of the system showing sub-systems, their inter-relation and the procedure to be followed to fulfill the process requirements.
- c) **Components :** The sub-systems are the components. The sub-systems should be distinguishable among themselves but have well-defined relation among. For example, a Sales system may be sub-systems like Invoicing, Delivery Monitoring, and Sales Proceeds Collection system. The inter-link between these systems must be well defined.
- d) **Integrated :** An Information System should be designed in such a fashion that proper integration among sub-systems are taken care to establish correct linkage and generate meaningful information. An information in isolation may not be that meaningful but its usage is improved if it is integrated with information of other closely related issues. For example, Sales information of a region becomes more meaningful if other information like previous period sales, sales in other regions, sales of competitive products are also combined in the information set.
- e) **Life-Cycle :** An Information system will have its own life-cycle. The duration of life-cycle varies from the system to system. An information system has the similar stages of life-cycle as seen in any other system. Every information system will have distinctly different phases - Initial, Growth, Maturity and Decline.
- f) **Behaviour :** A system has its own set of reaction and outcome depending on the environment. A well managed business information system behaves nicely with its users by satisfying them with correct and timely information. The design of the system plays a good role in setting its behaviour pattern.
- g) **Self-regulatory :** An Information System which may have different sub-systems interacting with the each other in a desired fashion to be operative smoothly and in the process they regulate themselves. This is what is self-regulatory nature of the system. A payroll system involves three activities – first, maintaining attendance of employees, second, pay calculation and third pay disbursement. If the target date for pay disbursement is last date of a month, the second adjusts its start time accordingly and the first one is also regulated in such a fashion that it can provide input to the second in time.

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7. **Types of Information System.**

Ans: The following are the types of Information System

- a) **Strategic-level information systems** : It help senior management to tackle and address strategic issues and long-term trends, both within the firm and external environment. Their principal concern is matching changes in the external environment with existing organisational capability - What will be the cost-trends, where will our firm fit in, what products should be made etc ? In other words, these systems are designed to provide top-management with information that assists them in making long range planning decisions for the organization.
- b) **Tactical-level information systems** : It serve middle level managers and help in taking decisions for a period of 2-3 years. The managers are typically concerned with planning, controlling and use summaries of transactions to aid their decision making. These systems provide middle-level managers with the information they need to monitor and control operations and to allocate resources more effectively. In tactical systems, transactions data are summarized, aggregated, or analysed. Their purpose is not to support the execution of operational tasks but to help the manager control these operations.
- c) **Operational-level information systems** : It are typically transaction processing systems and help in the operational level managers to keep track of elementary activities and transactions of the organisations such as sales, receipts, cash deposits, flow of materials etc. Their purpose is to answer routine questions and to track flow of transactions. Thus, the primary concern of these systems is to collect, validate, and record transactional data describing the acquisition or disbursement of corporate resources. Thus, each type of information system serves the requirements of a particular level in the organisation, providing the needed basis for decision making.

8. **Management Information System (MIS).**

Ans: MIS has an objective to provide best possible timely information with the use of modern sophisticated technology. The strategy in MIS is to exploit the technological tool in ensuring the flow of information of right quality at right time at right place (user's place) for effective decision making.

- Its important features are :
 - a) It is an improved version of EDP system
 - b) It enables the management to have access to desired set of data only
 - c) It meets information requirement at different levels with pre-defined reports
 - d) It undertake transaction processing for different functional areas
 - e) It provides online access to data and efficient reporting system
 - f) It supports routine decision making

9. **Decision of Information System.**

Ans: It is a sophisticated decision making model with the help of high powered software to take semi-structured decisions.

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- The basic features of a DSS are :
 - a) It is based on one or more corporate databases
 - b) It must be supported by a set of quantitative models
 - c) It has the ability to solve unstructured problems
 - d) It should have the network computing facilities embedded in the system
 - e) It is used for solution in a complex business situation
 - f) It provides supports to Executive Information system for decision making
 - g) Software at different locations facilitates group decision making.

10. **Expert System.**

Ans: An Expert system is a knowledge based system which acts an expert in devising solutions. An expert system acts in a specific area only with the support of knowledge database on this specific area. Knowledge data base means structured information stored on previous solution sets in unstructured problem situations. In other words, an expert system operates on previous experience which is stored in a database. Even the present solution devised from the system and the information on its outcome will also be stored.

11. **Executive Information System.**

Ans: An Executive Information System is a advanced model of Decision Support System which can take care of unstructured problem situation. It aims at providing information to top executives of an organization who are involved in strategic decision making.

12. **Factors Responsible for Growth of Business Information System.**

Ans: In recent times there has been substantial growth for scientific information system in business system. Modern business managers have perceived the importance of support from good information system in business decision making. The following factors have contributed towards growth of business information system :

- a) **Change in Computer Technology :** Cost of hardware has gone down. Thanks goes to technological innovations. Computing speed has gone up tremendously and storage capacity has increased enormously. The revolution in communication technology induced every activity in the business and society to be under its call. The change in the computing capabilities in Information systems due to technological innovations have brought significant changes in the attitude of the management towards effective use of information.
- b) **Fast Transaction Processing :** Today network technology has brought the concept of intranet in an organization. This has helped fast and accurate transaction processing based on instant updation of information from point-of-sale (POS) and warehouse. Large Banks are using the intranet for having on-line information for exchange and control. Information system in banking service has brought a new dimension in control, efficiency, productivity and profitability.

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- c) **Customer Support** : Market place is full of suppliers. Products are flooded from domestic and international supply. The expectations of the customers has increased. They have become more knowledgeable about the quality, cost and availability of the products. A business organization can not survive unless it demonstrates its customer orientation. There has been a trend to manage the total supply chain system through computer system primarily to satisfy customer need and to efficiently control inventory.
- d) **Changing Product Technology** : In the global competition of trade, the technology is fast changing. Innovations are revolutionary. Products have shorter life-cycle. Risk of business obsolesce is very high. Only a good Information system can provide right kind of support with right flow of information for scientific control mechanism and decision making. Business Managers are under tremendous pressure to cope up with the speed of development. The magic tools under IT provide continuous information to update with the changes taking place throughout the world.
- e) **Continuous Improvement Effort** : Cost Competitiveness and quality improvement are two important aspect on which survival of an business depends. Only continuous efforts with better control mechanism can help to achieve the results. The information system is providing the best support. Is it possible to adopt Just-in-Time for Inventory Control without computer based information system? Quality information with the help of computer provides the right kind of database for analysis and corrective measures.
- f) **Strategic Decision Making** : Business Strategy and Information system of a modern organization is inseparable. A sound strategic decision is based on analysis of various factors - both internal and external. Strategic Analysis model of Michel Porter can provide strategic solutions to business problems based on scientific and comprehensive information data base. The Model is an eye opener to the business world to develop a new generation of information system for spontaneous strategic business solutions.
- g) **Wide Areas of applications in Offices** : Computers are being widely used for different purpose in business environment to support the cause of business. They are :
- Text management
 - E-mail
 - Document management with the use scanner
 - Communication through network etc.

13. **Areas of Computer-Based Applications**

Ans: Major areas of computer based applications are finance and accounting, marketing and sales, manufacturing, inventory/stock management, human resource management etc.

- a) **Finance and Accounting** : It helps forecasting revenues. It determines the procurement of funds and its optimum utilization and also managing other financial resources. The areas in Finance and accounting are :- General Ledger, cash management, accounts receivable/payable, fund management
- b) **Marketing and Sales** : The marketing system facilitates the chances of order procurement by marketing the products of the company, creating new customers and advertising the products. The objective of this system is to maximize sale and ensure customer satisfaction.

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- c) **Production or Manufacturing** : The system generates production schedules and schedules of material requirements. It monitors the product quality, control the waste and try to utilize its full capacity for producing goods and services.
- d) **Inventory/Stores Management** : The system is used to regulate the maximum and minimum level of stocks, identification of important items in terms of stock value (ABC analysis), identification most moving items and also non moving items.
- e) **Human Resource Management** : Less disputes, right utilization of manpower and quiet environment in this functional area ensure smooth conducting of business. HRM maintain the database of employee qualifications, experience and helps the management in allocating the people at right place.

14. **Information System Infrastructure**

Ans: Information System Infrastructure means the physical resources and organizational support required for operation of an information system. It consists of following six basic components:

- **Hardware** : Devices which store software, database and process data
- **Software** : Programs process data to generate reports
- **Database** : Data collected is stored in databases
- **Network** : Technology for sharing the data and other hardware resources
- **People** : Human resources to make the system operational.
- **Reports** : Reports are generated by the software with the help of databases for use by users.

15. **Quality of Business Information.**

Ans: Main quality criteria of a business information system are reliability of information, timeliness and correctness of reports. These depend on technology in use, manpower, ethical standard maintained and security of the system. To ensure good quality, system requirements must be properly understood and system infrastructure must be developed.

- a) **Reliability of Information** : Internet has flooded the information. Today business managers are burdened with analysis of huge volume of information. The exact of relevant information only can lead to sensible use of information. The role of Business Analyst will be of paramount importance with the growth of technological evolutions. There is a saying in computer information system - Garbage In Garbage Out (GIGO). The correctness or quality of reports depends on quality of information. Source of correct data, flow of data and procedure of authorization has to be established.
- b) **Processing Time** : Processing time is an important factor for information system. Information is generated for control in different business parameters in the operation and decision making.

Naturally, the time associated with dissemination of information is very important. Information not in time becomes useless.
- c) **Matching Management Requirements** : The information system should be well planned to fulfill the requirement of the management i.e. the owner of the system in terms of time, quality and frequency.

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At the time of designing the system the reports, contents, formats etc. are to taken care to exactly fulfill the requirements of users of different levels.

d) **Technology** : Technology refers to :

- Configuration of computer in terms of capability, security etc
- Software in use
- Communication system – network efficiency
- Type of processing - batch, real-time or online

e) **Human Resources** : The employees need new orientation in the knowledge of computer products, technological change taking place, expertise to handle these and managerial complexity evolving out of these. They are to develop the skill to develop appropriate IT infrastructure, use effective methods to store and access data and navigate them to properly use them. Quality of human resources is the most important component in an Information System organization.

f) **Ethical standard** : Ethical issues relating to employees, customer, supplier etc must be properly dealt with to maintain the right kind of image of the organization. Ethical standard must be maintained in dealing with the information being handled in an organization.

g) **Security** : The security of information system must be taken care properly. Here, security means security of information and assets. In an processing environment under network, the system is more vulnerable by unauthorized assess, leakage of sensitive information and sabotage. Loss of assets due to fire, theft, natural disaster must be protected.

16. **Business opportunities due to Development of Computers.**

Ans: Development in Computer has also evolved following business opportunities for Different Business activities relating to Hardware and Software.

1. **Computer Manufacturing** : This a function generally taken up by big companies. Earlier days manufacturers used to market their own products. Leading manufacturers in the world were IBM (International Business Machine), DEC (Digital Equipment Corporation), CDC (Control Data Corporation), Burrough, Honeywell, NCR, ICL, Hewlett Packard etc.
2. **Peripheral Equipment Manufacturing** : Some companies are involved in manufacturing peripheral devices like disk drives, tape drives, printers, plotters, monitors, communication equipments. Leading peripheral manufacturers in the world are Intel Corporation, Motorola, Texas Instruments, Toshiba, Phillips, Fujitsu, Hitachi, NEC Corporation etc.
3. **Computer Leasing** : Earlier days Computer Leasing was a very attractive business. The cost of Computer was high. Users generally were not ready to afford huge investment. Some computer manufacturer and some companies were involved in the business of computers leasing. Lease Rent was high. IBM used to provide machines in lease.
4. **Software Developers** : Companies and individuals undertake the responsibilities of developing software for third party companies. The job of contract used to be system designing, program development and system implementation.

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5. **Time-Sharing Companies :** In earlier days when hardware used to be costly and users were using only selective application systems for data processing, the time sharing facilities provided by different companies on their Computer were found to be cost-efficient and widely acceptable to many users. Some Companies took the opportunities for business purpose. Generally, companies used to buy a mainframe computers with multi-users facilities and charges used to on the basis of usage time of different components like CPU, Printers, Disk, Magnetic tape etc.
6. **Networking Parlour :** With the acceptance of networking to be the most efficient communication, use of e-mail and net-working surfing has gone up. It will further multiply when the e-commerce will take a formidable shape to be effectively operative. Providing networking facilities by small shop has become a good business in big and small towns.
7. **BPO Services :** The advantages of fast communication though internet technology has opened a new dimension for Business Process Outsourcing of commercial jobs. The data in being transmitted from one part of the globe to other for processing. The same being processed.

17. **Define System Design.**

Ans: It describe the desired software and replace an existing system. The stores manager ask a system analyst to organize the stock room operations for better control of inventory and an access of update information about stock levels.

18. **Define System Analysis.**

Ans: It is a step which involve in breaking a system into different parts and process of gathering and interpreting facts, diagnosing problems, and using the information to recommend improvements to the system.

19. **Prototype Model & its Advantages.**

Ans: Organizations are increasingly using prototyping techniques to develop smaller/pivot/part of a total system such as DSS, MIS and Expert systems. A prototype is an usable system or system component that is built quickly and at a lesser cost, and with the intention of being modifying or replacing it by a full scale and fully operational system. Prototyping technique is used to develop smaller systems such as decision support systems, management information systems and expert systems. The goal of prototyping approach is to develop a small or pilot version called a prototype of part or all of a system.

- **Advantages :**

1. It provides quick implementation of an incomplete, but functional, application.
2. Prototyping requires intensive involvement by the system users.
3. A very short time period is normally required to develop and start experimenting with a prototype.
4. Since system users experiment with each version of the prototype through an interactive process, errors are hopefully detected and eliminated early in the developmental process.

5. It reduces the cost of user training.
6. It improves the fact finding process.
7. It helps to identify confusing or difficult functions and missing functionality.
8. Prototyping model encourages innovation and flexible designs.

20. **Steps in System Development Life Cycle (SDLC).**

Ans: The process of system development starts when management or sometimes system development personnel realize that a particular business system needs improvement. The System Development Life Cycle (SDLC) consists of a set of phases/activities in which each phase of the SDLC uses the results of the previous one.

- The system development life cycle method consists of the following activities:
 - a) **Preliminary investigation:** Users submit a formal request for a new system to the MIS department, when they come across a problem. This activity consists of three parts-
 - i. Request clarification
 - ii. Feasibility study
 - iii. Request approval
 - b) **Requirements analysis or systems analysis:** Several fact-finding techniques and tools such as questionnaires, interviews, observing decision-maker behaviour and office environment, etc. are used for understanding the requirements of the users. As details are gathered, the analysts study the present system to identify its problems and shortcomings and identify the features which the new system should include to satisfy the new or changed user application environment.
 - c) **Design of the system:** The analyst designs various reports/outputs, data entry procedures, inputs, files and database. These detailed design specifications are then passed on to the programming staff for software development.
 - d) **Acquisition and development of software:** Specific type of hardware, software and services are determined. Subsequently, choices are made regarding which products to buy or lease from which vendors. Software developers then install purchased software or they may write new custom designed programs.
 - e) **System testing:** Special test data are input for processing, and then the results are examined. Various types of testing is made such as Unit testing, Integration testing, System testing etc.
 - f) **Implementation and maintenance:** Implementation and Maintenance is the final stage in SDLC. When system is found to be fit, it is implemented. After implementation, the system is maintained and it is modified to adapt to changing users and business needs.

21. **Feasibility Study**

Ans: Feasibility Study refers to a process of evaluating alternative systems through cost/benefit analysis so that the most feasible and desirable system can be selected for development. It is essential to carry out the feasibility study of the project before its implementation.

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22. **Importance of SDLC with reference to Information System Audit.**

Ans: Advantages of System Development Life Cycle from the perspective of IS audit

- a) If the detailed documentation is maintained during each phase of the SDLC the IS auditor can easily understand each phases,
- b) The IS Auditor on the basis of his examination, can write in his report about the compliance by the Information System management of the procedures, if any, set by the management,
- c) If The IS Auditor has a technical knowledge and ability of the area of SDLC, the IS Auditor can guideduring the various phases of SDLC.
- d) The IS auditor can also provide an evaluation of the methods and techniques used through the various development phases of the SDLC.

23. **Facts finding techniques.**

Ans: Various fact-finding techniques, which are used by the system analyst for determining the needs / requirements of an organization are briefly discussed below :

- a) **Documents:** Analysts collect the hierarchy of users and manager responsibilities, job descriptions for the people who work with the current system, procedure manuals, program codes for the applications associated with the current system to understand the existing system.
- b) **Questionnaires:** Users and managers are asked to complete questionnaire about the problems with the existing system and requirement of the new system. Using questionnaires, a large amount of data can be collected fastly.
- c) **Interviews:** Users and managers may also be interviewed to extract information in depth.
- d) **Observation:** Observation plays a key role in requirement analysis. Only by observing how users react to prototypes of a new system, the system can be successfully developed.

24. **Types of Flow Charts.**

Ans: Flowcharting is a graphic technique that can be used by analysts to represent the inputs, outputs and processes of a business in a pictorial form.

- Flowcharts are divided into four major categories:
 - a) **Document flowchart** - showing a document flow through systems.
 - b) **Data flowchart** - showing data flows in a system.
 - c) **System flowchart** - showing controls at a physical or resource level.
 - d) **Program flowchart** - showing the controls in a program in a system.

25. **Merits & Demerits of Flow Charts.**

Ans: Merits of Flow charts:

- a) **Communication:** Flowcharts are better way of communicating the logic of a system and easily understandable.

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- b) **Effective analysis:** With the help of flowchart, problem can be analyzed in more effective way.
- c) **Proper documentation:** Program flowcharts serve as a good program documentation.
- d) **Efficient Coding:** The flowcharts act as a guide during the systems analysis and program development phase.
- e) **Proper Debugging:** The flowchart helps in debugging process.
- f) **Efficient Program Maintenance:** The maintenance of operating program becomes easy with the help of flowchart. It helps the programmer to put efforts more efficiently on that part.
- Demerits of Flow charts:
 - a) **Complex logic:** Sometimes, the program logic is quite complicated. In that case, flowchart becomes complex.
 - b) **Alterations and Modifications:** If alterations are required, the flowchart may require redrawing completely.
 - c) **Reproduction:** As the flowchart symbols cannot be typed, reproduction of flowchart becomes a problem.

26. Merits & Demerits of Flow Charts.

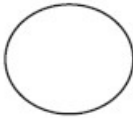
Ans: Merits of Flow Charts

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- f) **Efficient Program Maintenance:** The maintenance of operating program becomes easy with the help of flowchart. It helps the programmer to put efforts more efficiently on that part.
- Limitations of Using Flowcharts
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27. Data Flow Diagram.

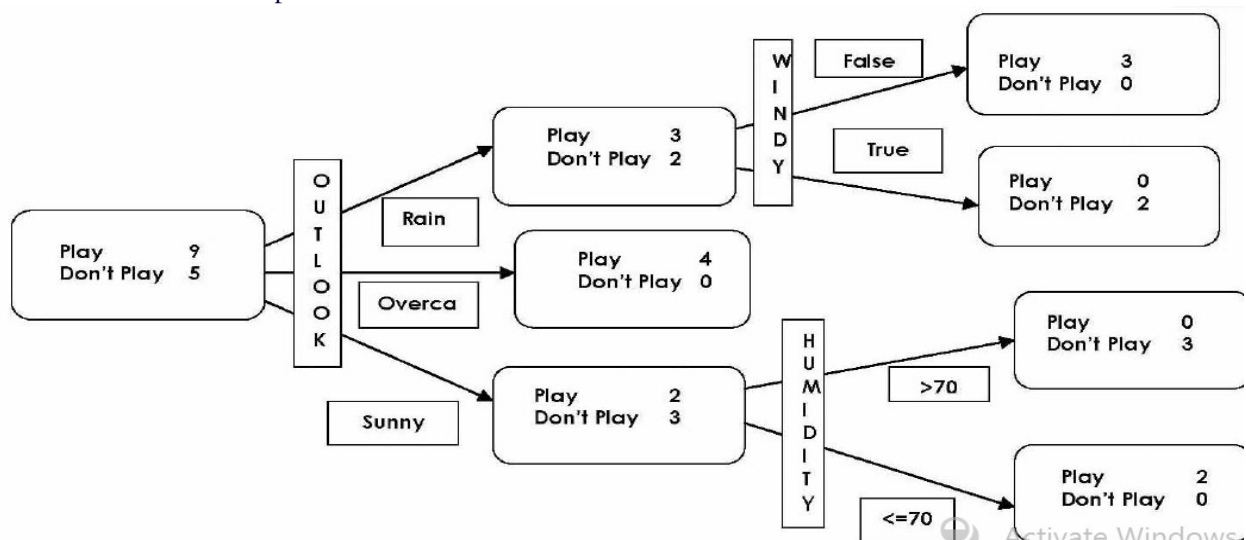
Ans: A Data Flow Diagram represents flow of data among external entities such as people, organizations, etc. A Data flow diagram is composed of four basic elements : Data Sources and Destinations, Data Flows, Transformation processes, and Data stores.

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1.	 <u>Rectangle</u>	Data Sources and Destination
2.	 <u>Arrow</u>	Data Flow
3.	 <u>Circle</u>	Transformation Process
4.	 <u>Parallel Lines</u>	Data Stores

28. **Decision Tree**

Ans: A Decision Tree is commonly used in operations research, specifically in decision analysis and to calculate conditional probabilities.



29. **Decision Table & its four parts.**

Ans: A Decision Table is a table which defining the possible contingencies that may be considered within the program.

- The four parts of the decision table are as follows:
 - a) **Condition Stub** - lists the comparisons or conditions;
 - b) **Action Stub** - lists the actions;
 - c) **Condition entries** - list in its various columns the possible permutations;
 - d) **Action entries** - lists, in its columns corresponding to the condition entries the actions contingent upon the set of answers to questions of that column.

30. **Case Tools.**

Ans: CASE (Computer-Aided-Software Engineering) refers to the automation of anything that humans do to develop systems and support virtually all phases of traditional system development process. These can be used to create internally requirements specifications with graphic generators and using of specifications languages. The various CASE tools are menu generator, screen generator, report generator and code generator.

- **Layout form & Screen Generator:** They are for printed report used to paint the desired layout.
- **Menu Generator:** Menu generator outlines the functions.
- **Report Generator:** It indicate totals, paging, sequencing and control breaks in creating samples of the desired report.
- **Code Generator:** It allows the analyst to generate modular units of source code.

Some of the other features that various CASE products possess are - Repository / Data Dictionary, Computer aided Diagramming Tools; Word Processing; Screen and Reverse Engineering.

31. **Data Dictionary**

Ans: Each computer record of a data dictionary contains information about a single data item used in a business information system. The information in each record of a Data Dictionary may include the following:

- a) Codes describing the data item's length, data type and range.
- b) Identity of the source documents used to create the data.
- c) Names of the computer files storing the data item.
- d) Identity of individuals/programs permitted to access the data item.
- e) Identity of programs/individuals not permitted to access the data item.
- f) Names of the computer programs that modify the data item.

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For an Auditor, A data dictionary can also help to establish an audit trail because it can identify the input sources of data items, the computer programs that modify particular data items ,and the managerial reports on which data items are output. For the accountants, a data dictionary can also be used to plan the flow of transaction data through the system.

32. **System Analyst.**

Ans: System Analysts is a link between the users and the programmers who converts the user requirements in the system requirement. System analysts determine the requirements of end users, especially naive and parametric end users, and develop specifications for canned transactions that meet these requirements.

33. **Team Leader.**

Ans: In developing a financial accounting application - Treasury, Accounts payable, Accounts receivable can be identified as separate modules and can be assigned to different module leaders.

34. **Programmer / Coder / Developer.**

Ans: Programmers converts design into programs by coding using programming language.

35. **Tester.**

Ans: Tester is one who tests programs and subprograms as per the plan given by the module / project leaders and prepare test reports.

36. **Domain Specialist.**

Ans: Domain Specialist help the project team in developing an application which is new to project team.

37. **Designing System Outputs and Inputs.**

Ans: Major factors to be considered in designing User Inputs:

Input design consists of developing specifications and procedures for data preparation, developing steps which are necessary to put transactions data into a usable form for processing, and data-entry. Important factors to be considered in the input design :

- a) **Content:** The system designer has to prepare new documents for collecting the information which are needed to generate user output.
- b) **Timeliness:** In data processing, it is very important that data is inputted to computer in time because outputs cannot be produced until certain inputs are available.
- c) **Media:** Media is just a device by which data is entered in the system and includes magnetic tapes, magnetic disks, key-boards, optical character recognition and voice input etc.

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- d) **Format:** After the data contents and media requirements are determined, input formats are to be considered. The type and length of each data field as well as any other special characteristics must be defined.
- e) **Input volume:** Input volume refers to the amount of data that has to be entered in the computer system at any one time. In many real-time transaction processing systems, input volume is light. In batch-oriented transaction processing systems, input volume could be heavy which involve thousands of records and also more than it.
- Major factors to be considered in designing User Outputs:
These are the important factors which should be considered by the system analyst while designing user outputs.
 - a) **Content:** Only the required information should be included in various outputs because too much content can cause managers to waste time in selecting the information that they need. For example- the contents of a weekly report of a sales manager might consist of sales persons and the amount of each product sold by each sales persons.
 - b) **Form:** Content can be presented in various forms-quantitative, non-quantitative, text, graphics, video and audio many managers prefer summary information in chart form such as pie chart, line chart, bar chart.
 - c) **Output volume:** It is better to use high-speed printer which are fast in case the volume is heavy.
 - d) **Timeliness:** Some outputs are required on a regular, periodic basis - perhaps daily, weekly, monthly, at the end of a quarter or annually.
 - e) **Media:** A variety of output media are available in the market are- video display, microfilm, magnetic tape/disk and voice output.
 - f) **Format:** The manner in which data are physically arranged is referred to as format.

38. Cohesion and Coupling.

Ans: Cohesion refers to the manner in which elements within a module are linked.

Coupling is a measure of the interconnection between modules. In a good modular design, cohesion will be high and coupling will be low.

In a good modular design, cohesion will be high and coupling will be low.

39. System manual.

Ans: A system manual is an output of the system design that describes the task to be performed by the system with complete layouts and flow charts. It contains:

- a) **General description of the existing system:** It describes the general structure of the existing system from top management to the bottom management.
- b) **Flow of the existing system:** It describes the input, processing and output of the data to be flow at various levels of organisation's structure.

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- c) **Outputs of the existing system:** The documents produced by existing system are listed.
- d) **General description of the new system:** A brief justification for the changes is specified.
- e) **Flow of the new system:** It defines the flow of the system from and to the computer operation and within the computer department.
- f) **Output Layouts:** It describes the user interface or layouts for the user that is used for better communication in near future.
- g) **Output distribution:** The output distribution is summarized.
- h) **Input layouts:** The inputs to the new system are described as well as a complete layouts of the input documents, input disks or tapes are described.
- i) **Input responsibility:** The source of each input document is indicated and thus the user department is responsible for each item on the input documents.
- j) **Macro Logic:** It defines the logic of the internal flows as to be defined by system analysts.
- k) **Controls:** This shall include type of controls, and the method in which it will be operated.

40. **Advantage of Pre-written Application Packages.**

Ans: The advantages of using pre-written application packages are summarized below:

- a) **Rapid implementation:** Just after purchasing application packages are readily available but software developed in-house may take months or even years.
- b) **Low risk:** Organizations know the cost and its price as the application package is available in finished but in With in-house developed software, there is an uncertainty with regard to both the quality of the final product and its final cost.
- c) **Quality:** Due to high expertise of the firms engaged in application package, developments can provide better software. In contrast, in-house programmers often have to work over a wide range of application areas and they may not be possessing expertise for undertaking proposed software development.
- d) **Cost:** A pre-written application package generally costs less than an in-house developed package. In addition, many hidden costs are faced by organisations that want to develop applications in-house.

41. **The factors upon which "Make or Buy" decision of an application software depends.**

Ans:

- a) **Availability of skilled manpower:** If sufficient number of programmers is not available, the organization may purchase packages.
- b) **Cost of programming:** If the cost of developing the software is more than the price of pre-written software, the organization may decide to buy the software.
- c) **Suitability of software:** Many times the available software may not be suitable for the particular needs of the organization. Hence, it may be better to develop software in such instances.

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- d) **Time frame available for implementation:** If the time available for implementation of the new computerized system is very short, the organization may go for buying the software.
- e) **Availability of sophisticated software:** In many instances, the programs available for purchase are more sophisticated than the organization would probably develop. For example, many of the applications programs are fully integrated with other application programs. This integration forces for purchasing rather than developing programs.

42. **Vendor evaluation.**

Ans: Once the proposals are received from various vendors for the system, it is the responsibility of the IT Incharge or the committee to select the best product relevant to the requirements/needs of the organization. . In order to facilitate the process, following are the factors contributing to evaluation and validation process of vendors' proposals:

- a) **Performance Rating of the proposed system in relation to its cost:** In this approach, the vendors are provided with the sample data and the task is performed by each vendor. Subsequently representatives of the organization examine the outputs for accuracy, consistency as well as processing efficiency. so, operational efficiency is judged.
- b) **Cost Benefits of the proposed system:** In this process, the cost benefit analysis is performed in relation to the performance benefits against the Total Cost of Operations. Information System Analysis and Design
- c) **Maintainability of the proposed system:** It refers to the flexibility and customization scope inbuilt in the proposed system for effective use in the organization. If the changes occurring due to the federal tax laws and statutory legal requirements, it should be analysed that whether it can be incorporated in the package easily or not.
- d) **Compatibility with Existing Systems:** The proposed system has to be operated in integration with other existing systems in the organization so that it forms a part of the Integrated Enterprise System.
 - Vendor Support: Support of vendors must be provided at the time of training, implementation, testing and back-up systems.

43. **Program Debugging.**

Ans: Debugging is the form of testing activity which refers to correcting programming language syntax and diagnostic errors so that the program compiles cleanly and thus in this process, errors are found and then they are corrected.

- Debugging consisting of following four steps.
 - a) Inputting the source program to the compiler.
 - b) Letting the compiler find errors in the program.
 - c) Correcting lines of code that are erroneous.
 - d) Resubmitting the corrected source program as input to the compiler.

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44. **System Testing & its types.**

Ans: When the software as a whole is operational, System testing begins. The types of testing that might be carried out are as follows:

- a) **Recovery Testing:** Recovery testing is the forced failure of the software in a variety of ways to verify that recovery is properly performed.
- b) **Security Testing:** The six basic security concepts that need to be covered by security testing are - confidentiality, integrity, authentication authorization, availability and non-repudiation.
- c) **Stress or Volume Testing:** It involves testing beyond normal operational capacity.
- d) **Performance Testing:** In the computer industry, software performance testing is used to determine the speed or effectiveness of a computer, network, software program or device.

45. **Systems Implementation System.**

Ans: System Implementation include the conversion of old system into the new system.

- Four types of implementation strategies are as follows:
 - a) **Direct Implementation / Abrupt change-over:** Conversion by direct change over means that on a specified date the old system is dropped and the new system is put into use . The users have no possibility of using the old system other than the new one. Adaptation is a necessity. The disadvantage is that as the old system is dropped and new system is put to use, there is no adequate way to compare new results with old ones.
 - b) **Phased implementation:** If each phase is successful then the next phase is started, eventually leading to the final phase when the new system fully replaces the old one. The advantage is that. It allows users to get involved with the system gradually. The disadvantage is that It takes too long to get the new system in place.
 - c) **Pilot implementation:** With this strategy, the new system replaces the old one in one operation but only on a small scale, it might be tried out in one branch of the company or in one location. When one operation is sucessfully completed, other conversions are done for other operations. Each module is thoroughly tested before being used. Users become familiar with each module as it becomes operational.
 - d) **Parallel running implementation :** The old system remains fully operational while the new systems come online, the old and the new system are both used alongside each other .If all goes well, the old system is stopped and new system carries on. The advantage is that there is a possibility of checking new data against old data in order to catch any errors in the processing of the new system. The disadvantage is that Cost of running two systems at the same time is high. The workload of employees during conversion is almost doubled.

46. **Systems Maintainance & its types.**

Ans: System maintenance involves modifying reports ,adding new reports, changing calculations to update system.

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- Maintenance can be categorized in the following two ways :
 - a) **Scheduled maintenance:** Scheduled maintenance is anticipated .For example, the implementation of a new inventory coding scheme can be planned in advance. The system should be evaluated periodically to ensure that it is operating properly and is still workable for the organization.
 - b) **Rescue maintenance:** Rescue maintenance refers to previously undetected malfunctions or such sudden changes that were not anticipated but require immediate solution. Rescue maintenance is unplanned. Thus a system that is properly developed and tested should have few occasions of rescue maintenance.

As System increase and expand, systems maintenance places increasing demands on programmers time. Some other maintenance which can be done are :

- i. **Corrective maintenance:** The need for corrective maintenance is usually initiated by bug reports drawn up by the end users.
- ii. **Adaptive maintenance:** Adaptive maintenance consists of adapting software to changes in the environment, such as change in business rule, government policies,
- iii. **Perfective maintenance:** Perfective maintenance mainly deals with accommodating to new or changed user requirements and concerns functional enhancements to the system and activities to increase the system's performance or to enhance its user interface.
- iv. **Preventive maintenance:** Preventive maintenance concerns with the activities aimed at increasing the system's maintainability.

47. **Operational Manual.**

Ans: A user's guide, also commonly known as an Operation Manual, is a document intended to give assistance to people using a particular system.

- The section of an operation manual after include the following :
 - a) A cover page, a title page and copyright page;
 - b) A preface, containing details of related documents and information on how to navigate the user guide;
 - c) A contents page;
 - d) A guide on how to use at least the main functions of the system;
 - e) A troubleshooting section detailing possible errors or problems that may occur, along with how to fix them;
 - f) A FAQ (Frequently Asked Questions);

48. **Data Entry.**

Ans: The data entry supervisor is responsible for ensuring whether the data is authorized, accurate and complete when entered into the system.

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49. **File Liabrary.**

Ans: Managing the organizations library of machine readable files involve 3 functions:

- a) Files must be used only for the purposes intended.
- b) The storage media used for files must be maintained in correct working order.
- c) A file backup strategy and file retention strategy must be implemented.
- The file librarian is responsible for recording, issuing, receiving and safeguarding all programs and data files that are maintained on computer tapes or disks.
 - i. **Security Administration** : The security administrator in a data processing organization is responsible for matters of physical security.
 - ii. **Conducting a Security program** : A security program is a series of ongoing, regular, periodic evaluations conducted to ensure that the physical facilities of an Information system are safeguarded adequately.

50. **Define Afferent & Efferent & Central transform..**

Ans: The portion consisting of processes that perform input and editing is called the **Afferent**.

The portion consisting of processes that do actual processing or transformations of data is called the **Central transform**.

The portion consisting of processes that do output is called the **Efferent**.

➤ Database Management System

1. **Meaning of Database.**

Ans: A database is a collection of related data. By data, we mean known facts that can be recorded and that have implicit meaning. A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database. A database can be of any size and of varying complexity.

2. **Shortnote on Database Management System (DBMS).**

Ans: A database management system (DBMS) is a collection of programs that enables users to create and maintain a database. The DBMS is hence a general-purpose software system that facilitates the processes of defining, constructing, and manipulating databases for various applications. Defining a database involves specifying the data types, structures, and constraints for the data to be stored in the database. Constructing the database is the process of storing the data itself on some storage medium that is controlled by the DBMS. Manipulating a database includes such functions as querying the database to retrieve specific data, updating the database to reflect changes in the miniworld, and generating reports from the data.

3. **Program Data Independence.**

Ans: The structure of data files is embedded in the access programs, so any changes to the structure of a file may require changing all programs that access this file. By contrast, DBMS access programs do not require such changes in most cases. The structure of data files is stored in the DBMS catalog separately from the access programs. We call this property program-data independence.

4. **Concurrency Control.**

Ans: A multiuser DBMS, as its name implies, must allow multiple users to access the database at the same time. This is essential if data for multiple applications is to be integrated and maintained in a single database. The DBMS must include concurrency control software to ensure that several users trying to update the same data do so in a controlled manner so that the result of the updates is correct.

5. **Database Administrators.**

Ans: In any organization where many persons use the same resources, there is a need for a chief administrator to oversee and manage these resources. In a database environment, the primary resource is the database itself and the secondary resource is the DBMS and related software. Administering these resources is the responsibility of the database administrator (DBA). The DBA is responsible for authorizing access to the database, for coordinating and monitoring its use, and for acquiring software and hardware resources as needed. The DBA is accountable for problems such as breach-of security or poor system response time. In large organizations, the DBA is assisted by a staff that helps carry out these functions.

6. **Actors on the Scene.**

Ans: For a small personal database, such as the list of addresses, one person typically defines, constructs, and manipulates the database. However, many persons are involved in the design, use, and maintenance of a large database with a few hundred users. In this section we identify the people whose jobs involve the day-to-day use of a large database; we call them the “actors on the scene”.

7. **Actors behind the Scene.**

Ans: In addition to those who design, use, and administer a database, others are associated with the design, development, and operation of the DBMS software and system environment. These persons are typically not interested in the database itself. We call them the “workers behind the scene,” and they include the following categories.

8. **Database Designer.**

Ans: Database designers are responsible for identifying the data to be stored in the database and for choosing appropriate structures to represent and store this data. These tasks are mostly undertaken before the database is actually implemented and populated with data. It is the responsibility of database designers to communicate with all prospective database users, in order to understand their requirements, and to come up with a design that meets these requirements. In many cases, the designers are on the staff of the DBA and may be assigned other staff responsibilities after the database design is completed. Database designers typically interact with each potential group of users and develop a view of the database that meets the data and processing requirements of this group. These views are then analyzed and integrated with the views of other user groups. The final database design must be capable of supporting the requirements of all user groups.

9. **End Users of Database Designer.**

Ans: End users are the people whose jobs require access to the database for querying, updating, and generating reports; the database primarily exists for their use. There are several categories of end users:

- **Casual end users** occasionally access the database, but they may need different information each time. They use a sophisticated database query language to specify their requests and are typically middle- or high-level managers or other occasional browsers.
- **Naive or parametric end users** make up a sizable portion of database end users; Their main job function revolves around constantly querying and updating the database, using standard types of queries and updates—called canned transactions—that have been carefully programmed and tested. The tasks that such users perform are varied:
 - Bank tellers check account balances and post withdrawals and deposits.
 - Reservation clerks for airlines, hotels, and car rental companies check availability for a given request and make reservations.
 - Clerks at receiving stations for courier mail enter package identifications via bar codes and descriptive information through buttons to update a central database of received and intransit packages.

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- **Sophisticated end users** include engineers, scientists, business analysts, and others who thoroughly familiarize themselves with the facilities of the DBMS so as to implement their applications to meet their complex requirements.
- **Stand-alone users** maintain personal databases by using ready-made program packages that provide easy-to-use menu- or graphics-based interfaces. An example is the user of a tax package that stores a variety of personal financial data for tax purposes.

A typical DBMS provides multiple facilities to access a database. Naive end users need to learn very little about the facilities provided by the DBMS; they have to understand only the types of standard transactions designed and implemented for their use. Casual users learn only a few facilities that they may use repeatedly. Sophisticated users try to learn most of the DBMS facilities in order to achieve their complex requirements. Standalone users typically become very proficient in using a specific software package.

10. **Graphical User interface (GUI).**

Ans: Because many types of users with varying levels of technical knowledge use a database, a DBMS should provide a variety of user interfaces. These include query languages for casual users; programming language interfaces for application programmers; forms and command codes for parametric users; and menu-driven interfaces and natural language interfaces for stand-alone users. Both forms-style interfaces and menu-driven interfaces are commonly known as graphical user interfaces (GUIs). Many specialized languages and environments exist for specifying GUIs. Capabilities for providing World Wide Web access to a database or web-enabling a database are also becoming increasingly common.

11. **Advantages of using a DBMS.**

Ans: In this section we discuss some of the advantages of using a DBMS and the capabilities that a good DBMS should possess. The DBA must utilize these capabilities to accomplish a variety of objectives related to the design, administration, and use of a large multiuser database.

- **Controlling Redundancy**

In traditional software development utilizing file processing, every user group maintains its own files for handling its data-processing applications. The redundancy in storing the same data multiple times leads to several problems.

First, there is the need to perform a single logical update—such as entering data on a new student multiple times: once for each file where student data is recorded. This leads to duplication of effort.

Second, storage space is wasted when the same data is stored repeatedly, and this problem may be serious for large databases.

Third, files that represent the same data may become inconsistent. This may happen because an update is applied to some of the files but not to others. Even if an update—such as adding a new student—is applied to all the appropriate files, the data concerning the student may still be inconsistent since the updates are applied independently by each user group.

12. **Implications of the Database Approach.**

Ans: In addition to the issues discussed in the previous section, there are other implications of using the database approach that can benefit most organizations.

- **Potential for Enforcing Standards:** The database approach permits the DBA to define and enforce standards among database users in a large organization. This facilitates communication and cooperation among various departments, projects, and users within the organization. Standards can be defined for names and formats of data elements, display formats, report structures, terminology, and so on. The DBA can enforce standards in a centralized database environment more easily than in an environment where each user group has control of its own files and software.
- **Reduced Application Development time:** A prime selling feature of the database approach is that developing a new application—such as the retrieval of certain data from the database for printing a new report—takes very little time. Designing and implementing a new database from scratch may take more time than writing a single specialized file application. However, once a database is up and running, substantially less time is generally required to create new applications using DBMS facilities. Development time using a DBMS is estimated to be one-sixth to one-fourth of that for a traditional file system.
- **Flexibility:** It may be necessary to change the structure of a database as requirements change. For example, a new user group may emerge that needs information not currently in the database. In response, it may be necessary to add a file to the database or to extend the data elements in an existing file. Modern DBMSs allow certain types of changes to the structure of the database without affecting the stored data and the existing application programs.
- **Availability of Up-to-Date Information:** A DBMS makes the database available to all users. As soon as one user's update is applied to the database, all other users can immediately see this update. This availability of up-to-date information is essential for many transaction-processing applications, such as reservation systems or banking databases, and it is made possible by the concurrency control and recovery subsystems of a DBMS.
- **Economies of Scale:** The DBMS approach permits consolidation of data and applications, thus reducing the amount of wasteful overlap between activities of data-processing personnel in different projects or departments. This enables the whole organization to invest in more powerful processors, storage devices, or communication gear, rather than having each department purchase its own (weaker) equipment. This reduces overall costs of operation and management.

13. **Concept of Database Model.**

Ans: One fundamental characteristic of the database approach is that it provides some level of data abstraction by hiding details of data storage that are not needed by most database users. A **data model**—a collection of concepts that can be used to describe the structure of a database—provides the necessary means to achieve this abstraction (Sometimes the word model is used to denote a specific database description, or schema). By structure of a database we mean the data types, relationships, and constraints that should hold on the data. We can categorize them according to the types of concepts they use to describe the database structure. High-level or conceptual data models provide concepts that are close to the way many users perceive data, whereas low-level or physical data models provide concepts that describe the details of how data is stored in the computer.

14. **Concept of Database Schemas.**

Ans: In any data model it is important to distinguish between the description of the database and the database itself. The description of a database is called the database schema, which is specified during database design and is not expected to change frequently.

15. **DBMS Architecture & Three-schema Architecture.**

Ans: Three important characteristics of the database approach, are

- a) Insulation of programs and data (program-data and program-operation independence);
- b) Support of multiple user views; and
- c) Use of a catalog to store the database description (schema). In this section we specify an architecture for database systems, called the three-schema architecture, which was proposed to help achieve and visualize these characteristics.

- **The Three-Schema Architecture**

The goal of the three-schema architecture, illustrated later, is to separate the user applications and the physical database. In this architecture, schemas can be defined at the following three levels:

1. The internal level has an internal schema, which describes the physical storage structure of the database. The internal schema uses a physical data model and describes the complete details of data storage and access paths for the database.
 2. The conceptual level has a conceptual schema, which describes the structure of the whole database for a community of users. The conceptual schema hides the details of physical storage structures and concentrates on describing entities, data types, relationships, user operations, and constraints. A highlevel data model or an implementation data model can be used at this level.
 3. The external or view level includes a number of external schemas or user views. Each external schema describes the part of the database that a particular user group is interested in and hides the rest of the database from that user group. A high-level data model or an implementation data model can be used at this level.
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16. **Define Mapping.**

Ans: The processes of transforming requests and results between levels are called **mappings**. These mappings may be time-consuming, however, a certain amount of mapping is necessary to transform requests between the conceptual and internal levels.

17. **Define Data Independence & its Types.**

Ans: The three-schema architecture can be used to explain the concept of data independence, which can be defined as the capacity to change the schema at one level of a database system without having to change the schema at the next higher level. We can define two types of data independence:

1. **Logical data independence** is the capacity to change the conceptual schema without having to change external schemas or application programs. We may change the conceptual schema to expand the database (by adding a record type or data item), or to reduce the database (by removing a record type or data item).

In the latter case, external schemas that refer only to the remaining data should not be affected. For example, the external schema of Fig. 4(a) should not be affected by changing the GRAD_REPORT file shown in Fig. 2 into the one shown in Fig. 5(a). Only the view definition and the mappings need be changed in a DBMS that supports logical data independence. Application programs that reference the external schema constructs must work as before, after the conceptual schema undergoes a logical reorganization. Changes to constraints can be applied also to the conceptual schema without affecting the external schemas or application programs.

2. **Physical data independence** is the capacity to change the internal schema without having to change the conceptual (or external) schemas. Changes to the internal schema may be needed because some physical files had to be reorganized—for example, by creating additional access structures- to improve the performance of retrieval or update. If the same data as before remains in the database, we should not have to change the conceptual schema. For example, providing an access path to improve retrieval of SECTION records (Fig. 2) by Semester and Year should not require a query such as “list all sections offered in fall 1998” to be changed, although the query would be executed more efficiently by the DBMS by utilizing the new access path.

18. Define DDL, SDL, VDL & DML.

Ans: DDL : Once the design of a database is completed and a DBMS is chosen to implement the database, the first order of the day is to specify conceptual and internal schemas for the database and any mappings between the two. In many DBMSs where no strict separation of levels is maintained, one language, called the **data definition language (DDL)**, is used by the DBA and by database designers to define both schemas.

- **SDL :** In DBMSs where a clear separation is maintained between the conceptual and internal levels, the DDL is used to specify the conceptual schema only. Another language, the storage definition language (SDL), is used to specify the internal schema.
- **VDL :** For a true three-schema architecture, we would need a third language, the view definition language (VDL), to specify user views and their mappings to the conceptual schema, but in most DBMSs the DDL is used to define both conceptual and external schemas.
- **DML :** Once the database schemas are compiled and the database is populated with data, users must have some means to manipulate the database. Typical manipulations include retrieval, insertion, deletion, and modification of the data. The DBMS provides a data manipulation language (DML) for these purposes.

19. Define DBMS interface & its Types.

Ans: User-friendly interfaces provided by a DBMS may include the following:

1. **Menu-Based Interfaces for Browsing :** These interfaces present the user with lists of options, called menus, that lead the user through the formulation of a request. Menus do away with the need to memorize the specific commands and syntax of a query language; rather, the query is composed step by step by picking options from a menu that is displayed by the system.

Pull-down menus are becoming a very popular technique in window-based user interfaces. They are often used in browsing interfaces, which allow a user to look through the contents of a database in an exploratory and unstructured manner.

2. **Forms-Based Interfaces :** A forms-based interface displays a form to each user. Users can fill out all of the form entries to insert new data, or they fill out only certain entries, in which case the DBMS will retrieve matching data for the remaining entries. Forms are usually designed and programmed for naive users as interfaces to canned transactions. Many DBMSs have forms specification languages, special languages that help programmers specify such forms. Some systems have utilities that define a form by letting the end user interactively construct a sample form on the screen.
3. **Graphical User Interfaces :** A graphical interface (GUI) typically displays a schema to the user in diagrammatic form. The user can then specify a query by manipulating the diagram. In many cases, GUIs utilize both menus and forms. Most GUIs use a pointing device, such as a mouse, to pick certain parts of the displayed schema diagram.
4. **Natural Language Interfaces :** These interfaces accept requests written in English or some other language and attempt to “understand” them. A natural language interface usually has its own “schema,” which is similar to the database conceptual schema. The natural language interface refers to the words in its schema, as well as to a set of standard words, to interpret the request. If the interpretation is successful, the interface generates a high-level query corresponding to the natural language request and submits it to the DBMS for processing; otherwise, a dialogue is started with the user to clarify the request.
5. **Interfaces for Parametric Users :** Parametric users, such as bank tellers, often have a small set of operations that they must perform repeatedly. Systems analysts and programmers design and implement a special interface for a known class of naive users. Usually, a small set of abbreviated commands is included, with the goal of minimizing the number of keystrokes required for each request. For example, function keys in a terminal can be programmed to initiate the various commands. This allows the parametric user to proceed with a minimal number of keystrokes.
6. **Interfaces for the DBA :** Most database systems contain privileged commands that can be used only by the DBA's staff. These include commands for creating accounts, setting system parameters, granting account authorization, changing a schema, and reorganizing the storage structures of a database.

20. **Database System Utilities.**

Ans: In addition to possessing the software modules just described, most DBMSs have database utilities that help the DBA in managing the database system. Common utilities have the following types of functions:

1. **Loading :** A loading utility is used to load existing data files—such as text files or sequential files—into the database. Usually, the current (source) format of the data file and the desired (target) database file structure are specified to the utility, which then automatically reformats the data and stores it in the database. With the proliferation of DBMSs, transferring data from one DBMS to another is becoming common in many organizations. Some vendors are offering products that generate the appropriate loading programs, given the existing source and target database storage descriptions (internal schemas). Such tools are also called conversion tools.

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2. **Backup** : A backup utility creates a backup copy of the database, usually by dumping the entire database onto tape. The backup copy can be used to restore the database in case of catastrophic failure. Incremental backups are also often used, where only changes since the previous backup are recorded. Incremental backup is more complex but it saves space.
3. **File reorganization** : This utility can be used to reorganize a database file into a different file organization to improve performance.
4. **Performance monitoring** : Such a utility monitors database usage and provides statistics to the DBA. The DBA uses the statistics in making decisions such as whether or not to reorganize files to improve performance.
Other utilities may be available for sorting files, handling data compression, monitoring access by users, and performing other functions.

21. **Types of Database Models.**

Ans: A database model is a type of data model that determines the logical structure of a database and fundamentally determines in which manner data can be stored, organized and manipulated. Some prominent data models are :

1. **Hierarchical Database Model** : In a hierarchical database model, records are logically organized into a hierarchy of relationships. A hierarchical Structured database is arranged logically in an inverted tree pattern.
2. **Network database model** : The network database model is a variation of hierarchical database model to the extent that it is built on the concept of multiple branches (lower-level structures) emanating from one or more nodes (higher-level structures). The network model is able to represent redundancy in data more efficiently than in the hierarchical model.
3. **Relational Database Model** : The basic relational data model represents a database as a collection of tables, where each table can be stored as a separate file. Most relational databases use the high-level query language called SQL and support a limited form of user views.
4. **Object oriented Database Model** : Databases can be used to provide persistent storage for program objects and data structures. This is one of the main reasons for the emergence of the object-oriented database systems.

22. **Difference between DBMS & RDBMS.**

Ans: A DBMS has to be persistent, that is it should be accessible when the program created the data ceases to exist or even the application that created the data restarted. A DBMS also has to provide some uniform methods independent of a specific application for accessing the information.

- RDBMS adds the additional condition that the system supports a tabular structure for the data, with enforced relationships between the tables. This excludes the databases that don't support a tabular structure or don't enforce relationships between tables.
- DBMS does not impose any constraints or security with regard to data manipulation it is user or the programmer responsibility to ensure the ACID PROPERTY of the database whereas the RDBMS is more with this regards because RDBMS defines the integrity constraint for the purpose of holding ACID PROPERTY. RDBMS may be or may not be Client Server Database System.

23. Domains & Domain Constraint.

Ans: The datatype describing the types of values, appearing in each column is called a **Domain**. A domain D is a set of atomic values. By atomic value, we mean that each value in the domain is not divisible as far as the relational model is concerned.

- **Domain constraints** specify that the value of each attribute A must be an atomic value from the domain dom (A). the data types associated with domains typically include standard numeric datatypes for integers (such as short, long) and real numbers (float and double), characters, fixed length strings data types

24. Concepts of Primary key, Foreign key & Super key.

Ans: A candidate key is chosen by the database designer as the principal means of identifying entities within an entity set or relation and it is called the **Primary key**.

- The primary key of a relation appears as a non-key attribute of some other associated relation. Such a nonkey attribute is called a **Foreign key**.
- The data values of an attribute or a group of attributes uniquely identify a tuple in a relation. This attribute or the group of attributes is called a key or a **Super Key**.

25. Concepts of Union Sets, Intersection Sets, Difference & Extended Cartesian Product.

Ans: The union operator is denoted by the word **UNION** or the symbol $\cup$ and it acts on two relations to generate a new relation containing all tuples of the relations except the duplicate ones. This implies that the new relation will have tuples which will belong to either the first relation or the second or both. Thus the result of this operation, denoted by $R \cup S$, is a relation that includes all tuples those are either in R or in S or in R and S. duplicate tuples are eliminated.

- The intersection operator is denoted by the word **INTERSECT** or the symbol $\cap$ and it acts on two relations to generate another relation consisting of only the common tuples between the two. The result of this operation, denoted by $R \cap S$ includes all tuples that are in both R and S.
- The **Difference** operator is denoted by the symbol '-' (or minus) and it operates on two relations to yield a third relation that comprises all tuples belonging to the relations preceding the operator and not to the relation following it.

The result of this operation denoted by $R - S$, includes all tuples present in R.

- The **Extended Cartesian product** of two relations is denoted by the operator $\bowtie$ and it produces a third relation containing all possible tuples that may be formed by concatenating the attributes of the relations.

Let A and B be relations of degree n_1 and n_2 , respectively. Then $A \times B$, the Cartesian product of A and B is the set of $(n_1 + n_2)$ – tuples whose first n_1 attribute values form a tuple in A and the last n_2 attribute values from a tuple in B. if the cardinality of the relations be C_1 and C_2 then the cardinality of the resulting relation will be $n_1 \times n_2$.

➤ Management Information System (MIS) And Information Economics

1. **Shortnote on Management Information System (MIS).**

Ans: Decisions are made on many issues that recur regularly and require a certain amount of information. So, the information systems can be developed so that the reports are prepared regularly to support these recurring decisions. MIS is designed to provide accurate, relevant and timely information to managers at different levels and in different functional areas throughout the organization for decision-making purpose.

2. **Define Management Information System (MIS) & its Feature.**

Ans: The term Management Information System refers to the data, equipment and computer programs that are used to develop information for managerial use.

- Basic Features of an MIS :

1. **Management Oriented:** The basic aim of MIS is to provide necessary information support to the Management in decision making. Naturally, the design of MIS is framed keeping the consideration of requirement of management of the organization. The management plays the most important role to develop the system specification of MIS to ensure the information need of different levels of management.
2. **Timeliness:** One of the most important issues involved in the effectiveness of MIS are flow of information at right time to the user level of management.
3. **Integrated:** Disintegrated information from different sub-systems becomes too much clumsy in decision making. Information from different related functional areas is to be integrated to make it meaningful for the users. In today's business environment, the different parameters of business process have a complex equation in an overall impact on the outcome. To understand the combined effect, linking them with the help of different analytical models is essential.
4. **Simplicity:** An MIS System should be as simple as possible so that people at operation and users do not feel any hazards. The success of a system lies in the acceptance by operation staff and users. A good amount of planning is required on the part of a MIS designer to make it simple keeping in mind the need of information at different levels of management. The designing skill of database and analytical models decides the quality of MIS.
5. **Reliability:** MIS system should provide most reliable information. For that what is needed the skill in design and efficiency in programming to develop the system. More important is a thorough check of input information, process flow and output reports on regular and routine basis.
6. **Consistency:** The input data and output reports must follow some standard norm so that consistency is preserved.
7. **Relevance:** Only relevant information flow at different levels of management helps in increasing the effectiveness of MIS. In other words, information of right quantity improves the efficiency of the users in the use of information for their decision making.
8. **Flexibility:** MIS should be flexible enough to take care of changes in the environment in the business system.

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3. Attributes of good MIS.

Ans: Important Characteristics for a Good Management Information System are Briefly Discussed Below:

- a) **Management Oriented:** A good management information system is not necessarily meant for top management only it may also meet the information requirements of middle level or operating levels of management.
- b) **Management directed:** Management should be responsible for setting system specifications well as management should also involve in directing changes when occur.
- c) **Integrated:** It means that all the functional and operational information sub-systems should be integrated together and there must be a capability of generating more meaningful information.
- d) **Common data flows:** It means that common input, processing and output procedures and media should be used. It eliminates data duplication and produces an efficient information system.
- e) **Heavy planning element:** A management information system usually takes 3 to 5 years and sometimes even longer period to get established firmly within a company. It means that MIS designer should keep in view future objectives and requirements of firm's information in mind.
- f) **Computerized:** The use of computer system increases the effectiveness of MIS. It processes the data fast and accurate.

4. Pre-requisites of an MIS.

Ans: The following are pre-requisites of an effective MIS:

- a) **Database -** The data in database is organised in such a way that access to the data is improved and redundancy is reduced. Such a database is capable of meeting information requirements of its executives, which is necessary for planning, organising and controlling the operations of the business.
- b) **Qualified System and Management Staff -** MIS should be managed by qualified officers. The organizational management base should comprise of two categories of officers
 - (i) System and Computer experts and
 - (ii) Management experts
- c) **Support of Top Management -** A MIS becomes effective only if it receives the full support of top management. To gain the support of top management, the officer should place before them all the supporting facts and state clearly the benefits which will accrue from it to the organization.
- d) **Control and Maintenance of MIS -** Sometimes users develop their own procedures or shortcut methods to use the system, which reduces its effectiveness. Maintenance is closely related to control.

5. Effects, Impacts & Advantages of Using Computer for MIS.

Ans: The effects of applying computer technology to Information System are as discussed below:

- a) **Increase in speed of processing and retrieval of data:** Computer with its fast computational capability and systematic storage of information with random access facility has emerged as an answer to the problems faced in modern days management.

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- b) **Expansion in the scope of use of information system:** System experts in business organizations developed the areas and functions, where computerized MIS could be used to improve the working of the concern. These types of applications are not feasible under the manual system.
- c) **Scope of analysis widened:** The use of computer can provide multiple type of information accurately and which makes the decision fast.
- d) **Complexity of system design and operation increased:** The computer manufacturers have developed some important programs software to help the users, which are self explanatory and require minimum system experts.
- e) **Integrates the working of different information subsystem:** There are number of subsystems like production, material, marketing ,finance, engineering and personnel which are integrated only due to applying computer technology to MIS.
- f) **Increases the effectiveness of information systems:** Before the existence of computer technology, it was difficult to provide the relevant information to business executives in time even after incurring huge expenses. The use of computer technology has overcome this problem, by providing timely, accurate and desired information for the purpose of decision-making.
- g) **More comprehensive information:** The use of computer for MIS enabled system expert to provide more comprehensive information to executives on business matters.

6. **Limitations of MIS.**

Ans: Limitations of the Management Information System are:

- MIS is not a substitute for effective management.
- MIS may not have requisite flexibility to quickly update itself with changing needs of time.
- MIS cannot provide standard information packages suitable for the purpose of every type of decision made by executives.
- MIS takes into account mainly quantitative factors, thus it ignores the non-quantitative factors like morale and attitude of members of the organization.
- MIS is less useful for making non-programmed decisions.

The effectiveness of MIS decreases due to frequent changes in top managements, organisational structure and operational team.

7. **Types of Decision making .**

Ans: Decision making type may be (i) programmed decisions and (ii) Nonprogrammed decisions.

- a) **Programmed decision making** refers to those decision making process which are based on some standard set of procedure established by the management and according to scientific principle of management. In case of programmed decision making, supporting information sets and reports are standard, well defined and well structured. Naturally decision making process is simple and based on some guidelines. For example, stores ledger summary and material consumption reports may help in decision making on Inventory control.

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- b) **Non-programmed decision making** refers to those decision making process which does not go by any pre-determined set of guidelines. Normally this type of decision making takes place to handle special business situations with the help of experience, judgement and vision of the decision maker. In case of non-programmed decision making, information are unstructured and external environmental information is a must along with internal information sets. For example, for decision on business policy many non-standard information like technology change, competitors market share etc is required apart from internal information of sales of different products.

8. **Transaction Processing System.**

Ans: Transaction processing refers to the processing of information relating to monetary transactions in the business activities like purchase, sale, payment, receipts etc. It is a computer based processing for different functional areas to generate all required reports for day-to-day use in the organization. The transaction processing system may be disintegrated or integrated. In case disintegrated transaction processing, data are collected from respective functional areas and processed and reports are generated for their use. In case of integrated transaction processing system, an application system which has capability of integrating all functional areas (say, ERP system), transaction processing are interlinked with all data from different system and the reports reflect the impact of integrated information.

- An information system designed to process routine business transactions
- Seeks time- and cost-efficiency by automating repetitive operations in large volumes
- Interfaces with an organization's other information systems, such as IRS, DSS, EIS
- Centers around accounting and finance transactions
- e.g, airline reservation systems, order entry/processing systems, bank's account processing systems

9. **Online Transaction Processing System (OLTP).**

Ans: On-line transaction processing is carried in a client/server system. In today's competitive environment, information at right time plays a great role in controlling costs of various resources and providing best possible services to the customers. In other words, business environment has been characterized by growing competition, shrinking cycle time and accelerating pace of technological innovations and companies have to focus on better information management. Better information means right information at right time. OLTP are being adopted in wider scale to have the following advantages:

- It can serve multiple users at a point of time
- Technology serves the facilities to collect information from multi-locations
- High flexibility in information processing etc.

10. **Online Analytical Processing (OLAP).**

Ans: An OLAP software does the analysis of information from data warehouse. The OLAP applications are widely scattered in divergent application area like Finance Management, Sales Analysis. The real test of an OLAP system is inefficient use of data from databases and computational capability of data to develop model establishing the relationship of various parameters. In fact, it provides the services of 'just-in-time' information.

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Though OLAP software are found in widely divergent functional areas, they have three common key features which are:

- Multidimensional views of data
- High analytical ability
- 'Just-in-time' information delivery

Rarely a business model limited a fewer than three dimensions. The common dimensions in business environment are organization, line item, time, product, channel, place etc. OLAP system should have the ability to respond the queries from a manager within a specified time. The OLAP software must provide a rich tool kit of powerful capability of analytical ability.

11. **Executive Information System (EIS).**

Ans: An Executive Information System (EIS) is special type MIS meant for top management of an organization. In other words, it is a Decision Support System (DSS) for Executives. Executive decisions are of three types – strategic planning, tactical planning and 'fire-fighting'.

An Executive Information System (EIS) is a set of procedure designed to allow senior managers to gather and evaluate information relating to the organization and its environment.

- Following are the special features of an EIS:
 - a) It a specially designed tool to feed executives information need.
 - b) It is an easy - to - use and screen based software.
 - c) It provides the executives the facilities of on-line analysis tools like time series analysis, regression analysis etc.
 - d) It is not limited to internal data only. Access to external sources of data is also provided.
 - e) It provides the facilities to connect to internet.
 - f) Information is presented in summary format.
 - g) It is a comprehensive Information System and work in conjunction with DSS.

12. **Business Intelligent (BI).**

Ans: A conceptual framework for decision support. It combines architecture, databas (or data warehouse), analytical tools and applications

- Remember that we defined business analytics (BA) to include the access, reporting, and analysis of data supported by software to drive business performance and decision making
- From our perspective, BA and BI are the essentially the same thing

13. **Data mining & Data Warehouse.**

Ans: Data mining : A class of information analysis based on databases that looks for hidden patterns in a collection of data which can be used to predict future behavior.

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- **Data Warehouse** : Data obtained from operational systems needed to support decision making

14. **Competitive Intelligence (CI).**

Ans: CI implies tracking what competitors are doing by gathering material on their recent and in process activities.

- BI can obtain data from third-party vendors such as demographic data

BI can support a competitive strategy in an industry

- low-cost leader
- market niche

Sustaining competitive advantage through building brand and customer loyalty using BI applications.

15. **Coding & its Advantages and Disadvantages.**

Ans: Information stored in a computer is often coded Coding categorises information and can replace long, description strings with a few letters or numbers (or both!) You are probably familiar with examples such as F for female and M for male

- **Coding – Advantages**

Information is often coded because:

- a) It is quicker to enter into the computer
- b) It require less disc space to store, and less memory to process
- c) It can make processing easier – or possible – as there will be fewer responses
- d) It improves the consistency of the data as spelling mistakes are less likely
- e) Validation is easier to apply

- **Coding – Disadvantages**

Coding also has some negative effects:

- a) Information is coarsened by forcing it all into categories – there might not be a category that matches what you want to record – e.g. hair colour
- b) The same can be true of rounding numbers – the intervals or numbers of categories is called the granularity – this needs to be chosen carefully to maintain the quality of the information

➤ Enterprise Resource Planning

1. **Enterprise Resource Planning.**

Ans: An enterprise planning system is an integrated computer based application used to manage internal and external resources, including tangible assets, financial resources, material and human resources. Basically, an ERP combines several traditional management functions into a logical integrated system and facilitate flow of information across these functions. It is designed to model and automate basic processes across the organization over a centralized database and eliminates the need of disparate systems maintained by various units of the organization.

2. **Advantages of ERP System.**

Ans: Following are the Advantages of The successful implementation of an ERP system:

- a) **Business integration and Improved Data Accuracy:** ERP system is composed of various modules/sub modules where a module represents a particular business component. If data is entered in one module such as receiving, it automatically updates other related modules such as accounts payable and inventory. This updating occurs at real time i.e. at the time a transaction occurs. Since, data needs to be entered only once at the origin of transaction, the need of multiple entries of the same data is eliminated. Likelihood of duplicate/ erroneous data is, therefore, minimized. The centralized structure of the data base also enable better administration and security provisions, which minimizes loss of sensitive data.
- b) **Planning and MIS:** The various decision support tools like planning engines and simulations functions, form integral part of an ERP system which helps in proper utilization of resources like materials, human resources and tools. Constrained based planning help in drawing appropriate production schedules, thereby improving operation of plant and equipment. As a part of MIS, an ERP system, contains many inbuilt standard reports and also a report writer which produce ad hoc reports, as and when needed.
- c) **Improved Efficiency and Productivity:** In addition to provision of improved planning, ERP system provides a tremendous boost to the efficiency of day to day and routine transactions such as order fulfillment, on time shipment, vendor performance, quality management, invoice reconciliation, sales realization, and cash management. Cycle time is reduced for sales to cash and procurement to pay sequences.
- d) **Establishment of Standardized Procedures:** ERP system is based on processes of international best practices, which are adopted by the organizations during implementation. Department silos are purged and maverick practices are done away with. Because of top down view available to management, chances of theft, fraud and obsolescence are minimized.
- e) **Flexibility and technology:** Due to globalized environment, where production units, distribution centers and corporate offices reside in different countries, organizations need multi currency, multi-language and multi accounting modes, in an integrated manner. These provisions are available in most of the ERP systems, particularly in products offered by tier 1 and tier 2 vendors. ERP vendors are also quick to adopt latest technologies, from mainframe to client server to internet. Unlike a bespoke system, Upgrading to latest technology for a running ERP system is uncomplicated, involving mostly adoption of service packs and patches.

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3. ERP Vendor.

Ans: During 1990, ERP market was dominated by few vendors namely SAP, BaaN, Oracle, People Soft and JD Edwards, who were also known as big five of ERP market. The market was, then, was growing at compound rate of approximately 35%. Fortune 500 companies were the major customers. Key focus of ERP vendors, during that period, was to expand functional scope of their product and provide sharper vertical focus. Manufacturing made up for the largest segment of ERP spending.

4. SAP & Oracle.

Ans: SAP : They are the largest ERP solution provider with more than 75,000 customers and 12 million users and holding around 30% of market share. The Flagship Solution, R/3 is unmatched for its sophistication and robustness. R/3 software gives an option of around 1000 pre-configured business processes. This solution is available in all major currencies and languages and can be hosted on several Operating Systems and Databases. As mid market option, SAP has brought out, Business All in One, a solution with industry tailored configurations. SAP offering for smaller organization is SAP Business One. SAP offers a hosted solution, namely SAP Business by Design, for organizations lacking IT resources.

Oracle : It is next to SAP in ERP market breadth, depth and share. It offers a comprehensive, multilingual and multi currency solution, mostly through its channel partners.. It is the first to implement internet computing model for developing and deploying its product. Oracle also took over various ERP solution providers during 2000 such as People Soft, J.D. Edwards, Retek (retail industry solution), and Siebel (customer relationship management software). It has taken up project Fusion (based on Service Oriented Architecture) to integrate various products, outcome of which is keenly awaited.

5. Business process Re-engineering & its Implementation.

Ans: BPR means not only change but radical change within a short period. This change is achieved by complete revamp of organizational structure, business process workflow, job description, performance measurement and adoption of information technology.

Some of Basic characteristics of BPR are:

- View business as a set of customer (both internal and external) oriented processes rather than a set of departmental functions.
- Processes must have clear cut ownership.
- Non value adding activities within a process should be eliminated.
- Gather information only once at the point of origin.

A successful BPR implementation brings significant improvement to productivity, customer service and bottom-line. There are pain and difficulties during implementation and instances where BPR efforts did not achieve desired result. Notwithstanding, the risk is worth taking. Otherwise, there will be grater risk of being overtaken by competitors who develop and progress rapidly through BPR.

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- Implementation phases

- a) **Project kick off:** Project goal, project team and communication standards are agreed upon. A number of workshops are held where project scope, sponsors commitment, project risk, milestones and deliverables are discussed. A SWOT (strength, weakness, opportunities and threat) analysis is carried out with active participation of all.
- b) **Process identification and data gathering:** "As is" processes are assembled through flow charts. Current practice of interfacing with business partners is gathered. Bottlenecks, delays, complexity, internal blame games, idle assets etc. are brought forward. Use of existing technologies is comprehended. Major and strategic business processes to be reengineered, are identified. Stakeholders categorize the processes to be reengineered and agreed upon on the timeline of implementation.
- c) **Process Re-engineering:** In this phase, actual reengineering begins. A number of brain storming sessions are held with project team and other stakeholders, where current business processes are critically analyzed to determine non value adding activities and identify excess control and check, always with customer value as a focal point. Impact of new technologies on process improvement is also evaluated. New process ideas with reduced check and control and enabling technologies such as Workflow Automation and ERP, are envisaged. Benchmarking is also done with best of breed industrial peers.
- d) **Blueprint of new system:** Blueprinting involves modeling workflow and information requirement, of new business processes. "To be" processes are modeled using various modeling tools. New organization structures, human resource need, performance monitoring and compensation, technological needs, are also outlined. Normally, a first cut redesign scheme is produced which is modified after gathering actionable feedback from the stakeholders

6. **Define Configuration.**

Ans: Configuration of an ERP system deals with handling of numerous usage controls, which can be switched off or switched on, so as to balance its functionalities to extant needs. First thing to happen is to install specific modules needed and configuring these modules, as per the scope of the project. Thousands of configuration tables are present, which define how the system should operate, how the data entry screen will look like, how the signals and messages will appear etc.

7. **Describe Inventory Management in SAP.**

Ans: Features of Inventory Management in SAP:

- a) Entry of goods movements (receipt, issue, transfer posting etc.) are on real time basis. Goods movements include both "external" movements (e.g. goods receipts from external procurement, goods issues for sales orders) and "internal" movements (e.g. goods receipts from production, withdrawals of material for internal purposes, stock transfers, and transfer postings)
- b) Creation of a document for every goods movement
- c) Automatic updating of quantity & value for inventory management and creation of accounting documents (Cost Accounting and Financial Accounting).

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- d) Division of the stocks into different categories (such as Unrestricted-use stock, stock in quality inspection or blocked stock)
- e) Batch management
- f) Management of special stocks (e.g. Vendor consignments, material provided to vendor etc.)
- g) Physical Inventory (Stock verification)
- h) Various analyses (such as the stock overview, Age Analysis etc.)

➤ Cyber Laws, E-Commerce

1. Define Asymmetric Crypto System.

Ans: It means a system of a secure key pair consisting of a private key for creating a digital signature and a public key to verify the digital signature.

2. Define Public Key & Private Key.

Ans: Public Key : The key of a key pair used to verify a digital signature and listed in the Digital Signature Certificate. The key of a key pair used to create a digital signature.

Private Key : The key of a key pair used to create a digital signature.

3. Power of CG to make Rules

Ans: Section 87 of the Information Technology Act, 2000 confers on the Central Government the power to make rules by notifying in the Official Gazette and the Electronic Gazette, in respect of certain matters, some of which are:

✓ Manner in which

- Any information or matter may be authenticated by means of digital signature under section 5;
- Electronic records shall be filed, created or issued and the method of payment;
- Digital signature may be affixed under section 10;
- The adjudicating officer shall hold enquiry under section 46.

✓ (Electronic) Form in which

- Electronic records shall be filed, created or issued;
- Digital signature may be affixed under section 10;
- An application for licence may be made;
- Application is made for renewal of licence under section 23;
- Application for issue of a digital signature certificate may be made;
- Appeal may be filed .

✓ Prescribing fee

- Payable along with application for license;
- For renewal of a license under section 23;
- Late payable under proviso to section 23;
- To be paid to certifying authority for issue of digital signature certificate;
- For filing an appeal.

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- ✓ Prescribing salary, allowances and other conditions of service of the
 - Presiding Officer under section 52;
 - Officers and employees.
- ✓ Prescribing procedure
 - for security, for the purpose of creating secure electronic record and secure digital signature under section 16;
 - For investigation of misbehavior or incapacity of the Presiding Officer .
- ✓ Prescribing
 - standards to be observed by the Controller ;
 - requirements which an applicant must fulfill ;
 - period of validity of license granted ;
 - documents which shall accompany an application for license;
 - qualification and experience which the adjudicating officer shall possess;
 - any other power of the civil court;
- ✓ Matters relating to the
 - type of digital signature under section 10;
 - Any other.

4. Offences & Penalty

Ans:

<u>Section</u>	<u>Offence</u>	<u>Penalty</u>	<u>Imprisonment</u>	<u>Both</u>
Sec. 43	Damage to computer, computer system etc. in <u>negligence</u>	Compensation	-	No
Sec. 65	Tampering (Damaging) with Computer source documents	Rs.2,00,000	Upto 3 yrs	Yes
Sec. 66	Damage to computer, computer system etc. in <u>intentionally</u>	Rs.5,00,000	Upto 3 yrs	Yes
Sec. 66A	Sending offensive messages or E-mails through computer	Fine	Upto 3 yrs	No
Sec. 66B	Retaining any stolen computer resource	Rs.1,00,000	Upto 3 yrs	Yes
Sec. 66C	Dishonestly making use of Electronic signature, password	Rs.1,00,000	Upto 3 yrs	No

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<u>Section</u>	<u>Offence</u>	<u>Penalty</u>	<u>Imprisonment</u>	<u>Both</u>
Sec. 66D	Cheating by Personation using computer resource or communication device.	Rs.1,00,000	Upto 3 yrs	Yes
Sec. 66E	Capturing, publishing or transmitting private area of any person without his or her consent.	Rs.2,00,000	Upto 3 yrs	Yes
Sec. 66F	Cyber terrorism threaten the unity, integrity, security or sovereignty of the nation	-	Life Imprisonment	No
Sec. 67	Publishing or transmitting Obscene Material in electronic form.	1st Time: Rs.5,00,000	Upto 3 yrs	Yes
		2nd Time: Rs.10,00,000	Upto 5 yrs	Yes
Sec. 67A	Publishing or transmitting of material containing sexually explicit act in electronic form	1st Time: Rs.10,00,000	Upto 5 yrs	Yes
		2nd Time: Rs.10,00,000	Upto 7 yrs	Yes
Sec. 67B	Child Pornography	1st Time: Rs.10,00,000	Upto 5 yrs	Yes
		2nd Time: Rs.10,00,000	Upto 7 yrs	Yes
Sec. 67C	Preservation of information by intermediaries in such manner as the Central Government may prescribe.	Fine	Upto 3 yrs	No
Sec. 68	Non-compliance with Controller's directions	Rs.1,00,000	Upto 2 yrs	Yes
Sec. 69	Failure to assist in information decryption	Fine	Upto 7 yrs	Yes
Sec. 69A	Failure to comply with Central Govt. direction.	Fine	Upto 7 yrs	Yes
Sec. 69B	Failure to assist in online access to computer resource	Fine	Upto 3 yrs	Yes
Sec. 70	Securing access to protected system	Fine	Upto 10 yrs	Yes
Sec. 70B	Failure to provide information	Rs.1,00,000	Upto 1 yrs	Yes
Sec. 71	Misrepresentation	Rs.1,00,000	Upto 2 yrs	Yes
Sec. 72	Breach of confidentiality and privacy	Rs.1,00,000	Upto 2 yrs	Yes
Sec. 72A	Disclosure of information in breach of lawful contract	Rs.5,00,000	Upto 3 yrs	Yes

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<u>Section</u>	<u>Offence</u>	<u>Penalty</u>	<u>Imprisonment</u>	<u>Both</u>
Sec. 73	Publishing false ESCs.	Rs.1,00,000	Upto 2 yrs	Yes
Sec. 74	Publication for fraudulent purpose	Rs.1,00,000	Upto 2 yrs	Yes
Sec. 75	This Act shall apply to an offence or contravention committed outside India by any person, irrespective of his nationality			
Sec. 76	Confiscation- Any computer, computer system, floppies, compact disks, tape drives or any other accessories related thereto			
Sec. 77	Other punishments- No compensation awarded, penalty imposed or confiscation made under this Act shall prevent the award of compensation			
Sec. 78	A police officer not below the rank of deputy Superintendent of Police shall investigate any offence under this Act.			

5. Cyber Appellate Tribunal

Ans: Cyber Appellate Tribunal has been established under the Information Technology Act under the aegis of Controller of Certifying Authorities (C.C.A.). It is established by the Central Government in accordance with the provisions contained under Section 48(I) of the Information Technology Act, 2000. The Cyber Appellate Tribunal has, for the purposes of discharging its functions under the I.T. Act, the same powers as are vested in a civil court under the Code of Civil Procedure, 1908. However, the procedure laid down by the Code of Civil Procedure, 1908 applies but at the same time the Tribunal is guided by the principles of natural justice. The Cyber Appellate Tribunal has powers to regulate its own procedure including the place at which it has its sittings.

6. Factors responsible for growth of E-commerce.

Ans: Main Reasons for the Spread of E-commerce:

- Digital convergence, i.e., it means that due to digital revolution almost all digital devices can communicate with one another.
- Today's E-commerce is available to anyone, anywhere in the world, anytime 24/7 (24 hours a day, 7 days a week).
- It helps in bringing about positive changes in an organization.
- People are now having a widespread access to IT and Personal Computers (PCs).
- E-commerce helps in reducing operating costs and increasing profit margins due to global operations.
- Demand for customized products and services is increasing.

7. Concepts of EDI & its Users.

Ans: EDI is the system where data is transferred electronically in machine readable or processable form. Here, moment any message is sent through EDI then it would be immediately processed by receiving computer without any human intervention or interpretation or rekeying.

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- **Uses of EDI**

EDI is used in following ways:

1. EDI is used to electronically transfer documents such as purchase order, invoices, shipping notices, receiving advises and other standard business correspondence between the trading partners.
2. EDI can also be used to transmit financial information and payment in electronic form. However, where EDI is used for effecting payment it is commonly known as financial EDI or electronic funds transfer.

8. Benifits of EDI.

Ans: EDI has following benefits:

- a) The use of EDI eliminated many problems associated with traditional information flow such as the delay associated with making of documents.
- b) As data is not repeatedly keyed (typed) therefore the chances of error are reduced.
- c) Time required to re-enter data is saved.
- d) As data is not re-entered at each step in the process, therefore labour costs are reduced.
- e) As time delays are reduced therefore more certainty in information flow is there.
- f) EDI generates functional acknowledgement that the EDI message has been received by the recipient and is electronically transferred to sender. Therefore this acknowledgement which is sent electronically by the recipient to sender, states that the message has been received.

9. Concept of Digital Signature.

Ans: Digital signature means authentication of any electronic record by a subscriber by means of an electronic method or procedure.

10. Concept of Public Key Infrastructure.

Ans: Public Key Infrastructure (PKI) is about the management and regulation of key pairs by allocating duties between contracting parties (Controller/CA/Subscribers), laying down the licensing and business. E-commerce norms for CAs and establishing business processes /applications to construct contractual relationships in a digitized world. The idea is to develop a sound public key infrastructure for an efficient allocation and verification of digital signatures certificate.

11. Concept of EFT & its types.

Ans: It refers to a process by which money is transferred from one person's bank account to another person's account electronically rather than using a check or transferring cash. Of course, these electronic transfers are also available to governments and businesses. The individuals or governments or businesses using them authorize these electronic transactions in writing. The transactions are processed through the Automated Clearing House (ACH) Network. Organizations using the network have formed an association, National Automated Clearing house Association.

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- **Types of Electronic Financial Transaction (EFT)**

- a) **Direct Deposits** : Perhaps the most common example of this type of electronic financial transaction is requesting your employer to deposit your paycheck directly into your bank account. You must sign a form in which you tell your employer the name of the bank and the number of your account in which you want the employer to deposit your paycheck. Your employer typically notifies your bank and tests the transaction to make sure there is no problem on the date of the transaction.

You can withdraw your authorization at any time. Most often everyone involved is happy with this arrangement. The employer saves money because direct deposits take less time to create and cost less to process through the banking system. The employee likes it because the money is automatically in the bank on payday without having to pick up the check and getting it to the bank.

- b) **Direct Payments**

Instead of writing a check to pay your bills, you pay bills by transferring money directly from your bank account to your creditor's bank account. In many instances, your creditor prefers this arrangement because your creditor will not have to open the mail and process the check when receiving your payment. In fact, creditors frequently will give discounts to customers who pay their bills electronically.

In some instances, you can also authorize your creditor to come into your bank account and take money from your account whenever you owe the creditor money. Why would you ever allow such an arrangement, which is called an ACH debit? Usually, creditors will give even greater discounts to customers authorizing ACH debits. The primary reason the creditor likes ACH debits is the creditor is assured of receiving payment at an exact time chosen by the creditor. In this way, the creditor can more accurately predict the creditor's cash position, and more efficiently manage and invest cash resources. ACH debits are most common in the commercial world. However, you frequently see them used by consumers when repaying bank loans, such as car loans and second mortgages. Frequently, the bank will offer a lower interest rate, or perhaps extend a greater amount of credit to borrowers who agree that the monthly payment can be automatically withdrawn from the borrower's bank account on a date certain.

12. Taxation difficulties in E-commerce.

Ans: Tax is always an important area of concern in commerce. Moreover in the knowledge Society of Twenty First Century it has become more complex in E-commerce. There are various tax difficulties in E-commerce. A few such difficulties are:

- a) **Problem of Tax collection:** Tax collection is not easy in case of online transactions and depends on the location of the e-merchants business, the location of the buyer, the types of goods for sale, etc. Whether income derived from online taxation qualifies for source taxation or not depends upon whether the entity that earn the income has some presence in the source country?
- b) **Problem of Sales Tax:** Another important controversial issue under e-commerce is sales tax. The sales tax law differs from country to country. Also, each country has different sales taxes and different jurisdictions. Most governments would like to increase tax revenues by taxing e-commerce. Since the e-commerce is also using the conventional channels of trade and business, governments and tax authorities would like to tax online trade. But the fear is that taxation of e-commerce in its early years might affect its growth, causing a much greater loss for everyone concerned in the long run.

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Some experts say that there is a possibility of E-commerce going away from a region with high taxes thus leaving it behind in the global race for E-commerce.

- c) **The Problems of Tax Jurisdiction and Enforcement:** As many online transactions involve parties residing and operating in different legal and tax jurisdictions therefore moot question is which authority has the necessary tax jurisdiction and it is not clear in many situations. Similarly, enforcement of tax laws on the Internet is equally difficult. For this Tax authorities need to frame common tax policies to avoid such problems.
- d) **Whether Web Server or ISPs Constitute Permanent Establishment in the Cross-Border transaction?**
Traditionally profits are taxed on two basis:
- Tax payer's residence basis i.e. country where tax payer resides.
 - Source of profit basis i.e. a country where transaction took place.

13. Legal aspects of E-commerce.

Ans: Due to the new and different type of activities in E-commerce, various legal aspects have come up. These legal disputes and case law are attracting attention of industries and governments around the world. A few legal aspects in E-commerce are:

- | | | |
|--------------------|----------------|--------------------------|
| a) E-security. | e) Contracts, | i) Copyrights, |
| b) Integrity, | f) Liability, | j) Patents, |
| c) Authentication, | g) Warranties, | k) Trademarks and Domain |
| d) Jurisdiction, | h) Taxation, | Names. |