

2022-23 PYQ

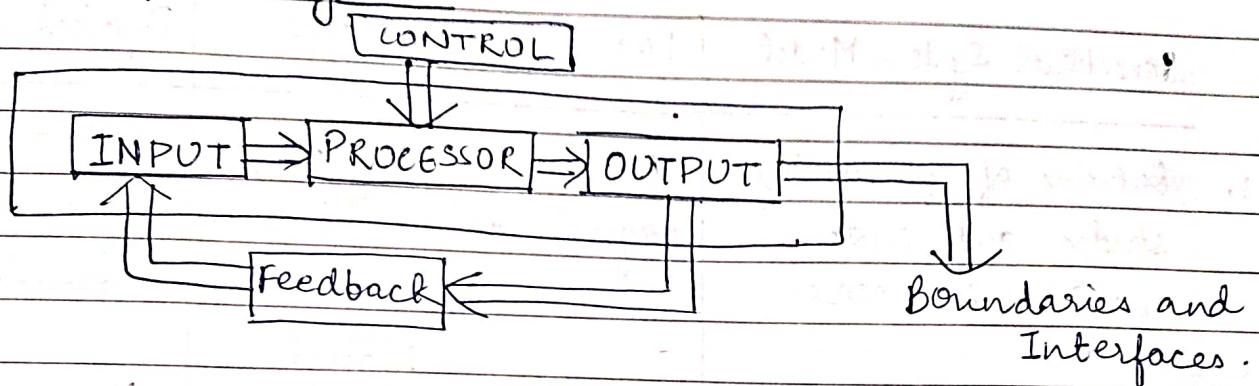
classmate

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1. Define a system. What are the key elements of a system? Distinguish between conceptual, physical and logical system models.

A system is an orderly grouping of independent components linked together according to a plan to achieve a specific goal.

Elements of a system



Output \Rightarrow Outcome of processing

Input \Rightarrow Information that enters into the system for processing.

Processor \Rightarrow Operational component of a system, involves the actual transformation of input into output.

Control \Rightarrow Decision making subsystem that controls the patterns of activities governing input, processing and output.

Feedback \Rightarrow Provides the control in a dynamic system.

Environment \Rightarrow Supersystem within which an organization operates.

6.

Boundaries and Interface \Rightarrow limits that identify its components processes and interrelationship when it interferes with another system.

System models are specifically designed to support analysis, specification, design, verification and validation of a system, as well as to communicate certain information.

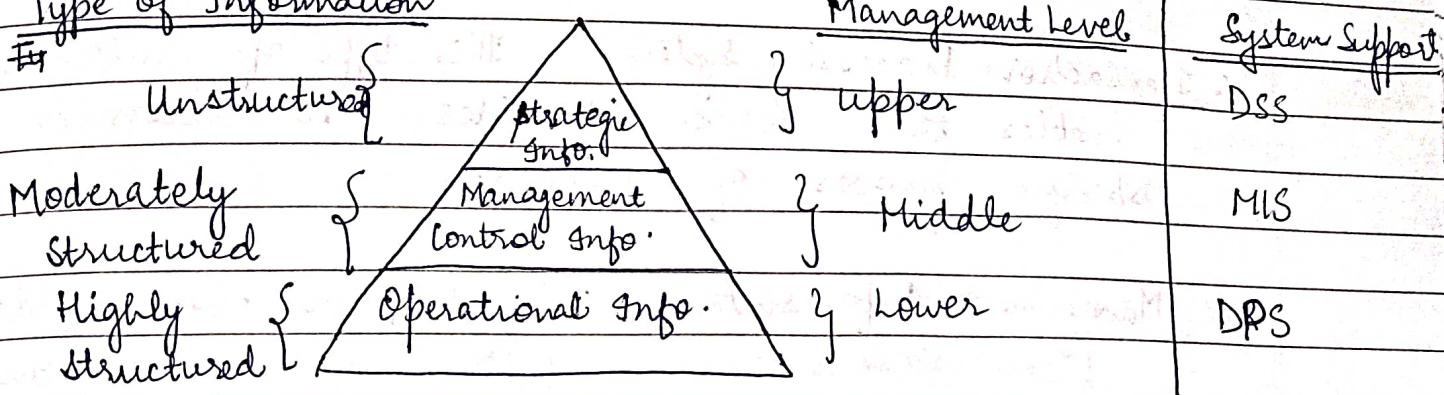
Conceptual System Model	Logical System Model	Physical System Model
1. Outcome of feasibility study and system analysis in SDLC.	Outcome of system / logical design phase.	Outcome of coding, testing and implementation phase of SDLC
2. It is conceptualization of the planned system.	It is the actual representation of a implemented system and is a tangible entity planned physical system and is yet to be implemented.	It consists of implemented system and associated documentation.
3. It is abstract conceptualisation and not a physical entity.	It specifies various modules/ components and their interdependence and interaction	It is the actual implemented system and is a tangible identity.

1.(b) Explain through a neat diagram the hierarchy of information levels and information systems in an organization.

1.(b) Information is processed form of data i.e. data that have been processed and shaped into a form that is meaningful to its users.

There are three categories of information related to managerial levels and the decision managers make.

Type of Information

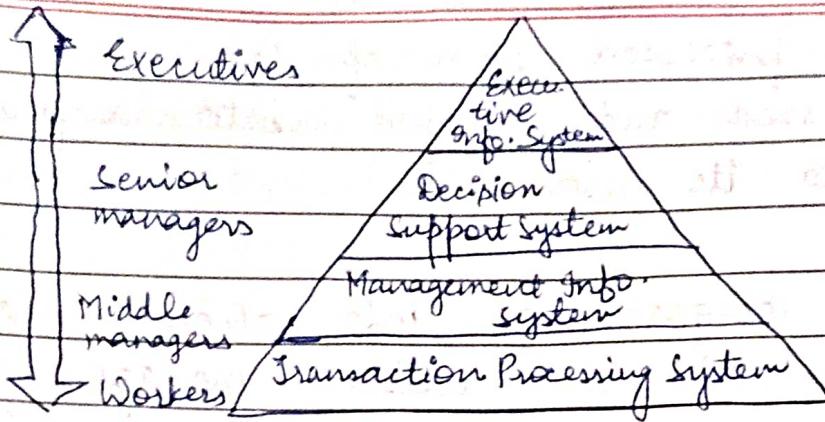


(i) Strategic Information - • Information required by topmost management for long range planning policies.
• It is achieved with the aid of Decision Support System (DSS).

(ii) Managerial Information - • Information required by middle management for short and intermediate range planning, ie in next few months.
• It is achieved with the aid of Management Information System (MIS).

(iii) Operational Information - Information required by low management for daily and short term planning.
• It is achieved with Data Processing Systems (DPS).

An information system is a combination of software, hardware and telecommunication networks to collect useful data especially in an organisation.



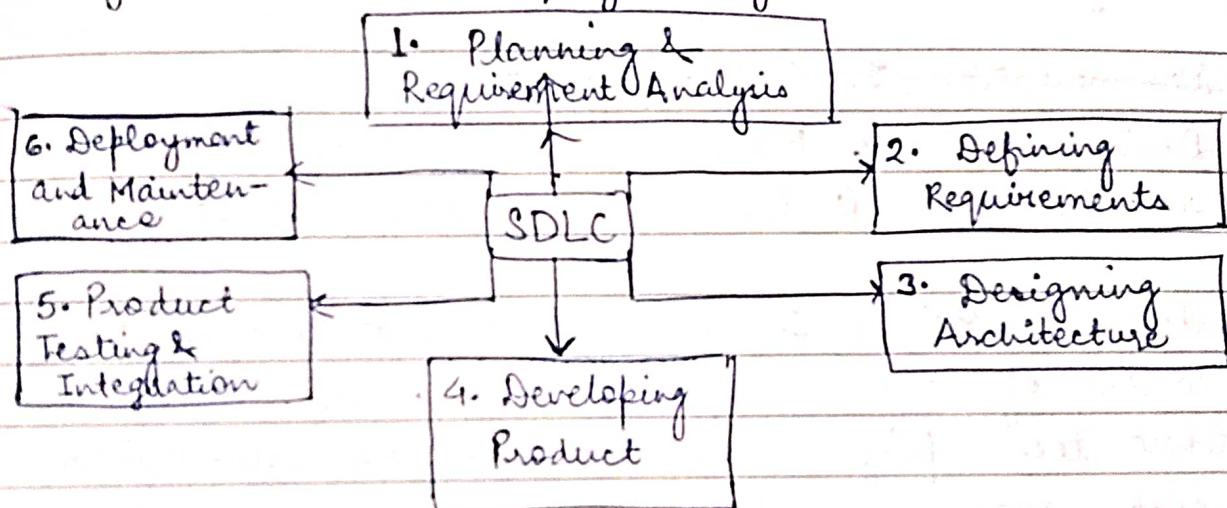
1. Transaction Processing System - This type of info. system enables the service provider to access a specific process of business.
2. Management Info. System - They help in obtaining data from various online system and data thus obtained is analysed in a productive manner to help in management of an organisation.
3. Decision Support System - It analyses the rapidly changing dat information that can't be determined in advance. An organisation can make an informed decision about its operation using decision support systems.
4. Executive Info. System - They help in making senior-level decisions for an organisation.

Q1) What is Software Development lifecycle? Explain the key elements of waterfall model along with its major advantages and disadvantages.

Software development lifecycle (SDLC) is a structured process that is used to design, develop and test good-quality software.

Goal of SDLC - to deliver high-quality, maintainable software that meets user requirements, within a given budget and a prescribed timeline.

Stages of SDLC - SDLC model involves six phases or stages while developing any software.



1. Planning & Requirement Analysis - This is attained from customer inputs and sales dept./market surveys.

In this stage, basic project is designed with all the available information.

2. Defining Requirements - This is fulfilled by utilizing SRS (Software Requirement Analysis). A sort of document that specifies all those things that need to be defined and created during the entire project cycle.

3. Designing Architecture - With the requirement defined in SRS, multiple designs for the product architecture are present in Design Document specification(DDS). After evaluating all the possible factors, the most practical & logical design is chosen for development.

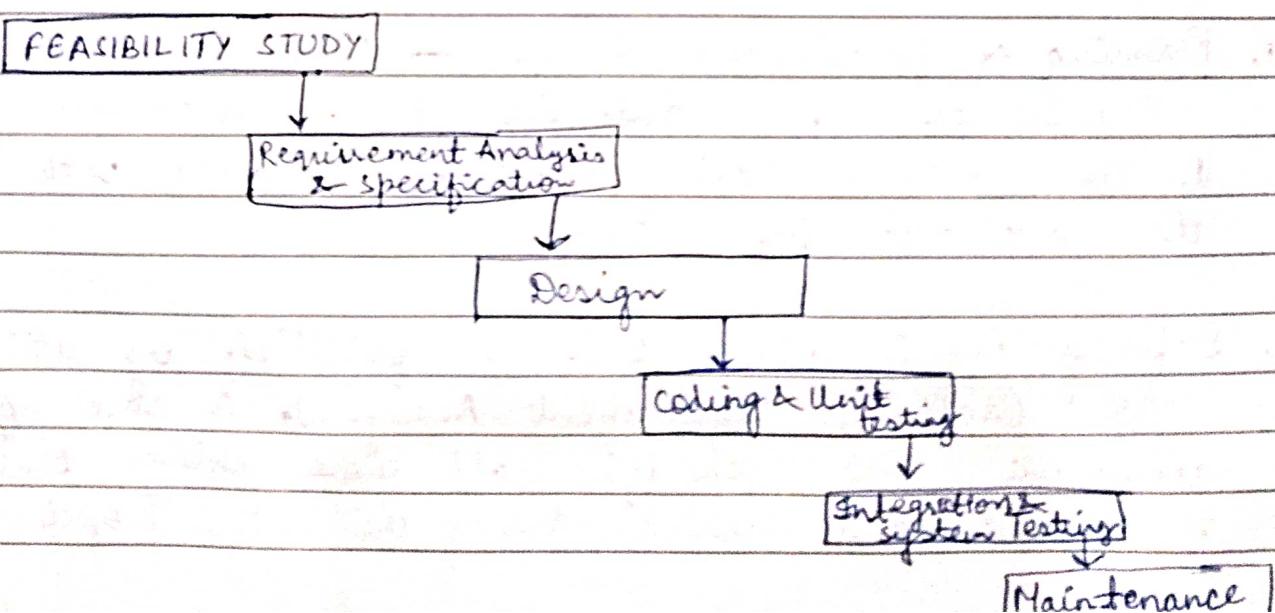
4. Developing Product - Fundamental development of product starts for, this developers use a specific programming code as per the design in the DDS.

5. Product Testing & Integration - Although minimal testing is done at every stage of SDLC, after development testing is done to ensure its smooth execution.

6. Documentation, Training & Support -

6. Deployment and Maintenance - Conclusive product is released and is tested in a real industrial environment.

Waterfall Model - Software development model used in context of large, complex projects. Useful in situations where the project requirements are well-defined and project goals are clear.



Advantages

- (i) Simple and easy to understand.
- (ii) Phases are processed one at a time.
- (iii) Processes, actions and results are very well documented.
- (iv) Clear and well-understood milestones.

Disadvantages

- (i) Doesn't incorporate any mechanism for error correction.
- (ii) Difficult to accommodate any change requests after the requirement specification phase is complete.
- (iii) Limited stakeholder involvement - stakeholders are typically involved in early phases of project but may not be involved in later phases.

Q. (b) Explain the commonly used fact finding tools for Preliminary Investigation.

Fact finding techniques are a process of collection of data and information based on techniques that contain a sampling of existing documents, research questionnaires, etc.

These are used in early stage of SDLC and is generally conducted by the requirement engineer.

1. Interviews - Most commonly used technique to collect info. however may not be able to get complete info. due to its formal nature, or lack of communication b/w system analysts and user.
2. Group Discussion - Involves more than two people.

Hence, agreement of on a certain aspect is a bit time consuming.

3. Site Visits - Site visits give the actual information about a project based on the observation of the person visiting the site.

Disadvantage - Time consuming, costly & expensive affair

4. Presentation - The engineer is required to give presentation to the customer to give them a basic idea of the project.

5. Questionnaires - These are used to collect info. from a large no. of users. Users fill up the questions which are given by system analyst and then give the answer back to system analyst.

3. (a) What is Feasibility study ? Explain the various types of feasibility analysis carried out during system analysis.

Feasibility study is the analysis of the software in terms of how much beneficial product development will be for the organization in a practical point of view.

The feasibility study mainly concentrates on below five mentioned areas :-

1. Technical Feasibility - Technical feasibility study gives report whether there exists correct required resources & technologies which will be used

for project development.

2. Operational Feasibility - Here, degree of providing service to requirements is analyzed along with this other operational scopes are determining usability of product.
3. Economic Feasibility - Cost and benefit of the project is analyzed. After this
4. Legal Feasibility - Project is analyzed in legality point of view. This includes data protection and social media laws, project certificate, license, copyright etc.
5. Schedule Feasibility - Here, mainly timelines/ deadlines is analyzed for proposed project which includes how many times much time team will take to complete final project.

3(b) What is the purpose of designing SRS document? Explain the typical structuring elements of SRS document.

Software requirement specification (SRS) is basically a description of software agreed between parties prior to its actual development.

Structure of SRS

1. Introduction
Consists of purpose, Intended audience, Scope, Definition and References.

2. Overall Description

- User Interfaces
- System Interfaces (e.g. Python modules, SSMS software)
- Constraints, Assumptions and Dependencies
- User Characteristics / Roles

3. System features and Requirements

- Functional Requirements (e.g. explicit mention of functional requirements)
- Non-functional requirements
- Use-cases (describing interaction b/w various entities)
- External Interface Requirements
- Logical Database Requirements

4. Share with end customers for approval (Approval Testing)

Uses of SRS Document

- (i) Development team requires it for developing product according to the need.
- (ii) Maintenance and support staff need it to understand the utility of software product.
- (iii) Cost customers use it to know what product they can expect.

4. (a) Distinguish between Coupling and Cohesion as design principles. What is desirable and why?

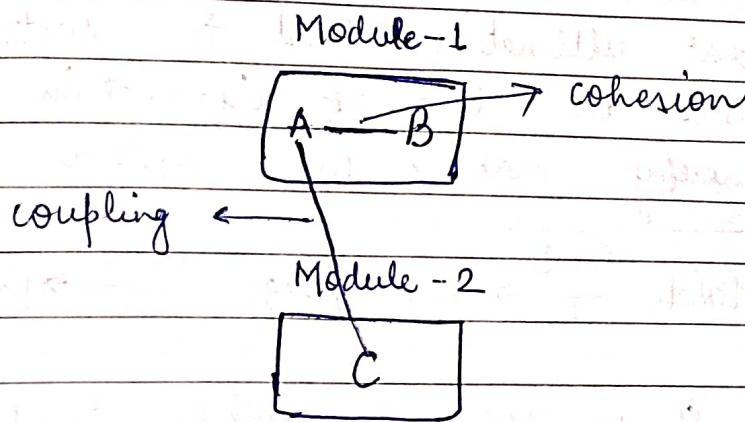
Cohesion

- i) Cohesion is an intra-module concept

Coupling

- Coupling is inter-module concept.

2. Cohesion represents the relationship within a module.	Coupling represents the relationship between modules.
3. It represents the functional strength of a software module.	It represents the independence among modules.
4. Cohesion is created between the same module.	Coupling is created between two different modules.
5. High cohesion gives the best software.	Loose coupling gives the best software.

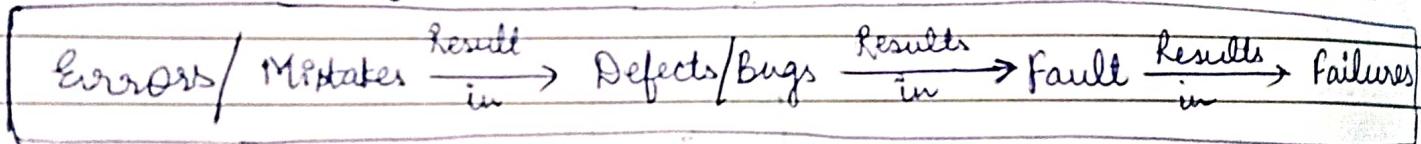


Low coupling is desired because it allows for greater flexibility and maintainability in the software system whereas, high cohesion is desired because it leads to more modular and maintainable software systems.

- b) Describe the following terms with reference to system testing:
- Error, Fault, Failure, Reliability.
- (i) Error - Refers to the discrepancy between a

Computed, observed or a measured value. It is a situation that happens when the development team or developer fails to understand a requirement definition and hence that misunderstanding gets translated into a buggy code.

- (ii) Fault - Faults occur in software when the logic are not incorporated to handle the errors in the application. This is an undesirable situation, but it mainly happens due to invalid documented steps or lack of definition.
- (iii) Failure - Failure is the accumulation of several defects that ultimately lead to software failure and results in loss of information in critical modules thereby making the system unresponsive.



- (iv) Reliability - It is the probability that a software/system will not undergo a failure for a specified time under specified conditions. Reliability is essentially the level of confidence one has in a system.
- There can be two measures of reliability:
- Ⓐ First measure is reliability for a specified period of time
 - Ⓑ Second measure is the average time between the occurrence of two failures.

Ques) Distinguish between verification and validation.
What are the various levels of software system testing?

Verification

- (i) It includes checking documents, design codes and programs
- (ii) Verification is the static testing
- (iii) It doesn't include the execution of the code
- (iv) Quality assurance team does verification
- (v) After Verification is done first.

Validation

- It includes testing and validating the actual product.
- Validation is the dynamic testing
- It includes the execution of the code.
- Validation is executed on software code with the help of testing team
- Validation is done after verification

Software testing is performed to identify errors so that errors can be removed to obtain a product with greater quality. There are different levels of testing:

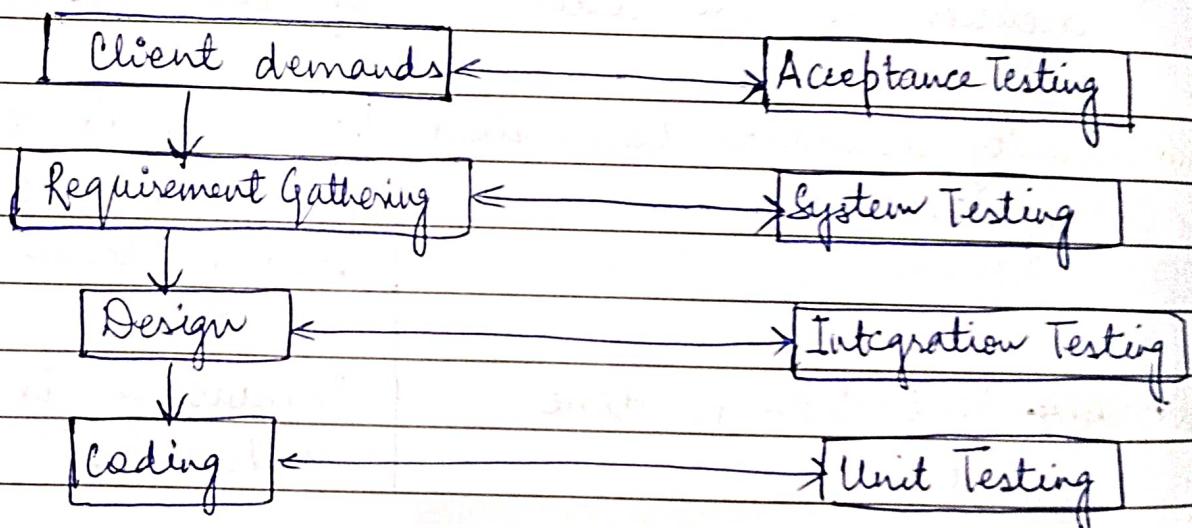
- (i) Unit Testing: Errors are detected individually from every component or unit by individually testing the components or units of software to ensure that they are fit for use by developers. Unit is the smallest testable part of the software.

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Integration Testing - At this level, many tested modules are combined into subsystems which are then tested. The goal here is to see if the modules can be integrated properly.

System Testing - At this level, the entire system is tested as per the requirements.

Acceptance Testing - It is a kind of testing conducted to ensure whether the requirements of the user are fulfilled prior to its delivery and the software works correctly in user's working environment.



Levels of Testing

5(b) What is the major difference between Blackbox and whitebox testing? Explain various criteria for testcase generation in the two approaches.

Refer to ans. 8(b) of 2016-17 PYQ.

6.(a) Describe the commonly used methods for system conversions.

System conversion is the process of changing from the old information system to a new or modified one.

There are four methods available for system conversion :-

(i) Parallel Conversion - Old and new systems are used simultaneously.

Advantages - Provides fallback when new system fails.

Disadvantages - Causes cost overruns and new system may not get fair trial.

(ii) Direct Cutover conversion - New system is implemented and old system is completely replaced.

Advantages - Forces users to make new system work.

Immediate benefits from new methods and control

Disadvantages - No fall back if problem arises with new system. Requires most careful planning.

(iii) Pilot Approach - Supports phased approach that gradually implement system across all users.

Advantages - Allows training and installation without unnecessary use of resources.

Avoid large contingencies from sick management

Disadvantages - It long term phasein causes a problem whether conversion goes well or not

Phase-In Method

(iv) Phase-In Method - Working version of system implemented in one part of organization based on feedback it is installed throughout the organization all alone.

Advantages - Provides experience and fine test before implementation when preferred new system involves new technology or drastic changes in performance.

Disadvantages - Gives impression that old system is erroneous and it is not reliable.

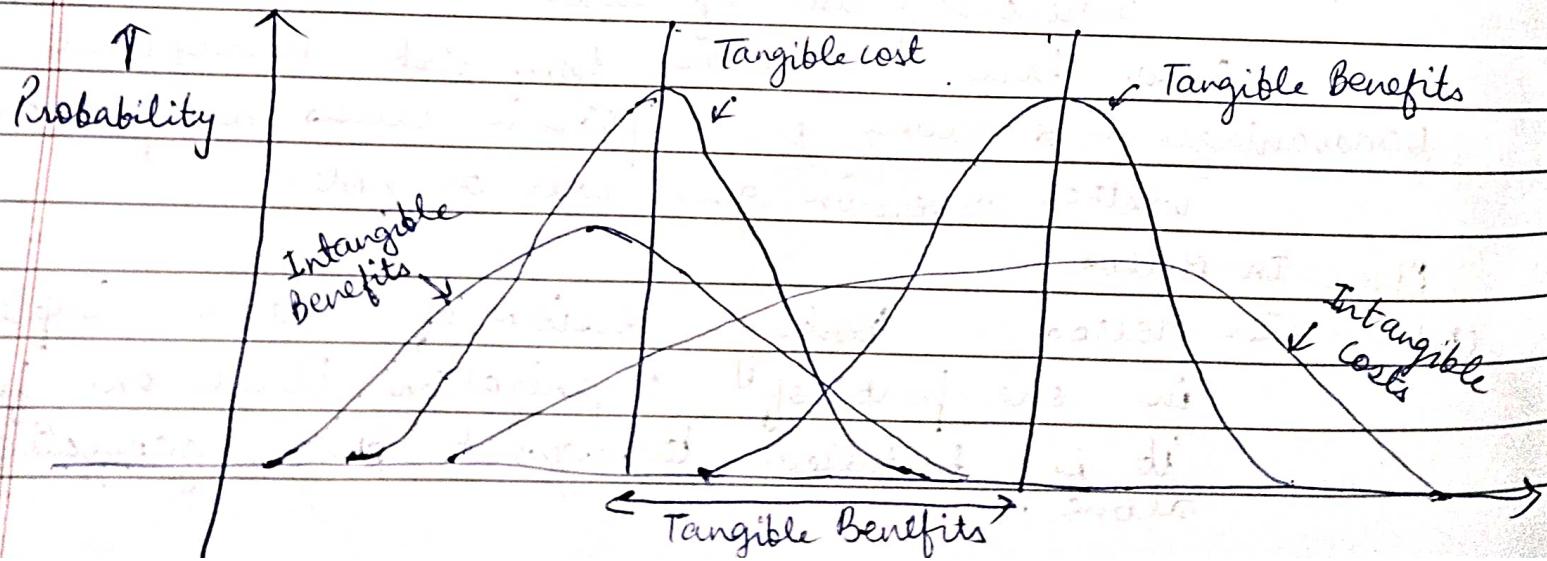
7. Write short notes on :-

(a) Tangible and Intangible Cost and Benefits :-

Tangibility refers to the ease with which costs or benefits can be measured. Thus, tangible costs are one that are readily identified and measured. e.g. Salaries of employees are tangible cost.

Costs that are known to exist who but whose financial value can't be accurately measured are referred to as intangible costs.

Benefits are also classified as tangible or intangible. Like costs, they are often difficult to specify accurately. Tangible benefits such as completing job in fewer hrs., reports with no errors are quantifiable. Intangible benefits such as more satisfied customers or an improved corporate image are not easily quantifiable.



(b)

Structured Analysis - Structured analysis came about during late 1970s. The basic goal of structured analysis is to clearly define what a system requirements are. It is a top-down approach which relies heavily on the use of some structural tools such as DFD, Decision tables, Data Dictionary etc.

Advantages of Structured Analysis :-

- (i) Provides a better method for organising and representing information about systems.
- (ii) Provides guidelines for checking the accuracy of the information.
- (iii) The specifications produced by this technique are clearly understandable due to use of standard tools.

Drawbacks

- (i) Most of the guidelines are only applicable in designing physical DFDs, there is no clearly specified guidelines for logical designing.
- (ii) It requires highly trained analysts and is time consuming.