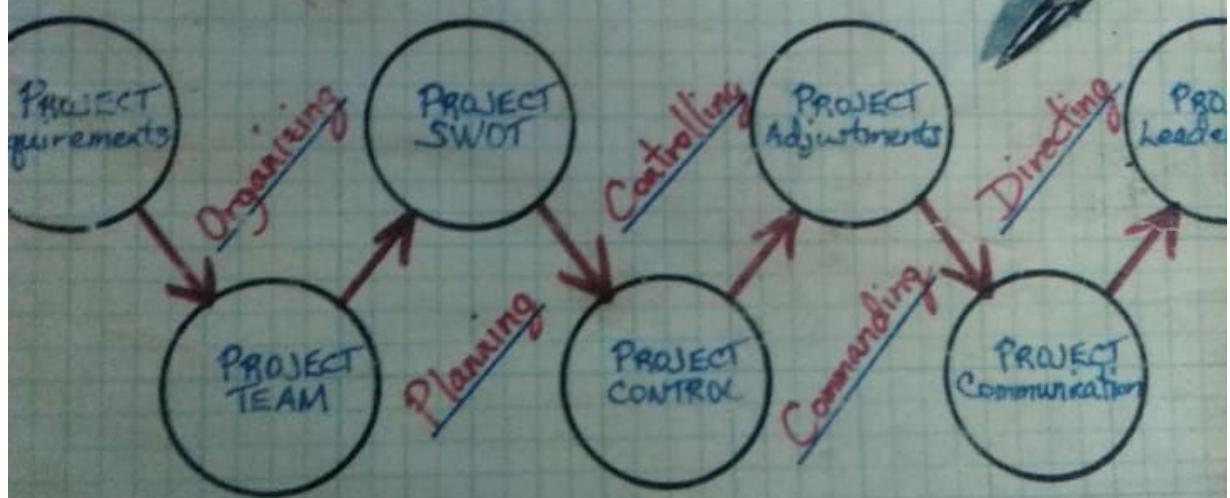


MANAGEMENT

GU  
BCA  
Sem 5

# Software Project Management

## PROJECT MANAGEMENT



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**NL-104**  
**November-2013**  
**SEC-301(1) :Software Project Management**

**Time : 3 Hours**

**Max. Marks : 70**

1. (a) Which are the activities covered by SPM ? List out all and explain it in detail.

A. There are basically 3 main activities covered by SPM. [ 06 ]

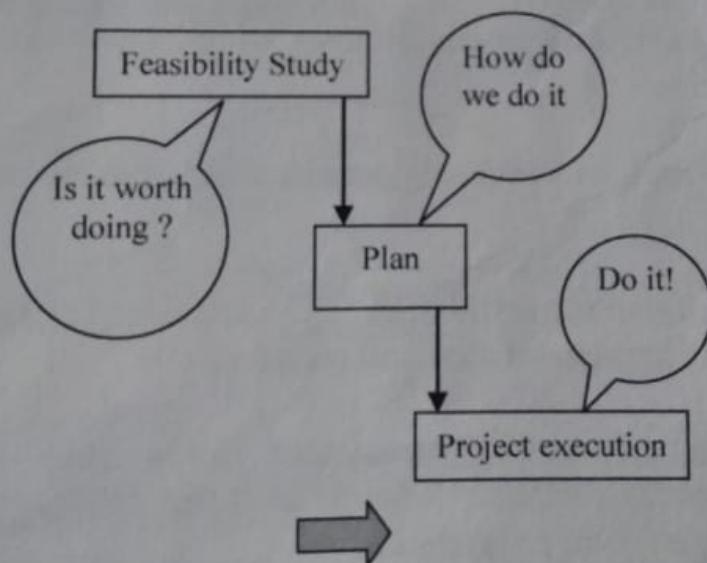
**1) Feasibility Study:**

The feasibility study assesses whether a project is worth starting or not.

Information is gathered about the requirements of the proposed application. With a large system, the feasibility study could be a project in its own right with its own plan.

Feasibility study can be of 3 types.

- a) Economical Feasibility
- b) Technical feasibility
- c) Operational feasibility



- a) **Economical feasibility** : This type of feasibility study checks whether the organization has enough budget to do the project or not.
- b) **Technical feasibility** : This feasibility study checks whether the organization has required resources or not.

c) **Operational feasibility** : This feasibility study checks whether the system works properly after developing and installing it.

**2) Planning :**

If the feasibility study indicates that the prospective project appears viable, then project planning can start.

The outline plan for the whole project and a detailed plan for the first stage is created.

**3) Project Execution:**

The project can now be executed.

The execution of a project contains design and implementation sub phases.

**OR**

**What is Programme ? Explain Infrastructure Programme in detail.**

- A. A program is a group of projects that are managed in a coordinated way to gain benefits that would not be possible were the projects to be managed independently.

**Infrastructure Programme:**

Organizations can have various departments which carry out distinct, relatively self contained activities.

These distinct activities will probably require distinct databases and information systems.

An infrastructure programme could refer to the activities of identifying a common infrastructure and its implementation and maintenance.

e.g. In a local authority, one department might have responsibilities for maintenance of highways, another for collection and another for education. They all require one infrastructure programme.

**(b) Define Stakeholder. Which are the categories of Stakeholders ? And explain in brief.**

[ 04 ]

**A. Stakeholder –**

The people who have a stake or interest in the project is called stakeholder.

Stakeholders can be categorized as:

**1. Internal to the project team:**

This means that they will be under the direct managerial control of the project leader.

**2. External to the project team but within the same organization:**

These are the stakeholders who are not the part of project team, but they are from the same organization.

e.g. The project leader might need help of user to carry out system testing.

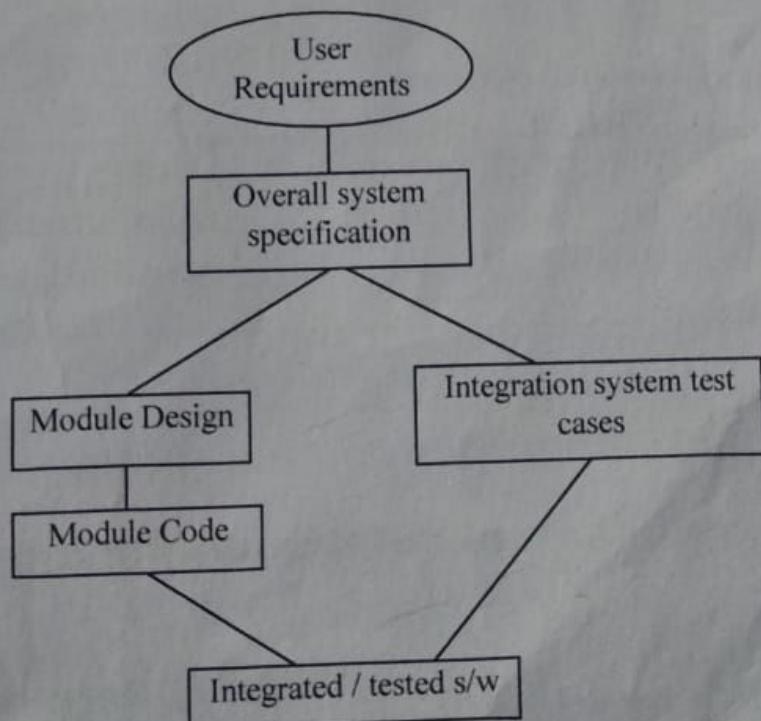
**3. External to both the project team and the organization:**

External stakeholders may be customers who will benefit from the system that the project implements.

**OR**

\* Explain Product Flow Diagram.

A.



Product flow diagram is used to document the generic flow of the system.

Some products will need one or more other products to exist first before they can be created.

The flow in the diagram is assumed to be from top to bottom and left to right.

PFDs should not have links between products which loop back iteratively. The form that a PFD takes will depend on assumptions and decisions about how the project is to be carried out.

**(c) Give differences between Sofware Project and other types of Project. [ 04 ]**

A.

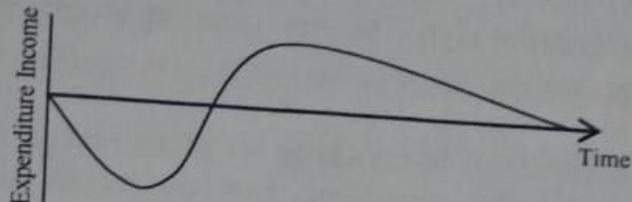
Term	Software Projects	Other type of project
Invisibility	With software, progress is not immediately visible.	In other types project, progress can actually be seen at every stage.
Complexity	Software products contain more complexity than other engineered art facts in terms of per dollar spent.	Other types of projects contains less complexity than software products.
Confirmity	Software developers have to conform to the requirements of human clients.	Other types of projects are governed by consistent physical laws. They do not require conformation of human clients.
Flexibility	Software project is easy to change	Other types of engineered projects cant changed once it has been developed.

**OR**

**Explain Cash Flow Forecasting.**

**A.** A cash flow forecast indicates when expenditure and income will take place.

2.



We need to spend money during a project's development. Such expenditure can't wait until income is received.

We can fund this expenditure either from the company's own resources or by borrowing.

A forecast is needed of when expenditure, such as the payment of salaries and any income are to be expected.

Accurate cash flow forecasting is difficult in the initial stage of the project development.

When estimating future cash flow, it is usual to ignore the effects of inflation.

## 2. (a) Explain eight core Atern/DSDM principles.

[ 06 ]

### A. Eight core Atern principles are:

- 1) Focus on business need: Every decision in the development process should be taken with a view to best satisfying business needs.
- 2) Deliver on time: Time-boxing is applied. Every deadline will see the delivery of valuable products even if some less valuable ones are held over.
- 3) Collaborate: A one-team culture should be promoted for the development of the project.
- 4) Never compromise quality: Realistic quality targets are set early in the project. The product should be continuously tested while developing.
- 5) Develop iteratively: The prototyping approach is followed to develop the product.
- 6) Build incrementally from firm foundations: The incremental delivery approach is applied here.

- 7) Communicate continuously: In the case of users, this could be done via workshops and demos.
- 8) Demonstrate control: It has a range of plans and reports that can be used to communicate project intentions and outcomes to sponsors and other management stakeholders.

**OR**

**Explain Albrecht Function Point Analysis.**

- A. The basis of function point analysis is that information system comprise five major components.
- 1) **External input types** : These are the input transactions which update internal computer files.
  - 2) **External output types** : These are the transactions where data is output to the users. These would be printed reports.
  - 3) **External inquiry types** : These are the transactions initiated by the user which provide information but do not update the internal files.
  - 4) **Logical internal file types** : These are the standing files used by the system. It refers to a group of data items that is usually accessed together.
  - 5) **External interface file types** : They allow for output and input that may pass to and from other computer applications.

10

23

23

(b) The project A has 9 inputs and 15 outputs. The new project B has 12 inputs and 14 outputs. Find out Euclidean distance. [ 04 ]

36

A. Euclidean distance =  $\sqrt{\text{target\_parameter1} - \text{source parameter1}}^2 + (\text{target\_parameter2} - \text{source parameter2})^2$

$$= \sqrt{(12-9)^2 + (14-15)^2}$$

$$= \sqrt{3^2 + (-1)^2}$$

$$= \sqrt{9 + 1}$$

$$= \sqrt{10}$$

$$= 3.16$$

**OR**

Define Prototype. Which are the different types of Prototype ? Explain in brief

**A. Prototype:**

A prototype is a working model of one or more aspects of the projected system.

**Types of prototype:****1) Throw-away prototype:**

The prototype tests out some ideas and is then discarded when the true development of the operational system is commenced. The prototype could be developed using a different software or hardware environment.

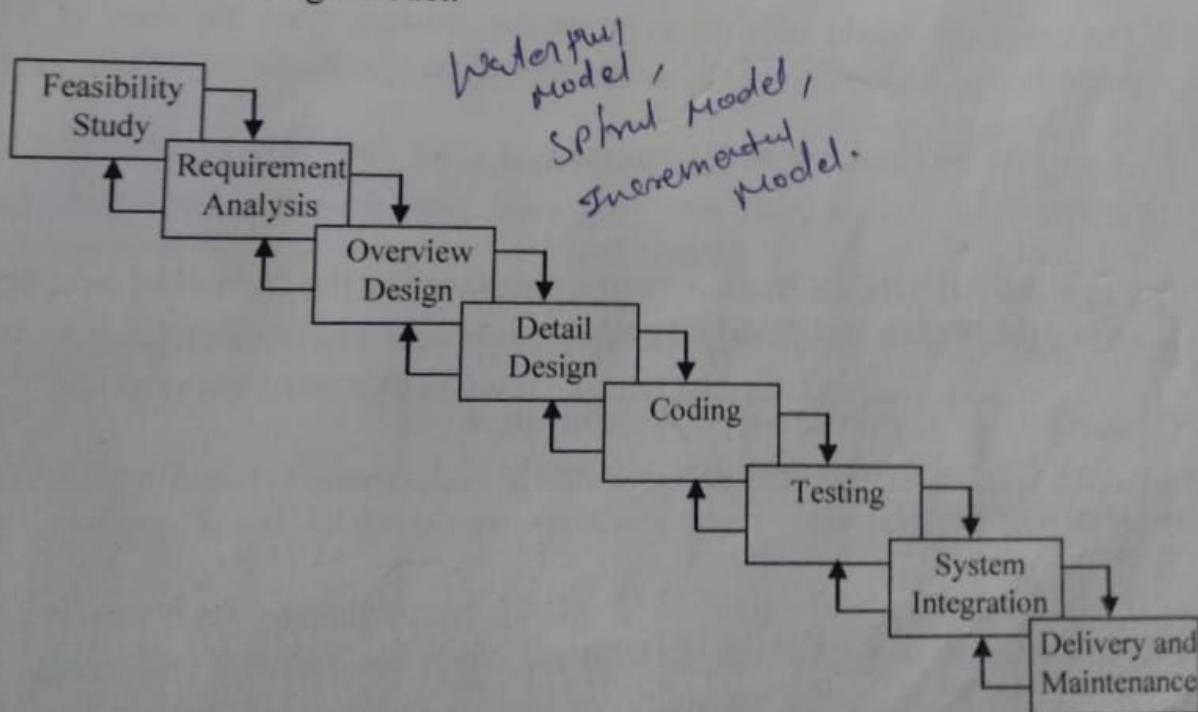
**2) Evolutionary prototype:**

The prototype is developed and modified until it is finally in a state where it can become the operational system.

**(c) Explain Waterfall Model.**

[ 04 ]

- A. This is the classical model of system development that is also known as the one-shot or once-through model.



There is a sequence of activities working from top to bottom.

The diagram shows some arrows pointing upwards and backwards. This indicates that a later stage may reveal the need for some extra work at an earlier stage.

The flow of a waterfall should be downwards, with the possibility of just a little splashing back.

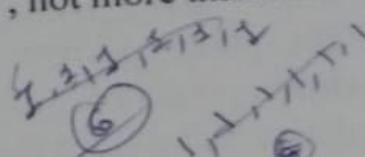
The waterfall approach may be favoured by some managements because it creates natural milestones at the end of each phase.

**Advantages:** It is the most common and easy to implement.

**Disadvantages:** User can go back only one stage , not more than that.

OR

**Explain Expert Judgement Technique.**



- A. This is the method of estimating a task from someone who is knowledgeable about either the application or the development environment.

This method is often used when estimating the effort needed to change an existing piece of software.

Someone already familiar with the software would be in the best position to do this.

The estimator would have to examine the existing code in order to judge the proportion of code affected and from that derive an estimate.

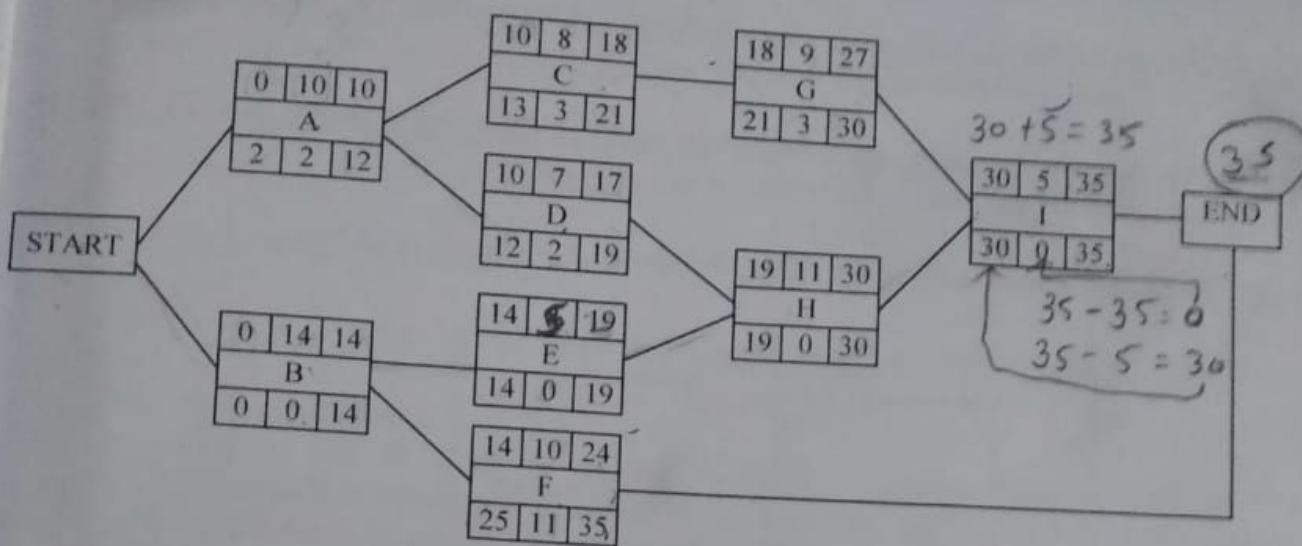
There may be cases where the opinions of more than one expert may need to be combined.

3. (a) Draw the Activity on Node network diagram for the following problem. Find out Critical Path and Total Duration.

Activity	Preceding Activities	Duration (days)
A	-	10
B	-	14
C	A	8
D	A	7
E	B	5
F	B	10
G	C	9
H	D, E	11
I	G, H	5

forward Max

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Critical Path = B - E - H - I

| ↗ ↘ |

Total Duration = 35 days

OR

Explain labelling conventions of Activity on Arrow network.

**A. Conventions of Activity on Arrow network:**

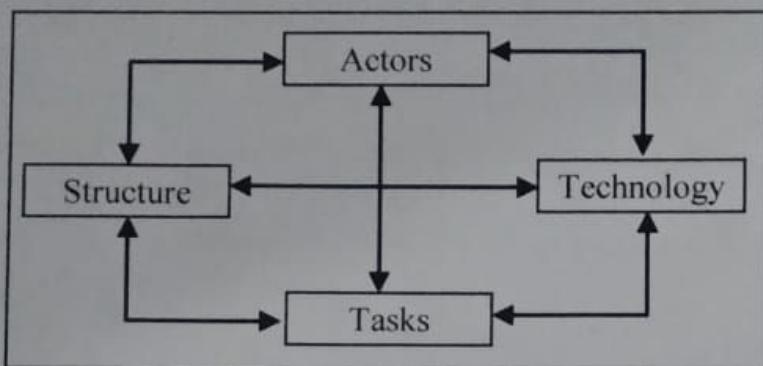
- 1) **A project network may have only one start node:** It is required that a network diagram have only one start node.
- 2) **A project network may have only one end node:** This is a requirement for activity-on-arrow networks.
- 3) **A link has duration:** A link represents an activity and activities take time to execute. The links are not drawn in any way to represent the activity duration.
- 4) **Nodes have no duration:** Nodes are events and are instantaneous points in time. The source node is the event of project becoming ready to start and the sink node is the event of project becoming completed.
- 5) **Time moves from left from right:** Activity-on-arrow networks are drawn, so that time moves from left to right.
- 6) **Nodes are numbered sequentially:** There are no precise rules about node numbering but nodes should be numbered so that head nodes have higher number than tail events.

- 7) **A network may not contain loops:** Loops either an error or logic or situation that must be resolved.
- 8) **A network may not contain dangles:** A dangling activity, can not exist, as they are not connected with the last activity.

**(b) Explain Socio technical model of risk.**

[ 04 ]

**A.**



This is based on Lyytinen s' socio technical model of risk

- 1) Actors relate to all those involved in the project including both developers, users and managers e.g. a risk could be that high staff turnover leads to information of importance to the project being lost
- 2) Technology – both that used to implement the project and that embedded in the project deliverables – risk could be that the technologies selected are not in fact appropriate.
- 3) Structure – this includes management procedures, risk here is that a group who need to carry out a particular project task are not informed of this need because they are not part of the project communication network
- 4) Tasks – the work to be carried out. A typical risk is that the amount of effort needed to carry out the task is underestimated.

**OR**

**Explain brainstorming in risk identification.**

- A.** Representatives of the main stakeholders can be brought together, ideally, once some kind of preliminary plan has been drafted.

They identify, using their individual knowledge of different part of the project, the particular problems that might occur.

Brainstorming can also be used to identify possible solutions to the problems that emerge.

**(c) Explain Risk Planning.**

[ 04 ]

A. Risks can be dealt with by: Risks can be dealt with by:

**1) Risk acceptance :**

This is the do nothing option. In risk prioritization process, we decide to ignore some risks in order to concentrate on the more likely or more damaging. The cost of avoiding the risk may be greater than the actual cost of the damage.

**2) Risk avoidance :**

Some activities may be so prone to accident that it is best to avoid them altogether. If you are worried about crocodiles then don't go into the water. Avoid the environment in which the risk occurs.

**3) Risk reduction :**

Here we decide to go ahead with a course of action. Here, we decide to go ahead with a course of action despite the risks, but take pre-cautions that reduce the probability of the risk. The risk is accepted but actions are taken to reduce its likelihood.

**4) Risk transfer:**

The risk is transferred to another person or organization. The risk of incorrect development estimates can be transferred by negotiating a fixed price contract with an outside software supplier.

**OR**

**Define Total Float and Free Float.**

**A. Total Float:**

The difference between an activity's earliest start date and its latest start date is called the total float.

Total float = earliest start duration – latest start duration.

**Free Float:**

The difference between the earliest completion date for an activity and the earliest start date of the succeeding activity.

Free float = earliest completion duration – earliest start duration of next activity

(a) List out categories of resources and explain in brief. [ 06 ]

**A. Resources:**

A resource is any person or item required for the execution of the project.

**Categories of resources :**

**1) Labour:**

The main items in this category will be members of the development project team such as project manager, system analyst and software developers.

**2) Equipment :**

Obvious items will include workstations and other computing and office equipment such as chairs, desks.

**3) Materials:**

Materials are items that are consumed rather than equipment is used. E.g. Require supplies of disks to be specially obtained.

**4) Space:**

For projects that are undertaken with existing staff, space is normally readily available.

**5) Services:**

Some projects will require procurement of specialist services. E.g. requires scheduling of telecommunication services.

**6) Time:**

Time is the resource that is being offset against the other primary resources.

**7) Money:**

Money is the secondary resource used to buy other resources and will be consumed as other resources are used.

List out types of contracts and explain anyone in brief.

A. Types of contract:

- 1) Fixed price contracts:
- 2) Time and materials contracts
- 3) Fixed price per delivered unit

**Fixed Price contract:**

In this situation a price is fixed when the contract is signed. The consumer knows that if there are no changes in the contract terms, this is the price they pay on completion.

For this to be effective, the customer's requirement has to be fixed at the outset.

When the contract is to construct a software system, the detailed requirement analysis must already have been carried out.

**Advantages:**

- 1) known expenditure
- 2) supplier motivated to be cost-effective

50

**Disadvantages:**

- 1) supplier will increase price to meet contingencies
- 2) difficult to modify requirements
- 3) cost of changes likely to be higher
- 4) threat to system quality

(b) Write a short note on slip chart.

[ 04 ]

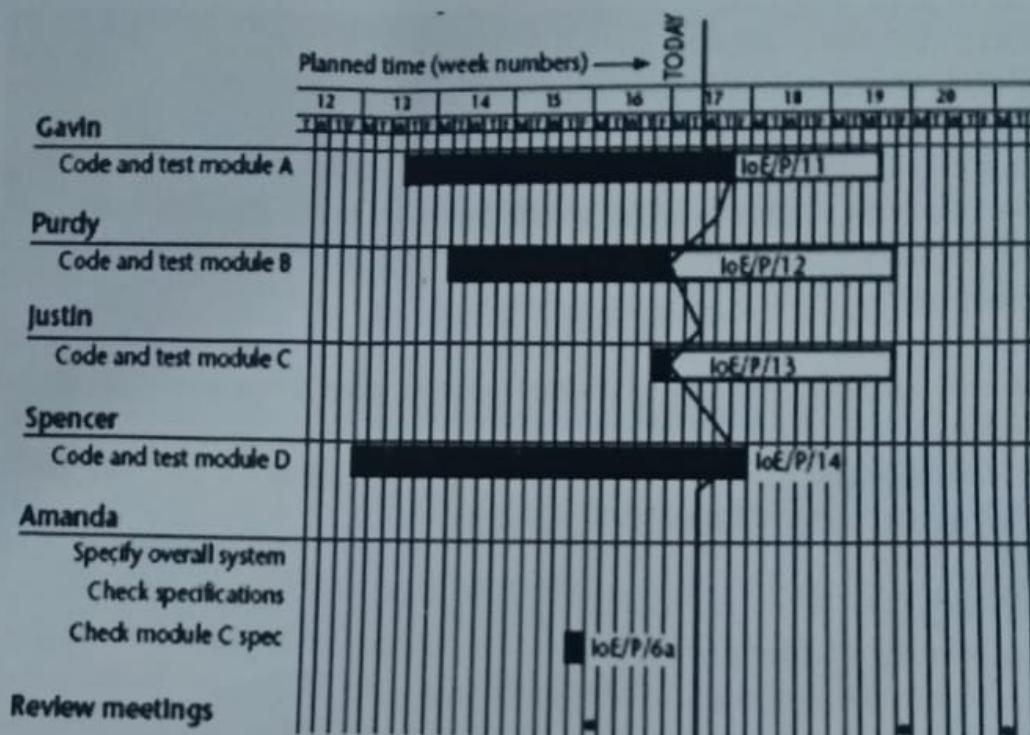
A. A slip chart is a very similar alternative favoured by some project managers who believe it provides a more striking visual identification of those activities that are not progressing to schedule.

The more the slip lines bends, the greater the variation from the plan.

The slip line indicates those activities that are either ahead or behind the schedule.

Too much bending indicates a need for rescheduling of the overall plan.

Additional slip lines are added at intervals and, as they build up, the project manager will gain an idea as to whether the project is improving (subsequent slip lines bend less) or not. A very jagged slip line indicates a need for rescheduling.



OR

**Define 0/100 technique; milestone technique.**

**A. 0/100 technique:**

It is a technique where a task is assigned a value of zero until such time that it is completed when it is given a value of 100% of the budgeted value.

**Milestone technique:**

It is a technique where a task is given a value based on the achievement of milestones that have been assigned values as part of the original budget plan.

**(c) Define Open tendering process and Restricted tendering process.** [ 04 ]

**A. Open Tendering Process:**

In this, any supplier can bid in response to the invitation to tender all tenders must be evaluated in the same way government bodies may have to do this by local/international law (including EU and WTO, World Trade Organization requirements).

### **Restricted Tendering Process:**

**Restricted Tendering Process:**  
In this case, there are bids only from those specifically invited can reduce suppliers being considered at any stage.

OR

## **Define Staff Costs and Overheads**

#### A. Staff costs:

These will include staff salaries as well as the other direct costs of employment such as the employer's contribution to social security funds, pension scheme contribution, holiday pay and sickness benefit.

### Overheads:

Overheads represents expenditure that an organization incurs which cannot be directly related to individual projects including space rental, interest charges and costs of service.

**5. Answer the followings :**

[ 14 ]

- (1) \_\_\_\_\_ system is created specifically for one customer ?

  - (a) Off-the-shelf
  - (b) Customized-off-the-shelf
  - (c) Bespoke
  - (d) None of above

#### A. (c) Bespoke

- (2)  $CV = \frac{\text{EV}}{\text{AC}} - \frac{\text{EV}}{\text{PV}}$ .

### A. (a) EV, AC

- (3) \_\_\_\_\_ is a method of recording and displaying the way in which targets have changed throughout the duration of the project.



#### A. (b) Timeline Chart

- (4) The probability that a system will not be available at the time required or the probability that a transaction will fail is called \_\_\_\_\_.

- (a) Availability
- (b) Mean time between failure
- (c) Failure on demand
- (d) Support Activity

A. (b) Mean time between failure

(5) Full form of MoA.

A. Memorandum of Agreement

(6) PERT stands for \_\_\_\_.

A. Program Evaluation and Review Technique.

(7) What is a Project ?

A. Project is a planned activity.

(8) Define Dangles.

A. A dangle activity is a "loose" activity in your project schedule, and it has neither a predecessor activity nor a successor activity.

(9) Define Hammock Activity.

A. Hammock activities are activities that have zero duration but are assumed to start at the same time and to end at the same time as the last one.

(10) Write down Parkison's Law.

A. Work expands to fill the time available.

(11) A project is a planned activity (True or False)

A. True

(12) Define Surrogate.

A. Surrogate is a method for calculating 'loss' in days rather than money.

(13) Risk Exposure = \_\_\_\_\_.

A. Potential damage \* probability of occurrence

- (14) Waterfall Model can be expanded into the \_\_\_\_ model.
- (a) V-process
  - (b) Incremental
  - (c) Spiral
  - (d) None of above

A. V-process

\* \* \*

**N 15 – 111**  
**November – 2014**  
**B.C.A, Sem. – V**  
**SEC 301(1) : Software Project Management**

**Time : 3 Hours]**

**[Max. Marks : 70]**

**(A) What is program ? Explain types of program.**

**[07]**

**OR**

**Define Stakeholder. Explain the categories of stakeholders.**

**A. Stakeholder**

The people who have a stake or interest in the project is called stakeholder.

**Stakeholders can be categorized as:**

**1. Internal to the project team:**

This means that they will be under the direct managerial control of the project leader.

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These are the stakeholders who are not the part of project team, but they are from the same organization.

e.g. The project leader might need help of user to carry out system testing.

**3. External to both the project team and the organization:**

**A. External stakeholders may be customers who will benefit from the system that the project implements.**

**B) Which are the activities covered by Software Project Management ? Explain them in detail.**

**[07]**

**1. There are basically 3 main activities covered by SPM.**

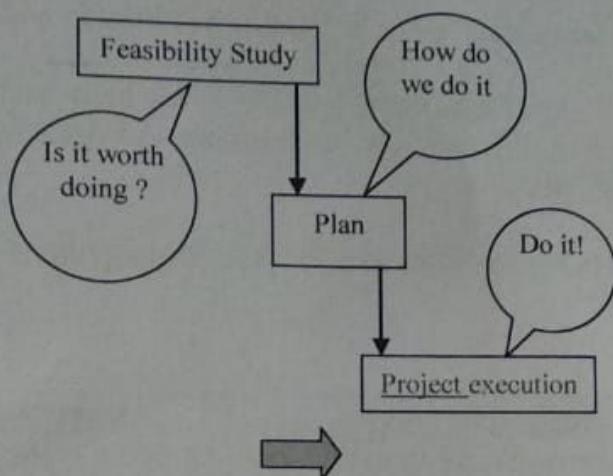
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  - Operational feasibility:** This feasibility study checks whether the system works properly after developing and installing it.
- 2. Planning :**  
If the feasibility study indicates that the prospective project appears viable, then project planning can start.
- The outline plan for the whole project and a detailed plan for the first stage is created.
- 3. Project Execution:**  
The project can now be executed.  
The execution of a project contains design and implementation sub phases.
- OR**
- Explain Product Flow Diagram.** [03]

A. Product flow diagram is used to document the generic flow of the system.

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The flow in the diagram is assumed to be from top to bottom and left to right.

PFDs should not have links between products which loop back iteratively. The form that a PFD takes will depend on assumptions and decisions about how the project is to be carried out.

(ii) Give the difference between Software Project Management and other types of project. [04]

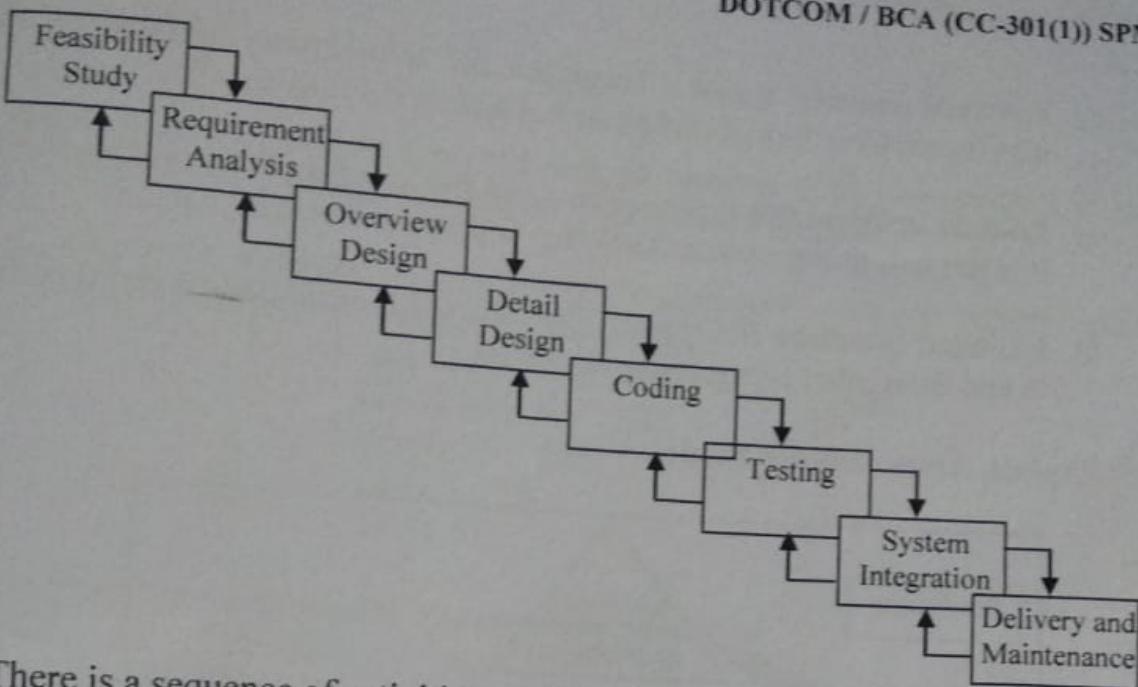
A.

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(A) Explain Waterfall Model.

[07]

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**Advantages:** It is the most common and easy to implement.

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**OR**

**Explain Albrecht Function Point Analysis.**

[07]

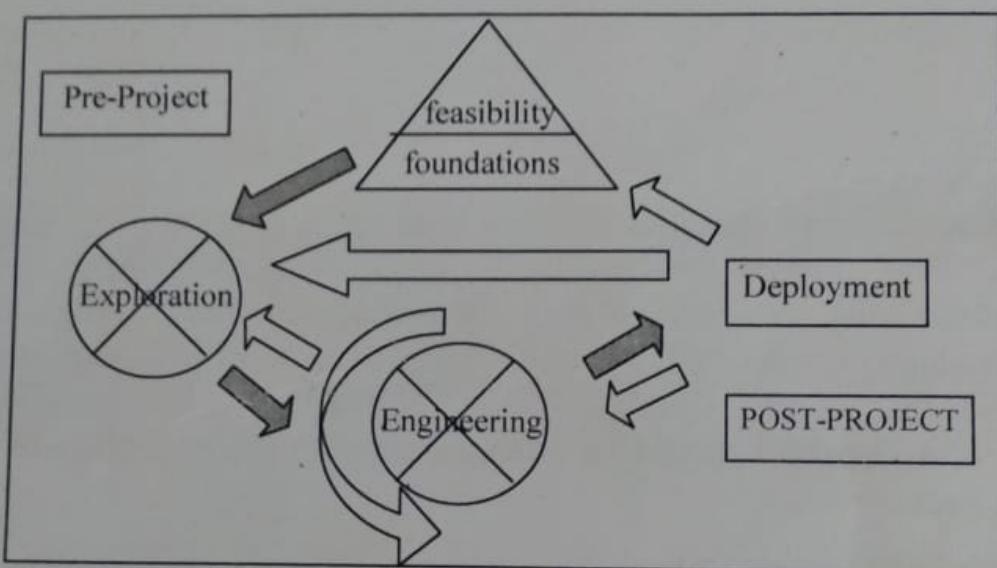
- A** The basis of function point analysis is that information system comprise five major components.
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- 5) **External interface file types:** They allow for output and input that may pass to and from other computer applications.

#### (B) Explain Atern Process Model.

[07]

A.



#### 1) Feasibility/foundation:

Among the activities undertaken here is derivation of a business case of the sort and general outlines of the proposed architecture of the system to be developed.

#### 2) Exploration cycle:

This investigates the business requirements. This could be an iterative process that could involve the creation of exploratory prototypes. A large project could be decomposed into smaller increments to assist the design process.

#### 3) Engineering cycle:

This takes the design generated in the exploration cycle and converts it into usable components of the final system that will be used operationally.

#### 4) Deployment:

This gets the application created in the engineering cycle into actual operational use.

OR

- (i) The project A has 6 inputs and 10 outputs. The new project B has 15 inputs and 23 outputs. Find out Euclidean Distance. [03]

A. Euclidean distance =  $\text{sqrt}((\text{target\_parameter1} - \text{source parameter1})^2 + (\text{target\_parameter2} - \text{source parameter2})^2)$

$$\begin{aligned} &= \text{sqrt}((15-6)^2 + (23-10)^2) \\ &= \text{sqrt}(9^2 + 13^2) \\ &= \text{sqrt}(81 + 169) \\ &= \text{sqrt}(250) \\ &= 15.81 \end{aligned}$$

- (ii) Define Prototype and Throw-away prototype. [04]

**A. Prototype:**

A prototype is a working model of one or more aspects of the projected system.

**Types of prototype:**

1) Throw-away prototype:

The prototype tests out some ideas and is then discarded when the true development of the operational system is commenced. The prototype could be developed using a different software or hardware environment.

2) Evolutionary prototype:

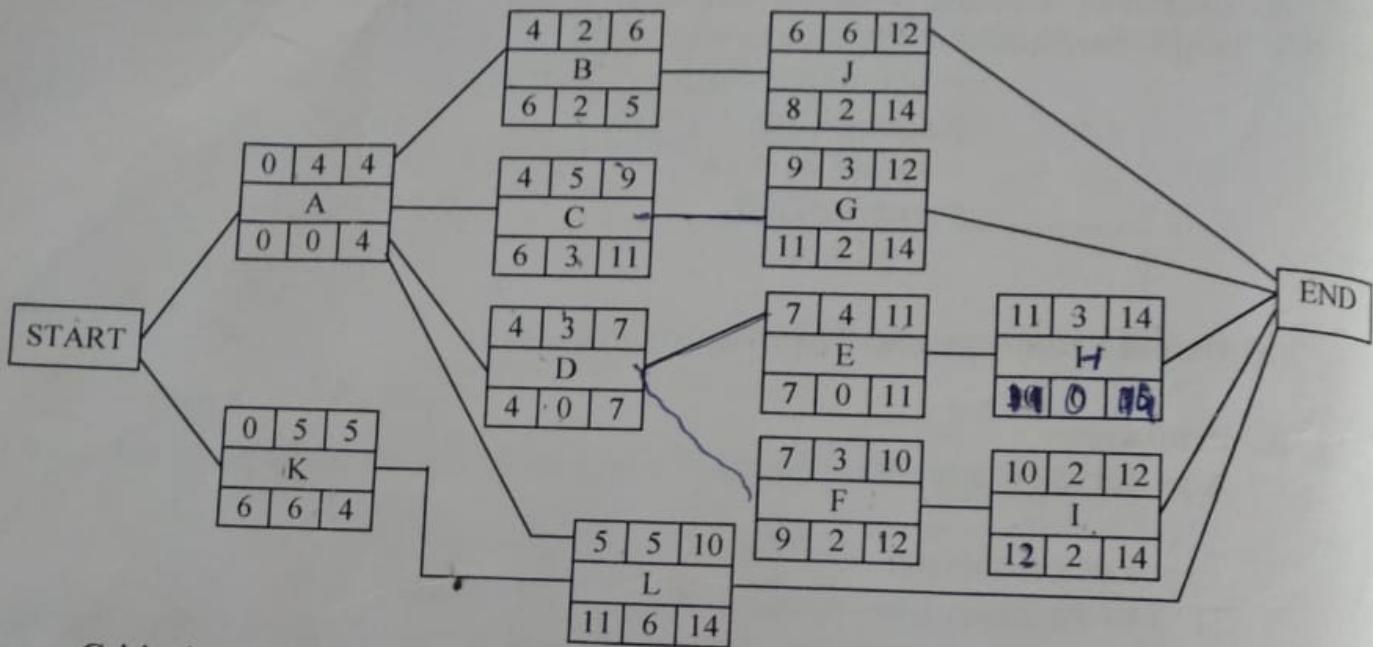
The prototype is developed and modified until it is finally in a state where it can become the operational system.

3. (A) Draw the activity of node network diagram for the following problem. Find out critical path and total duration. [07]

Activity	Duration (Days)	Precedents
A	4 5	-
B	2 3	A
C	5 6	A
D	3 4	A
E	4 5	D
F	3 4	D
G	3 4	C
H	3 4	E

I	2 3	F
J	6 7	B
K	5 6	-
L	5 6	A, K

A.



Critical path = A - D - E - H

Total Duration = 14 days

OR

Explain labeling conventions of activity on node network.

A. Conventions of Activity on node network:

- 1) A project network may have only one start node: It is required that a network diagram have only one start node.
- 2) A project network may have only one end node: This is a requirement for activity-on-arrow networks.
- 3) A link has duration : A link represents an activity and activities take time to execute. The links are not drawn in any way to represent the activity duration.
- 4) Nodes have no duration : Nodes are events and are instantaneous points in time. The source node is the event of project becoming ready to start and the sink node is the event of project becoming completed.

- 5) Time moves from left from right : Activity-on-arrow networks are drawn, so that time moves from left to right.
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- 7) A network may not contain loops : Loops either an error of logic or a situation that must be resolved.
- 8) A network may not contain dangles : A dangling activity, can not exist, as they are not connected with the last activity.

(B) Explain Risk Planning. (*Risk Identification*).

[07]

A. Risks can be dealt with by: Risks can be dealt with by:

1) Risk acceptance :

This is the do nothing option. In risk prioritization process, we decide to ignore some risks in order to concentrate on the more likely or more damaging. The cost of avoiding the risk may be greater than the actual cost of the damage.

2) Risk avoidance :

Some activities may be so prone to accident that it is best to avoid them altogether. If you are worried about crocodiles then don't go into the water. Avoid the environment in which the risk occurs.

3) Risk reduction :

Here we decide to go ahead with a course of action. Here, we decide to go ahead with a course of action despite the risks, but take pre-cautions that reduce the probability of the risk. The risk is accepted but actions are taken to reduce its likelihood.

4) Risk transfer:

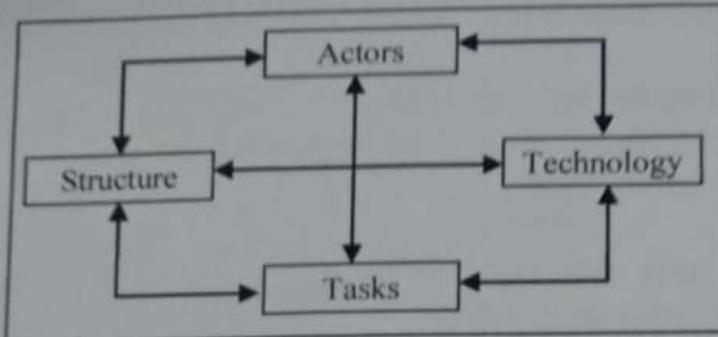
The risk is transferred to another person or organization. The risk of incorrect development estimates can be transferred by negotiating a fixed price contract with an outside software supplier.

OR



**Explain Socio-technical Model of risk.**

A.



This is based on Lyytinen's' socio technical model of risk

- 1) Actors relate to all those involved in the project including both developers, users and managers e.g. a risk could be that high staff turnover leads to information of importance to the project being lost
- 2) Technology – both that used to implement the project and that embedded in the project deliverables – risk could be that the technologies selected are not in fact appropriate.
- 3) Structure – this includes management procedures, risk here is that a group who need to carry out a particular project task are not informed of this need because they are not part of the project communication network
- 4) Tasks – the work to be carried out. A typical risk is that the amount of effort needed to carry out the task is underestimated.

**4. (A) Explain slip chart.**

[07]

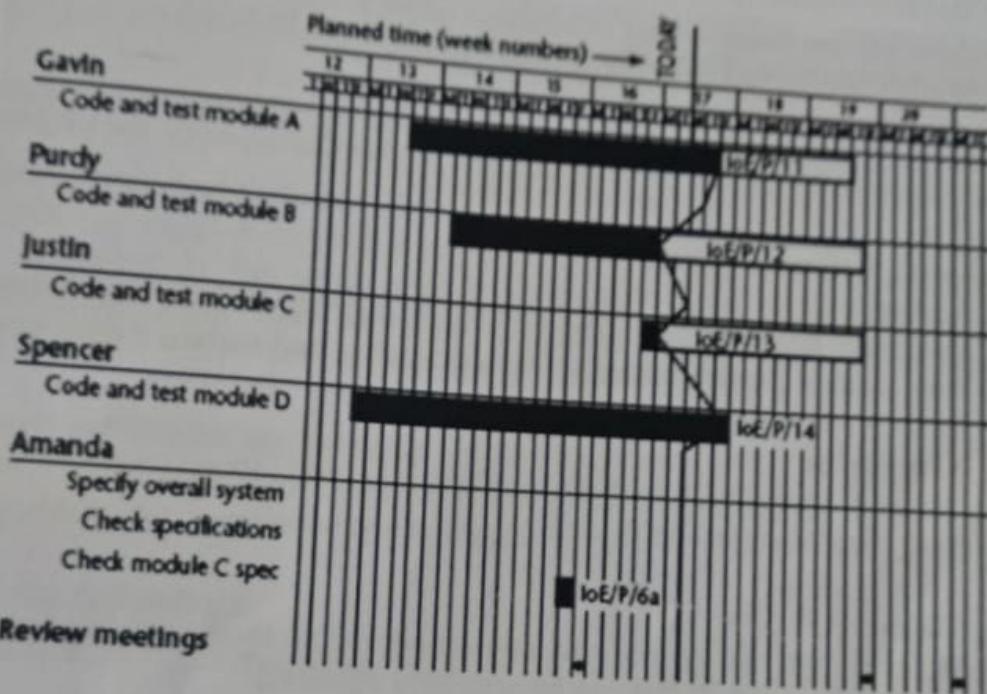
- A. A slip chart is a very similar alternative favoured by some project managers who believe it provides a more striking visual identification of those activities that are not progressing to schedule.

The more the slip lines bends, the greater the variation from the plan.

The slip line indicates those activities that are either ahead or behind the schedule

Too much bending indicates a need for rescheduling of the overall plan.

Additional slip lines are added at intervals and, as they build up, the project manager will gain an idea as to whether the project is improving (subsequent slip lines bend less) or not. A very jagged slip line indicates a need for rescheduling.



**OR**

**Explain Fixed Price contract.**

**A. Fixed Price contract:**

In this situation a price is fixed when the contract is signed. The consumer knows that if there are no changes in the contract terms, this is the price they pay on completion.

For this to be effective, the customer's requirement has to be fixed at the outset.

When the contract is to construct a software system, the detailed requirement analysis must already have been carried out.

**Advantages:**

- 1) known expenditure
- 2) supplier motivated to be cost-effective

**Disadvantages:**

- 1) supplier will increase price to meet contingencies
- 2) difficult to modify requirements
- 3) cost of changes likely to be higher
- 4) threat to system quality

**(B) List out categories of resources and explain them in brief.**

[07]

**A. Resources:**

A resource is any person or item required for the execution of the project.

**Categories of resources:**

**1) Labour:**

The main items in this category will be members of the development project team such as project manager, system analyst and software developers.

**2) Equipment :**

Obvious items will include workstations and other computing and office equipment such as chairs, desks.

**3) Materials:**

Materials are items that are consumed rather than equipment is used. E.g. Require supplies of disks to be specially obtained.

**4) Space:**

For projects that are undertaken with existing staff, space is normally readily available.

**5) Services:**

Some projects will require procurement of specialist services. E.g. requires scheduling of telecommunication services.

**6) Time:**

Time is the resource that is being offset against the other primary resources.

**7) Money:**

Money is the secondary resource used to buy other resources and will be consumed as other resources are used.

**OR**

**(i) Define 0/100, 50/50 and Milestone technique.**

[04]

**A. 0/100 technique:**

It is a technique where a task is assigned a value of zero until such time that it is completed when it is given a value of 100% of the budgeted value.

### Milestone technique:

It is a technique where a task is given a value based on the achievement of milestones that have been assigned values as part of the original budget plan.

- (ii) Define open tendering process and restricted tendering process. [13]

#### A. Open Tendering Process:

In this, any supplier can bid in response to the invitation to tender all tenders must be evaluated in the same way government bodies may have to do this by local/international law (including EU and WTO, World Trade Organization, requirements).

#### Restricted Tendering Process:

In this case, there are bids only from those specifically invited can reduce suppliers being considered at any stage.

## 5. Answer the followings: [14]

- (1) Full form of KLOC.

A. Thousand Lines of Code

- (2) Forecasts of \_\_\_\_\_ rates tend to be uncertain.

A. Inflation Rate

- (3) \_\_\_\_\_ cost consisting of costs of putting the system into place, mainly any new hardware.

- |                 |                 |
|-----------------|-----------------|
| (a) Development | (b) Overhead    |
| (c) Setup       | (d) Operational |

A. (d)

- (4) \_\_\_\_\_ package is known as shrink-wrapped software ?

- |                              |                   |
|------------------------------|-------------------|
| (a) Off-the-shelf            | (b) bespoke       |
| (c) Customized-off-the-shelf | (d) None of above |

A. (a)



(5)  $CPI = \frac{\text{_____}}{\text{_____}}$

- (a) EV, AC
- (c) AC, EV

- (b) AC, PV
- (d) EV, PV

A. (a)

(6) \_\_\_\_\_ is a method of reported progress by recording on the chart by shading activity bars.

- (a) 0/75
- (c) Timeline chart

- (b) Gantt chart
- (d) Percentage

A. (c)

(7) The probability that a system will not be available at the time required or the probability that a transaction will fail is called \_\_\_\_\_.

- (a) Availability
- (c) Mean time between failure
- (b) Failure on demand
- (d) Support Activity

A. (b)

(8) PERT stands for \_\_\_\_\_.

A. Program Evaluation and Review Technique.

(9) What is a Management ?

A. Management is a combination of various activities like planning, organizing, staffing, directing, monitoring, controlling, innovating and representing.

(10) Define Hammock activity.

A. Hammock activity are activities that have zero duration but are assumed to start at the same time and to end at the same time as the last one.

(11) Write down Parkinson's Law.

A. Work expands to fill the time available.

(12) \_\_\_\_\_ is a method for calculating 'loss' in days rather than money.

A. Surrogate

(13) Effort = \_\_\_\_\_.

A. Size \* Rate.

(14) \_\_\_\_\_ is also known as the One shot or Once through model.

A. Waterfall Model

\*\*\*

**ND – 111**  
**December – 2015**  
**B.C.A., Sem.-V**  
**SEC-301(1) : Software Project Management**

**Time: 3 Hours**

**Max. Marks: 70**

- 1. (a) Which are the activities covered by software project management ? Explain them in detail.** [07]

- A.** There are basically 3 main activities covered by SPM.
1. Feasibility study
  2. Plan
  3. Execution

**1. Feasibility Study:**

The feasibility study assesses whether a project is worth starting or not.

Information is gathered about the requirements of the proposed application. With a large system, the feasibility study could be a project in its own right with its own plan.

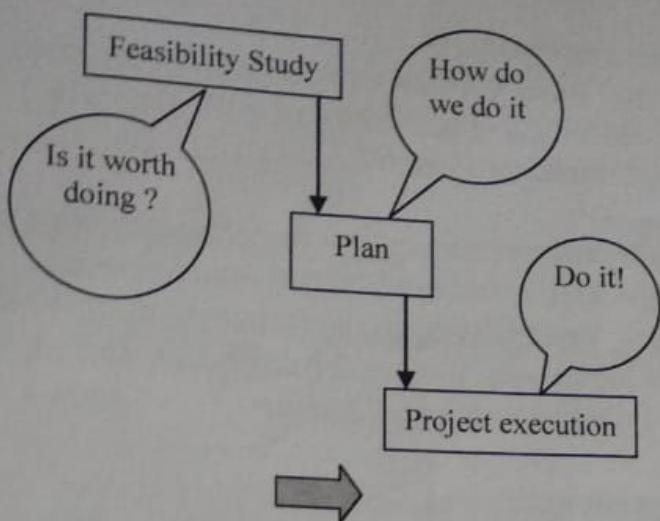
Feasibility study can be of 3 types.

- a) Economical Feasibility
- b) Technical feasibility
- c) Operational feasibility

**a) Economical feasibility:** This type of feasibility study checks whether the organization has enough budget to do the project or not.

**b) Technical feasibility :** This feasibility study checks whether the organization has required resources or not.

**c) Operational feasibility:** This feasibility study checks whether the system works properly after developing and installing it.



### 1. Planning :-

If the feasibility study indicates that the prospective project appears viable, then project planning can start.

The outline plan for the whole project and a detailed plan for the first stage is created.

### 2. Project Execution:

The project can now be executed.

The execution of a project contains design and implementation sub phases.

**OR**

**Define programme. Explain different forms of programmes.** — *Others*

A. A programme can be defined as, 'a group of projects that are managed in a coordinated way to gain benefits that would not be possible where the projects are managed independently.'

#### Types of programmes:

- a. Business cycle programmes
- b. Strategic programmes
- c. Infrastructure programmes
- d. Research and development programmes
- e. Innovative partnership

*New / modern*

#### Business cycle programmes:

The collection of projects that an organization undertakes within a particular planning cycle has already planned. Many organizations have a fixed budget for development.

### **Infrastructure programmes:**

Organizations can have various departments which carry out distinct, relatively self contained activities. These distinct activities will probably require distinct databases and information systems.

An infrastructure programme could refer to the activities of identifying a common infrastructure and its implementation and maintenance.

e.g. In a local authority, one department might have responsibilities for maintenance of highways, another for collection and another for education. They all require one infrastructure programme.

### **Strategic Programme:**

Several projects together can implement a single strategy. Each activity could be treated as a distinct project, but would be coordinated as a programme.

### **Research and development programmes:**

Truly innovative companies those that are trying to develop new products for the market, are well aware that projects will vary in terms of their risks of failure and potential returns that they might eventually reap.

### **Innovative partnership:**

Companies sometimes come together to work collaboratively on new technologies in a pre-competitive phase.

## **(b) Explain Cost-benefit analysis.**

[07]

- A. Even where the estimated benefits will exceed the estimated cost, it is often necessary to decide if the proposed project is the best of several options.

### **Cost-benefit analysis comprises two steps :**

- 1) Identifying all of the costs and benefits of carrying out the project and operating the delivered application.

These costs can be,

**Development cost :** including development staff costs.

**Setup costs :** Consisting of the costs of putting the system into place.

**Operational cost :** Cost relating to operating the system after installation.

- 2) Expressing these costs and benefits in common units :  
We must express each cost and benefit in money.

- Benefits can be ,  
 1) Quantified and valued benefits  
 2) Quantified but not valued  
 3) Identified but not easily quantified

(i) Define Stakeholder and Deliverables.

[03]

A. Stakeholder : The people who have a stake or interest in the project is called stakeholder.

Stakeholders can be,  
 Internal to the project team

External to the project team but within the same organization

External to both the project team and the organization

Deliverables :

Some of the products will be handed over to the client at the end of the project, these are called deliverables.

(ii) Give the difference between Software Project Management and Other types of Project.

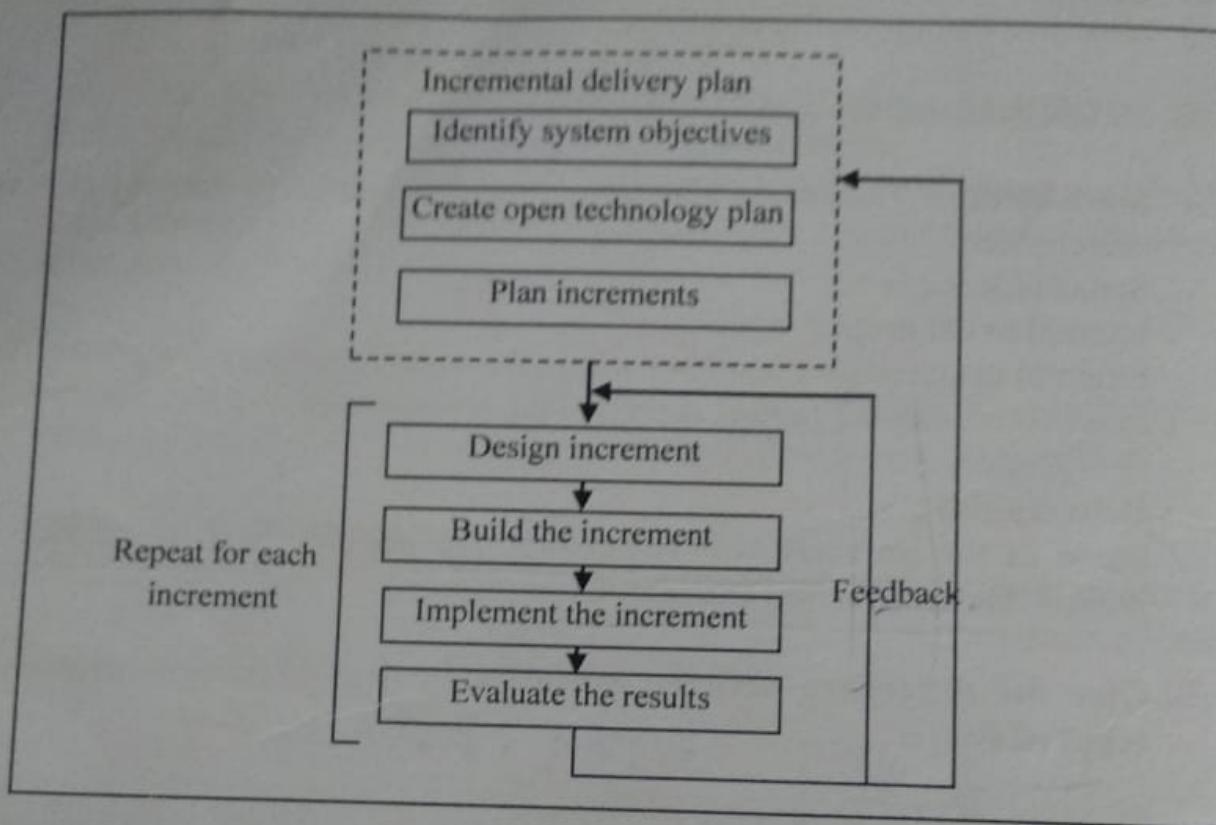
[04]

Term	Software Projects	Other type of project
Invisibility	With software, progress is not immediately visible.	In other types project, progress can actually be seen at every stage.
Complexity	Software products contain more complexity than other engineered art facts in terms of per dollar spent.	Other types of projects contains less complexity than software products.
Confirmity	Software developers have to conform to the requirements of human clients.	Other types of projects are governed by consistent physical laws. They do not require conformation of human clients.
Flexibility	Software project is easy to change	Other types of engineered projects cant changed once it has been developed.

(a) Explain Incremental Delivery.

[07]

- A. This approach breaks the application down into small components which are then implemented and delivered in sequence. Time-boxing is often associated with incremental approach.



#### **Following are the advantages of Incremental Delivery:**

- 1) Feedback is improved for early stages: The feedback from early increments improves the later stages.
- 2) Possibility of changes in requirements is reduced: The possibility of changes in requirements is reduced because of the shorter time span between the design of a component and its delivery.
- 3) Users get benefit earlier than with a conventional approach
- 4) Early delivery improves cash flow: Early delivery of some useful components improves cash flow, because you get some return on investment early on.
- 5) Smaller sub-projects are easier to control and manage.

- 6) Gold-plating: Requesting of features that are unnecessary and not in fact used, is less as users know that if a feature is not in the current increment then it can be included in the next.
- 7) The project can be temporarily abandoned if some urgent work emerges.
- 8) Job satisfaction is increased.

**Following are the disadvantages of Incremental Delivery:**

- 1) Later increments might require modifications to earlier increments. This is known as Software Breakage.
- 2) Software developers may be more productive working on large system than on a series of smaller ones.

**OR**

**Explain reasons to follow software prototype.**

- A.** A prototype is a working model of one or more aspects of the projected system. Prototypes are used for following reasons:
1. Learning by doing.
  2. Improved communication
  3. Improved user involvement
  4. Clarification of partially known requirements
  5. Reduced need for documentation
  6. Demonstration of the consistency and completeness of a specification
  7. Reduced maintenance costs
  8. Feature constraint
  9. Production of expected results

#### **1. Learning by doing:**

We can usually look back on a task and see whether we have made mistakes.

#### **2. Improved communication:**

Users do not get feel for how the system is likely to work in practice from a specification.

#### **3. Improved user involvement:**

The users can be more actively involved in design decisions.

#### **4. Clarification of partially known requirements:**

Where there is no existing system to mimic, users can often get a better idea of what might be useful to them by trying out prototypes.

**5. Demonstration of consistency and completeness of a specification:**

Any mechanism that attempts to implement a specification on a computer is likely to uncover omissions.

**6. Reduced need for documentation:**

There is less need for detailed documentation of requirements.

**7. Reduced maintenance costs:**

The reduction of maintenance costs is the core of the financial prototypes.

**8. Feature constraint:**

This can be easily implemented by that tool.

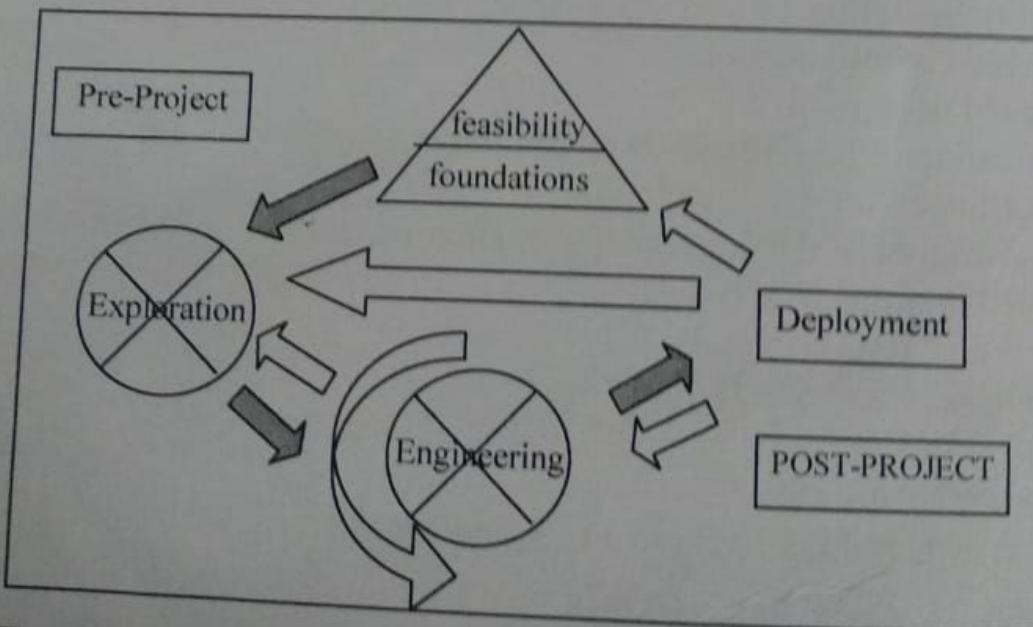
**9. Production of expected results:**

Accurate calculation of the expected results can be possible.

**(b) Explain Atern Process Model.**

[07]

A.



**1) Feasibility/foundation:**

Among the activities undertaken here is derivation of a business case of the sort and general outlines of the proposed architecture of the system to be developed.

**2) Exploration cycle:**

This investigates the business requirements. This could be an iterative process that could involve the creation of exploratory prototypes. A large project could be decomposed into smaller increments to assist the design process.

### 3) Engineering cycle:

This takes the design generated in the exploration cycle and converts it into usable components of the final system that will be used operationally.

### 4) Deployment:

This gets the application created in the engineering cycle into actual operational use.

- (i)* The project A has 10 inputs and 12 outputs. The new project B has 15 inputs and 18 outputs. Find out Euclidean Distance. [15]

$$\begin{aligned}
 \text{A. Euclidean distance} &= \sqrt{\text{target\_parameter1}^2 + \text{target\_parameter2}^2} \\
 &= \sqrt{(15-10)^2 + (18-12)^2} \\
 &= \sqrt{(5)^2 + (6)^2} \\
 &= \sqrt{25 + 36} \\
 &= \sqrt{61} \\
 &= 7.81
 \end{aligned}$$

- (ii)* Explain Albrecht Function Point Analysis. [14]

- A. This is a top down method that was devised by Allan Albrecht when he worked with IBM. Albrecht was investigating programming productivity and needed some way to quantify the functional size of programs independently of the programming languages in which they had been coded. He developed the idea of function points (fp).

The basis of function point analysis is that computer-based information systems comprise five major components:

- External input types
- External output types
- Logical internal file types
- External interface file types
- External inquiry types

- 1) **External input types** : These are the input transactions which update internal computer files.
- 2) **External output types** : These are the transactions where data is output to the users. These would be printed reports.
- 3) **External inquiry types** : These are the transactions initiated by the user which provide information but do not update the internal files.
- 4) **Logical internal file types** : These are the standing files used by the system. It refers to a group of data items that is usually accessed together.
- 5) **External interface file types** : They allow for output and input that may pass to and from other computer applications.

#### Albrecht complexity multipliers:

External user type	Multiplier			Low / and Average and High value
	Low	Average	High	
External input type	3	4	6	
External output type	4	5	7	
External inquiry type	3	4	6	
Logical internal file type	7	10	15	
External interface file type	5	7	10	

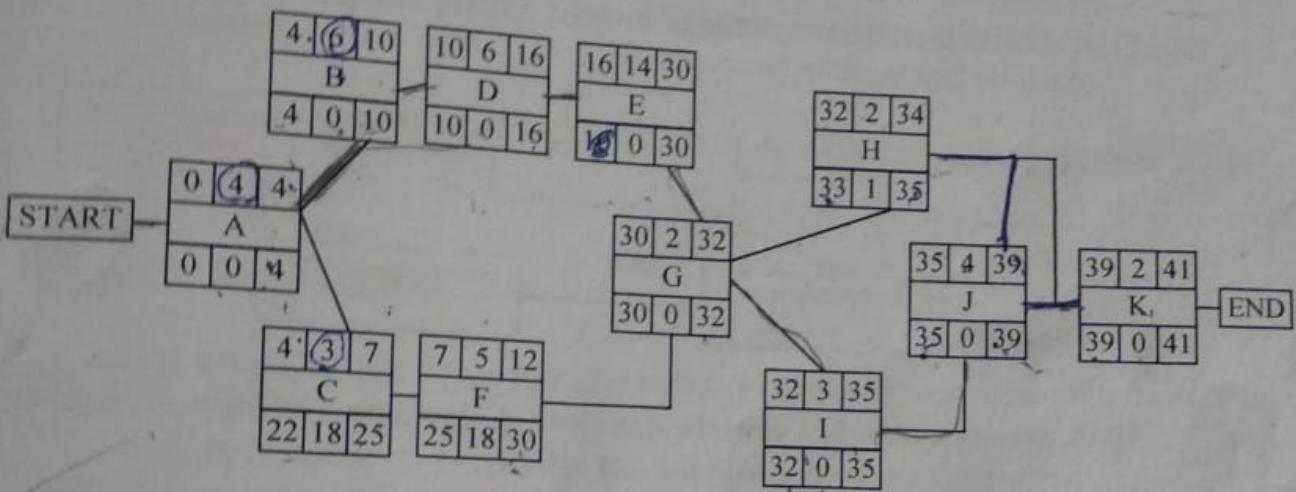
Function point analysis recognizes that the effort required to implement a computer based information system relates not just to the number and complexity of the features provided but also to the operational environment of the system.

- (a) Draw the Activity on Node network diagram for the following problem. Find out critical path and total duration. [07]

Activity	Duration (Days)	Precedents
A	4 5	-
B	6 7	A
C	3 4	A
D	6 7	B
E	14 15	D

A.

F	5 6	C
G	2 3	E & F
H	2 3	G
I	3 4	G
J	4 5	H & I
K	2 3	J



Critical Path = A - B - D - E - G - I - J - K

Total project duration = 41 days.

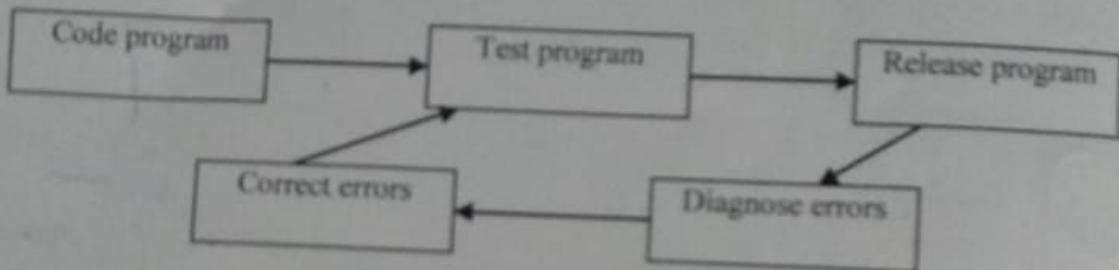
Activity node diagram.

Explain labeling conventions of activity on node network.

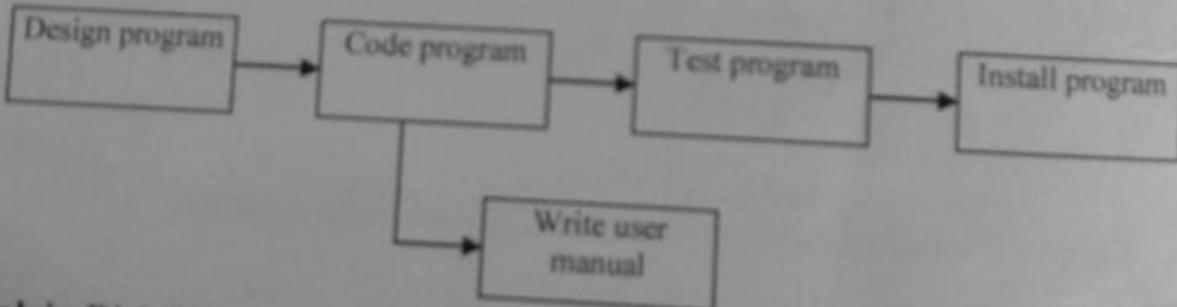
A. Conventions of Activity on node network:

- 1) **A project network may have only one start node :** It is required that a network diagram have only one start node.
- 2) **A project network may have only one end node :** This is a requirement for activity-on-node networks.
- 3) **A link has duration :** A link represents an activity and activities take time to execute. The links are not drawn in any way to represent the activity duration.
- 4) **Nodes have no duration :** Nodes are events and are instantaneous points in time. The source node is the event of project becoming ready to start and the sink node is the event of project becoming completed.

- 5) Time moves from left to right : Activity-on-node networks are drawn, so that time moves from left to right.
- 6) Nodes are numbered sequentially : There are no precise rules about node numbering but nodes should be numbered so that head nodes have higher number than tail events.
- 7) A network may not contain loops : Loops either an error of logic or a situation that must be resolved.



- 9) A network may not contain dangles : A dangling activity, can not exist, as they are not connected with the last activity.



### (b) Explain Risk Identification.

[07]

- A. The two main approaches to the identification of risks are the use of Checklists and brainstorming.

#### 1. Checklists :

Checklists are simply lists of the risks that have been found to occur regularly in software development projects.

Ideally, a group of representative project stakeholders examines a checklist identifying risks applicable to their project.

#### 2. Brainstorming :

Representatives of the main stakeholders can be brought together, ideally, once some kind of preliminary plan has been drafted.

They identify, using their individual knowledge of different part of the project, the particular problems that might occur.

Brainstorming can also be used to identify possible solutions to the problems that emerge.

This collaborative approach may generate a sense of ownership in the project.

**OR**

**Explain Risk Planning.**

A. Having identified the major risk ,the task is to decide how to deal with them ,the choices will be ,

- Risk acceptance
- Risk avoidance
- Risk reduction
- Risk transfer

**1) Risk acceptance :**

This is the do -nothing option nothing option. In risk prioritization process, we decide to ignore some risks in order to concentrate on the more likely or more damaging. The cost of avoiding the risk may be greater than the actual cost of the damage.

**2) Risk avoidance :**

Some activities may be so prone to accident that is some activities may be so prone to accident that is the best to avoid them altogether. If you are worried about crocodiles then don't go into the water. Avoid the environment in which the risk occurs.

**3) Risk reduction :**

Here we decide to go ahead with a course of action. Here, we decide to go ahead with a course of action despite the risks, but take pre-cautions that reduce the probability of the risk. The risk is accepted but actions are taken to reduce its likelihood.

**4) Risk transfer:**

The risk is transferred to another person or organization. The risk of incorrect development estimates can be transferred by negotiating a fixed price contract with an outside software supplier.

**4. (a) Explain Gantt chart.**

[07]

- A. One of the oldest and simplest technique for tracking project progress is the Gantt chart.

**Gantt chart Format**

Tas k	Duratio n	Ja n	Fe b	Ma r	Ap r	Ma y	Ju n	Ju l	Au g	Se p	Oc t	No v	De c
1	2 mo.		[■]										
2	2 mo.				[■]								
3	2 mo.					[■]							
4	2 mo.							[■]					
5	2 mo.									[■]			
6	2 mo.											[■]	

This is essentially an activity bar chart indicating scheduled activity dates and durations, frequently augmented with activity floats.

Reported progress is recorded on the chart and today cursor provides an immediate visual identification of which activities are ahead or behind schedule.

It is simplest and oldest technique for tracking progress. Activity bar chart indicating scheduled activity dates and durations frequently augmented with activity floats. Reported progress is recorded on chart (by shading). A today cursor provides an immediate visual indication of which activities are ahead or behind schedule.

**Explain fixed price per unit delivered contract.**

**OR**

- A. This is often associated with FP counting. The size of the system to be delivered is calculated or estimated at the outset of the project. The size could be estimated in lines of code. A price per unit is also quoted. The final price is then the unit price multiplied by the total number of units.

**Advantages :**

1. **Customer understanding :** The customer can see how the price is calculated.
2. **Comparability :** Pricing schedules can be compared.
3. **Emerging functionality :** The supplier does not bear the risk of increasing functionality.
4. **Supplier efficiency :** The supplier still has an incentive to deliver required functionality in cost effective manner.
5. **Life cycle range :** The requirements do not have to be definitively specified at the outset.

**Disadvantages :**

1. **Difficulties with software size measurement :** Lines of code can easily be inflated by adopting a verbose coding style.
2. **Changing requirements :** Some requested changes may affect existing code drastically but not increase the overall FP count.

(b) List out nature of resources and explain them in brief.

[07]

- A. A resource is any person or item required for the execution of the project.  
In general, resources can be categorized as,

**Resources fall into following categories:**

- Labour
- Equipment
- Materials
- Space
- Services
- Time
- Money

The main items in this category will be members of the development project team such as project manager, system analyst and software developers.

**b. Equipment :**

Obvious items will include workstations and other computing and office equipment such as chairs, desks.

**c. Materials:**

Materials are items that are consumed rather than equipment is used. E.g. Require supplies of disks to be specially obtained.

**d. Space:**

For projects that are undertaken with existing staff, space is normally readily available.

**e. Services:**

Some projects will require procurement of specialist services. E.g. requires scheduling of telecommunication services.

**f. Time:**

Time is the resource that is being offset against the other primary resources. Project timescale can sometimes be reduced by increasing other resources and will almost certainly be extended if they are unexpectedly reduced.

**g. Money:**

Money is the secondary resource used to buy other resources and will be consumed as other resources are used.

**OR**

**(i) Define 0/100, 75/25 and Milestone technique.**

[03]

**A.**

**• The 0/100 technique:**

Where a task is assigned a value of zero until such time that it is completed when it is given a value of 100% of the budgeted value.

**• The 75/25 technique:**

Where the task is assigned 75% on starting and 25% on completion. This is often used when a large item of equipment is being bought.

**• The milestone technique:**

Where a task is given a value based on the achievement of milestones that have been assigned values as part of the original budget plan.

**(ii) Define Mandatory and Desirable requirements.**

[04]

**A. Mandatory requirements :**

If a proposal does not meet the requirement then the proposal is to be immediately rejected.

**Desirable requirements :**

A proposal may be deficient in this respect, but other features of the proposal could compensate for this.

**5. Answer the followings:**

[14]

**(1) A \_\_\_\_\_ is a planned activity.**

A. Project

**(2) Forecasts of \_\_\_\_\_ rates tend to be uncertain.**

A. Inflation

**(3) An estimation is based on the advice of knowledgeable staff is \_\_\_\_\_ technique.**

- |                        |                     |
|------------------------|---------------------|
| (a) algorithmic models | (b) analogy         |
| (c) price to win       | (d) expert judgment |

A. (d) expert judgement

**(4) An 'off-the-shelf' package is also known as \_\_\_\_\_ .**

- |                   |                              |
|-------------------|------------------------------|
| (a) Off-the-shelf | (b) Customized-off-the-shelf |
| (c) bespoke       | (d) None of above            |

A. (d)None of above

**(5) CPI - \_\_\_\_\_ / \_\_\_\_\_**

- |            |            |
|------------|------------|
| (a) EV, AC | (b) AC, EV |
| (c) AC, PV | (d) EV, PV |

A. (a) EV , AC

### A. (b) rescheduling



### A. (b) Mean time between failure

- (8) PERT stands for \_\_\_\_\_.

## A. Programme Evaluation and Review Technique

- (9) Risk Exposure = \_\_\_\_\_ \* \_\_\_\_\_.

#### A. potential damage \* probability of occurrence

- (10) WTO stands for \_\_\_\_\_.

## A. World Trade Organisation

- (11) Write down Brook's Law.

A.putting more people on late job makes it Later.

- (12) \_\_\_\_\_ is a method for calculating 'loss' in days rather than money.

### A. Surrogate

- (13) Effort = \*.

A. Effort = System size \* Productivity Rate

- (14) Waterfall Model is expanded into \_\_\_\_\_ model.

### A. V-process

