INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

Examinations Control Office

Examination	B TECH VI SEMESTER END EXAMINATIONS REGULAR JUNE 2025 REG UG20		
Month & Year	1-Jun	**Date**	25/06/2025
Course Name	SOFTWARE PROJECT MANAGEMENT		
Course Code	ACIC05	**E-Code**	8573

Instructions to Evaluators

- Evaluators should spend at least 3-5 minutes on one answer booklet during the evaluation.
- Evaluators should cross check that marks are allotted for all the attempted questions.
- The marks should be assigned fairly according to the mark distribution specified in the scheme of evaluation.
- For questions that were attempted incorrectly, evaluators are required to award zero marks.
- The evaluator must give a proper justification in case of any mistakes identified in the marks provided.

START WRITING FROM HERE

Q.No.

1.a Conventional software Management :-

The conventional project management refers to the primitive and traditional techniques and methodologies with linear and rigit properties..

for example :- Waterfall Model.

characterstics of conventinal software performance :

→ Low successrate, the traditional software project management have low succres rate.

→ Rigid phases, In traditional software project management the project have rigid structure, so they are not flexible to any changes in the requirements

→ Linear and Ordered, In traditional or conventional software projects the phase are linear. One phase must be completed to move on to the next phase

→ Defect Propagation, The defects in one phase may propogate/ pass/ forwarded to the next phases

→ High bug fixing Costs, eds in the conventional projects the testing is done during the terminal / last phases, the bug fixing or any

Q.No.

changes will cost more than 100 times in the traditional projects.

→ No Customer/stake holder feedback or involvement, here the customer/stake holder will only get to review their product during deployment or the production

* In conclusion the main characteristic of the conventional Software performance include Rigid phases, linear flow of phases, defect propagation, high change cost, no customer/stake holder feedback and have low Quality and Maintainability resulting in the failure of the project plan.

Evolution of Software Economics :

The economics in the context of the software project management include the budget estimation and analysis, risk analysis and other tasks like resource planning and project process management or scheduling.

The software economics plays an important role in the project management it provides a precise structure about time (duration), Resources (Personell and money) needed for the completion of the project.

Q.No.

The evolution of Software-economics refers how the software economic evolved over the different methodologies like in Conventional, Transitional and the Modern Project Management.

In the Conventional Management the project is developed from the scrach, which took more resources and time to complete.

- In the ~~Tradi~~ Transitional Management people started using tools like IDE, etc and only less than 70 % code is reused.
- But coming to the Modern Project Management ~~Peop~~ included the usage of tools and predefined or developed packages which made the efficient use of resources.

Q.No.

1.b Pragmatic Cost Estimation :-

The pragmatic cost estimation is estimation of the budged in a real-world and practical way, using the knowledge like historic knowledge of the Organization and Experiences, but not based on the theoritical Models.

In pragmatic cost estimation the budge is estimated based on the experience and intuitions and based on current market which will give more accurate results compared to the cost estimation using the Methods like from the theoritical Models.

→ It is a pratical Cost estimation method based on realworld scenarios and factors

→ It is based on the experience gaind by the historic Data.

→ More Accurate and effective for Modern project cost estimation.

→ Could use Data Mining tools like preprocesing, mining pattern and Analysis of historic data to do the estimation

Q.No.

Differnces between Pragmatic Cost-estimation and the costestimation using the theoritical Models.

Pragmatic Cost Estimation	Theoritical Models
• Uses practical knowledge to do cost-estimation	• Uses the theoritical models to do the cost estimation
• Real-world and practical way to estimate the budget	• theoritical and process centr' way to estimate budged
• Suitable for Organizations with large historic-data.	• Best for small on start up Organizations
• Needs experience and proper understing of the Market for the estimation	• Just need project Requirement and a theoritical Model like "cocomo" to perform estimation
• Inaccurate for complex projects	• Not accurate for complex of unique projects.

Q.No.

2.a **Modern Software Management :-**

The modern software Management refers to the usage of latest and Modern tools and Methodologies to implement a project. This include proper planning, scheduling, scope identification, process management and budged estimation using latest tool and Methods.

Core principles of Modern Software Management:

→ Proper team management, The team should be hirarchal with proper accountability.
→ Improved size, The size of the project should be minimized without any feature loss
→ Personell development, The teams should be well balanced to help new people to gain knowledge
→ Environment, The project should use modern tools and automate the iatte itterative / Repetative task to improve efficiency.
→ Planning, The every phase should be properly planed before the the implimentation

Q.No.

→ Required Quality, The project should achive the both functional and Non-functional requirements

Peer Inspection :-

The peer Inspection plays an Important role to maintain the project quality, The peer Inspection refers to the regular project inspection done in a project, there are the steps in peer inspection.

i) Planning :- Plan the inspection by identifying scope and schedule it

ii) Overview Meeting :- Conduct a overview meeting with the team and explain the phase

(iii) Preperation :- Prepare for the inspection, make the code readable and reusable

(iv) Inspection :- Go through the project find any missing thing, or modification, that could effect the Software quality.

v) Rework & follow-up :- Make the reported change and fixe the bugs reported and follow up with the state-holders.

Here in modern software management the peer-Inspection is a continuous process

Q.No.

2.b Software Economics :-

The software economic refers to the study and analysis of the software aspects such as budget/cost analysis, risk analysis, resource management and planning. The software economics play an important role in the Software development life cycle (SDLC).

The five Strategies to improve software economics:

(i) Improving Scale :-

In software the more is not equal to better, The more code (SLOC) make the project complex and hard to debug and expensive changes. Making it as a Bad Quality product of Inefficient. So the code must be refined, reusable, modularized and Readable.

(ii) Improving Team Management :-

Team management plays an important role in improving software economics. The Team should be properly Organized

Q.No.

in a hierarchal manner. And this will improve the accountability and CO-ordination

(iii) Automating Tasks :-

The repetative task like testing building, deploying should be automated which will improve efficiency, reduce manual error, and make it efficient by giving more time to do better thing, to the developer.

→ Use tools like, Selenium for test automation, JIRA, Bugzilla for Bug Tracking and finally Jenkin & Github action for CI-CD Automation

(iv) Improving Process :-

The process is a structure way of doing a task, follow proper process methods for best outcome, . There are Three type of software process

- Meta process
- Macro process
- Micro process.

Q.No.

(v) Peer Inspection :-

It is an inspection method to improve the product Quality, which induced the following Steps:

1. Planning
2. Overviews Meeting
3. Preperation
4. Inspection
5. Report & Follow up

Improving Team Effectiveness :-

The Effective team is important to improve the software economics. As in the statement of Barry Boremi, the "80% contribution comes from the 20% contributors", The team member should properly communicate and coordinate with each other. And Actively participate in standup meeting and stay upto date with the project progress.

Q.No.

3.a Life Cycle Phases :-

The life cycle phases explain the each activity and things done in a software development life cycle.

(i) Inception Phase :-

The inception phase is the initial and an important phase in a software development life cycle. In this phase the understanding of the project and definition of the high-level-requirement is done.

Example :- Client-Manage meetings, Stake-holder views of project etc

(ii) Elobration Phase :-

The elobration phase is the second phase in the software development life cycle. In this phase, the project planning and project requirements and its features are defined. Things like requirement Analysis, System design etc come under the elobration. The project is elobrated to the team and the stake holder. And Acceptance Testing, integration plans are defined here

example :-

- listing project requirements and features
- Project planning like methods, phases resources, cost, and complexity

(iii) Construction Phase :-

The construction phase is the main development phase in the software development life cycle. The construction phase include building Modules and resources files and integrating them together to produce the final product.

example :- • Building individual page like login, home, about etc

- And integrating them into one product.

(iv) Transision phase :-

The Transision phase is the final phase in the software development life cycle. In here the developed project will be transisoning into the ~~fixed~~ final product. ~~It~~ here, system testing, Uniting testing and

Q.No.

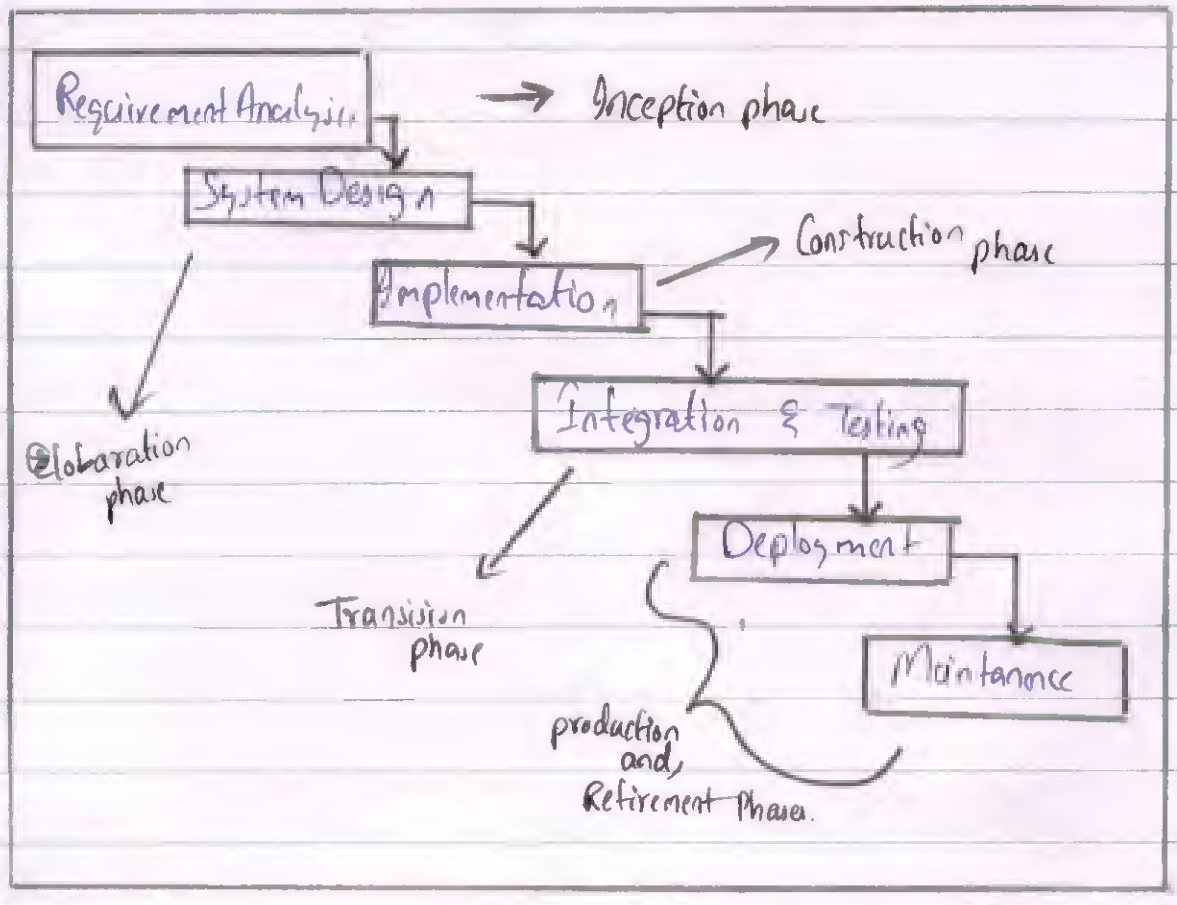
the acceptance testing are done to get the clients view of the project built.

Example:- Testing the product with system Testing

and there are other phases in the software development life cycle.

- Production phase and,
- Retirement phase.

Now, let us see the water fall Model as example



Q.No.

3.b Behavioral and Object Models :=

The behaviour and the Object Models are widely used in the software project managemnd and development. They are built using the Modelling language like Unified Modelling language (UML) or other mean. They are also known as UML diagrams. These UML Model help in the project planning and the daiging phases of a software development. Here The behavioural Models are used to redefine the interaction between the Objects in a give schema. Where as the Object Models explain the structure of the Model like attribute and types. - Let's see the kinds of Behavioral and Object Models.

(i) Entity Relation Diagram
(ii) Class Diagram
(iii) State Transition Diagram
(iv) Object Diagram
(v) Use case Diagram
(vi) Flow Diagram
(vii) Architecture Diagram

Q.No.

Role of Model- based Architecture :

In technical perspective the model based architecture plays a significant role in the development and also in management. The models give an overview of the design and the plans, making it easy for the developer to understand and implement accurately. The models also used as artifact which could help next team to understand the scheam and the component of the project.

- Proper Understanding of the design
- Easy reference to implement
- Used as a programatic Artifact
- Help the next - team to understand the project component
- Acts as the blueprint for the project.

Q.No.

5.a

Management Indicators :-

Management indicators are the metrics that are used to track the management aspects like progress, resources, estimation etc. They are measurable indicators

Types of management indicators :

- Source Lines of Code (SLOC)
- Schedule deviation
- Cost deviation
- Team Velocity, etc.,

Quality Indicators :-

Quality metrics that are used to measure and assert the quality of a software product

Types of Quality indicators.

- Defect Density
- Defect Recovery Rate
- Mean time defect
- Mean time recovery
- Fault tolerancy
- Load response Time
- Robust Service Rate etc,

Q.No.

These management indicator and the Quality Indicator play an important role in the software project Management in the aspect of tracking progress and Monitoring.

Project Control Techniques:-

The project control techaique are the techniques used to control the project, like completion rate, resources and cost. These are very important for the proper Completion of the project. There are few common techniques used to Control the project.

→ Changing Resource
→ Adding people to team
→ Updating Schedule
→ Re-Estimation of the Cost/ Budget

Q.No.

5.b Management Indicators :-

Management indicator are the software metric that are used for tracking the project progress, resource, and perform estimation of Risk and Cost. These are the measurable values. Here are a few management indicator that are commonly used

- Sorce Lines of Code (SLOC)
- Cost deviation
- Schedule deviation
- teamvelocity
- Rate of development
- Defect Density
- Quality Rating
- Rate of Phase Completion etc.

These are the few management indicator that are used commonly in a software project Management.

Evolution of Project Organization :-

In software project Management the project Organization is an key aspect

Q.No.

which include, planning, defining scope, allotting and manging Budged, Adjusting Resource and personel to the project team. The project Organization has been evolving according the models used. No the project Organization an hierarchal There are three main project Organization

- line-of-Business Organization
- Project Based Organization
- Matrix Organization.

Role of Process Automation :-

The process automation plays an significant role in the project management. The repeted task and possible tasks should be automated. The automation will improve efficiency, reduce the manual error, and gives more time to the developer to do more work

- More efficient
- Reduces Manual error
- Save Time
- Improves The accuracy.

Q.No.

7.a Software project Management :-

The software project Management refer to the planning, defining scope, team management, economic management like budge and resources, scheduling the phase and defining the phases. The software project Management help the development of the project. As we know that only 15% of the whole project development is coding and rest 85% include planning, scheduling, and maintaining the project.

Challenges in Software Project Management :-

* Cost Estimation, The cost/ Budget estimation is one of the complex challenge faced in the project Manage-ment. Depending on the size and scale of the project it will more complex to perform an accurate estimation.

* Transisioning to future Management, The transition -ing of a project from the modern project development to the Future software project

Q.No.

management will be complex and time taking.

* Training personnel :- The team members should be aware of the future software project Management approaches like, Agile development, iterative sprints devOps, CICO etc,

Opportunities in future Software project Management :-

There is a good scope in the future software project Management techniques Many companies and Organization are transitioning to the Agile Methodologies and devOps etc, Then will help the Organization to do the development in a stakeholder view. The future SPM is very suitable for the current Market.

Modern Project Profiles :-

Project Profile are the overview or domain of a project, than as follows

1) Cloud profile project
2) Service profile project
3) AIML profile project etc,

Q.No.

7.b Modern Management Methods :-

In modern Management, the project is not built from ~~Scrap~~ Scrap. We use tools, automation, and packages to build our project. Which will improve the cost, time and improve of our software quality.

Next Generation Software Economics :-

The next generation of software economics are the future standards for the software project Management. These included Agile Methodologies, Iterative phase or Sprints and devOps tools to automation like CI and CD which will help the project futuristic project needs.

Considering the organization using the Modern management Methods like

- Code Reusability
- Modularization
- Package, and tools,

to It is better to transition into the next generation software economic for the upcoming project in the Organization. This Transition will help

Q.No.

- Organize the project
- User centric
- Continuous feedback
- CI-CD
- DevOps and Agile Methodologies

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	

Q.No.	