Sixth Semester B.E. Degree Examination, June/July 2024
21CS61 Software Engineering and Project Management

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

ANSWER SCHEME

Module 1

1.

a. Define Software process. Explain generic Software Process Framework.   **(10 Marks)**

Definition of software process (activity, action, tasks)	1
Process framework – establishes foundation by identifying framework activities	1
Activities	
Communication	2
Planning	2
Modeling	2
Construction	1
Deployment	1
	10

b. Define process patterns. Explain the means of describing the patterns.   **(10 Marks)**

Definition of Process pattern (identifies environment; suggest solution)   2

Means for describing:

(i) Pattern name   (ii) Forces

(iii) Type   (iv) Initial content

(v) Problem, solution   (vi) Resulting content

(vii) Related patterns (viii) known uses & example

$8 \times 1 = 8$

10

OR

2.

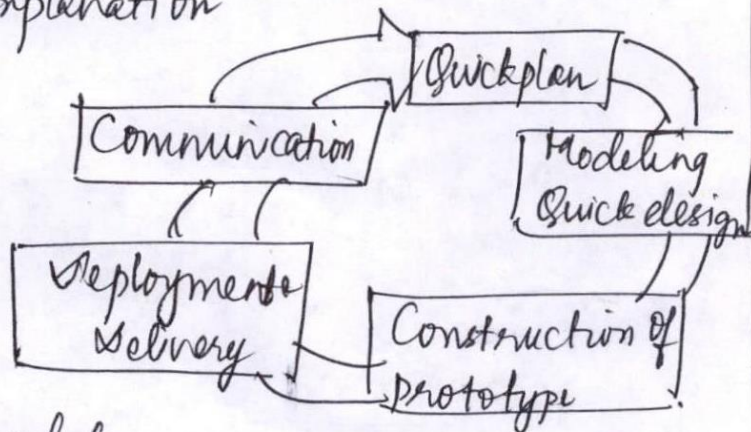   a. Explain the different types of evolutionary process models.   **(10 Marks)**

Evolutionary Process models — evolve over time

— they are iterative

Two common evolutionary process models:

Prototyping : defines only general objective

Can be used as stand alone or technique

Diagram & explanation

Quickplan

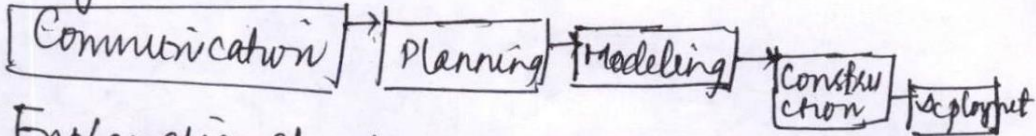Communication

Modeling Quick design

Deployment Delivery

Construction of prototype

The Spiral model

- Couples iterative nature with systematic aspects of waterfall
- Potential for rapid development of complete versions of software

Planning

Communication

Modeling

Deployment

Construction

Diagram & explanation

1

1

1

3

1

1

2

10

b. Explain waterfall model.   **(10 Marks)**

Waterfall model – when requirements are
well understood. | 1
Diagram   – classic life cycle | 1

[Communication] → [Planning] [Modeling] → [Construction] [Deployment] | 3

Explanation of above 5 activities | 5×1=5
                                                                         | 10

Module 2

3.

a. Define requirements engineering. Explain its distinct tasks.   **(10 Marks)**

Requirement engineering definition | 1
Outcomes : (understanding wants, analysing needs, | 2
            assessing feasibility, negotiating solution)
Seven Distinct tasks (Inception, Elicitation, Elaboration, | 1×7 =7
            Negotiation, Specification,
            Validation, Management | 10

b. Explain various approaches in requirements modeling.   **(10 Marks)**

Approaches in Requirements Modeling
(i) Requirement Analysis, (ii) Scenario based | 5×2
                                        modeling
(iii) UML models that supplement use case
(iv) Data modeling concepts (v) Class based
                                        modeling | 10

OR

4.

a. Explain requirements elicitation.   **(10 Marks)**

Requirements Elicitation definition	2
Set of solution requirements	
(i) Collaborative Requirements gathering	2
(ii) Quality functional deployment	2
(iii) Usage scenarios	2
(iv) Elicitation work products	2
	10

b. Explain preliminary use case diagram for the Safe Home system. **(10 Marks)**

Explanation of problem statement	2
Diagram	

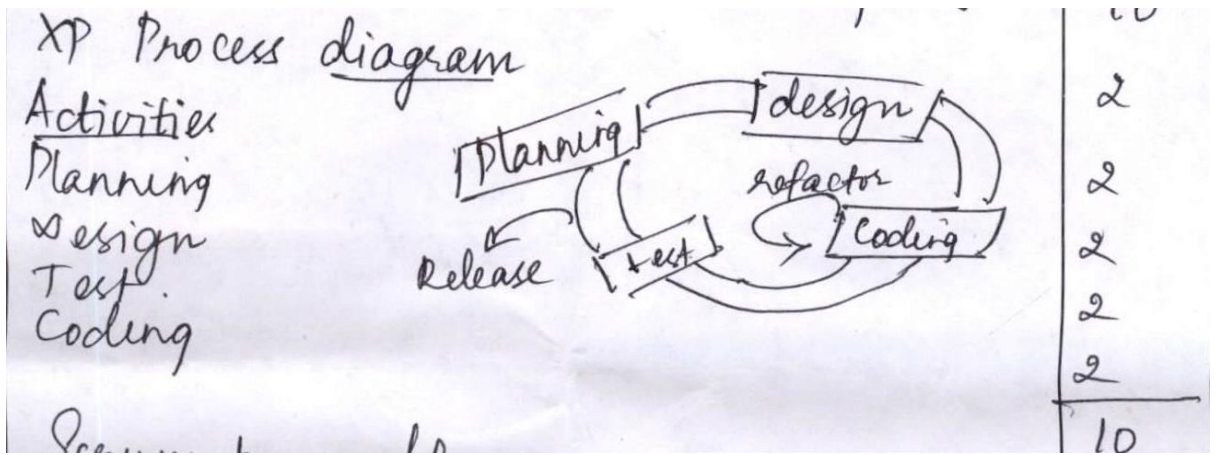|	
	2
Explanation of Actor, SafeHome, Camera, Usecase ×3	6×1=6
	10

Module 3

5.

a. Explain principles of agility. **(10 Marks)**

Agility Principles
(i) Customer satisfaction (ii) Welcome changing requirements
(iii) Deliver frequently (iv) Business people & developers
(v) Supportive environment (vi) Face-to-face conversation
(vii) Working software (viii) Promote sustainable development
(ix) Continuous attention to excellence (x) Simplicity

	10×1
	10

b. Explain the process of extreme programming. **(10 Marks)**

XP Process diagram

Activities
Planning
Design
Test
Coding

	2
	2
	2
	2
	2
	10

Planning → design
Release ← test → refactor → Coding

OR

6.

a. Explain scrum process model. **(10 Marks)**

Scrum process flow

Framework activities: Requirements, Analysis, Design, Evolution, delivery

Backlog, Meetings, demo

	10
	2
	1×5 =5
	1×3 =3
	10
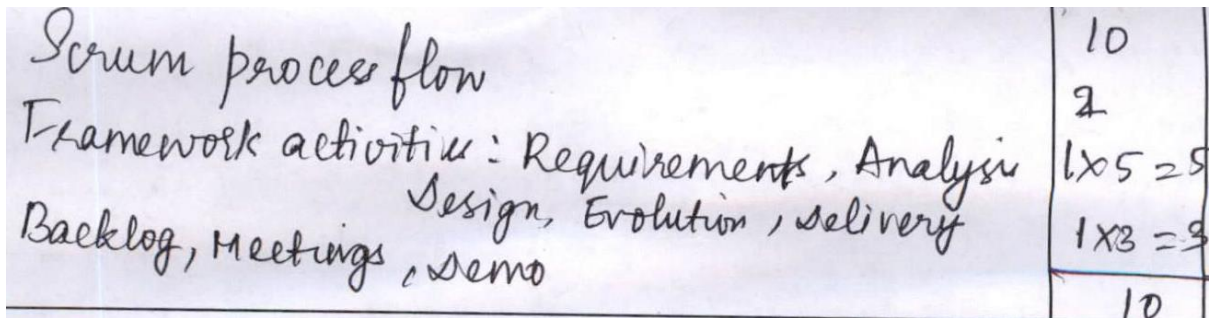
b. Explain Feature Driven Development (FDD) **(10 Marks)**

Definition

Philosophy (Collaboration, feature based, communication)

Benefits (easy description, early, organised, operational feature, easy to inspect)

Diagram Develop — Build — Plan — Design — Build
          feature list

	1
	3×1=3
	5×1=5
	1
	10
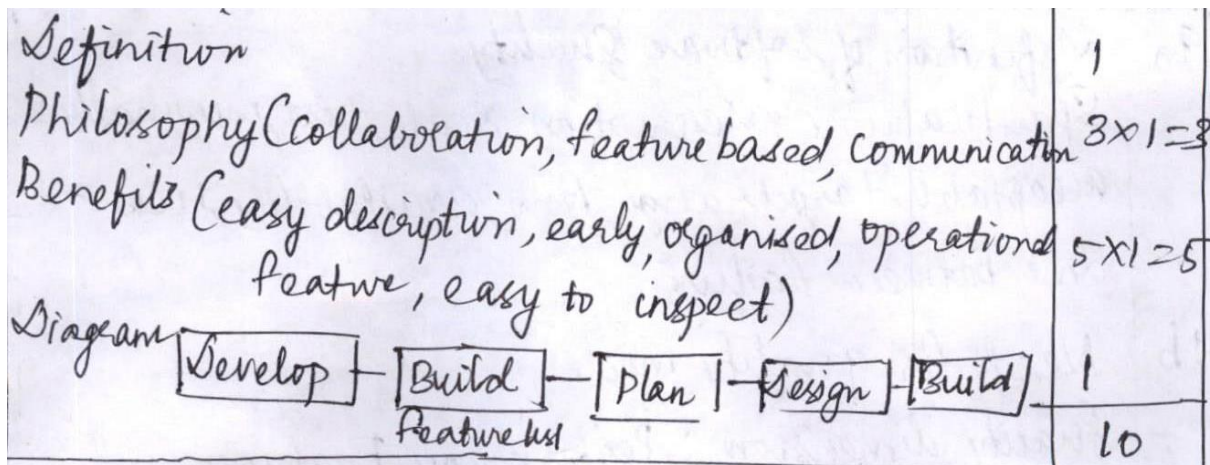
Module 4

7.

a. Explain the significance of efficient project management. **(10 Marks)**

(i) Complexity Mgmt (ii) Requirements mgmt (iii) Time Budget
(iv) Risk mgmt (v) Quality assurance (vi) Team Coordination
(vii) Stakeholder mgmt (viii) Scope mgmt (ix) Process improvement
(x) Resource allocation

	10×1
	10
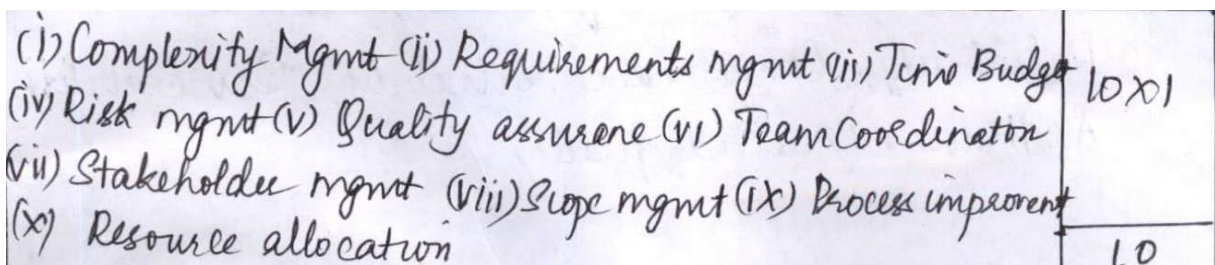
b. Define project. Explain the characteristics of a project. **(10 Marks)**

Project definition
Characteristics: Non routine, planning, specific
Objectives, pre determined time span, specialism,
phases, constrained resources

	1
	20.1×9
	10

OR

8.

a. Explain the different ways of categorizing software projects. **(10 Marks)**

Need for project classification
ways of categorizing
(i) Change to characteristics (ii) Voluntary V/s compulsory
(iii) Information / Embedded system iv) Software vs Service
v) Product development vs outsourced vi) Object driven

	2
	8×1=8
	10

b. Explain the activities of management in doing *management* control. **(10 Marks)**

Project plan & stakeholders
Activities
(i) Planning (ii) Organising (iii) Staffing
(iv) Directing (v) Monitoring (vi) Controlling
(vii) Innovating (viii) Representing

	2
	8×1=8
	10

Module 5

9.

a. Define software quality. Explain quality specification in detail. **(10 Marks)**

Definition of software Quality
Specifications: Description, Scale, test, minimally
acceptable, target range, Now, availability, Mean-
time between failure

	1
	9×1
	10

b. Why do we need software quality models? Explain Garvin's quality dimension. **(10 Marks)**

Need for quality model

Quality dimension : Performance, Features,
Reliability, Conformance, Durability, Serviceability
Aesthetics, Perceived quality

	2
	8
	10

OR

10.

   a. Explain McCall's model. **(10 Marks)**

Correctness, Reliability, Efficiency, Integrity,
Usability, Maintainability, Flexibility,
Testability, Portability, Reusability, Interoperability

| | 10×1 |
| | 10 |

   b. Explain ISO 9126's major external software quality characteristics. **(10 Marks)**

ISO Quality characteristics:

Functionality (Suitability, Accuracy, Security, Interoperability)	2
Reliability (Maturity, Fault tolerance, Recoverability, Reliability)	2
Usability (Understandability, Learnability, Operability, Attractiveness)	2
Efficiency (Time behavior, Resource Utilization, Efficiency)	1
Maintainability (Analysability, Changeability, Stability Testability)	1
Portability (Adaptability, Installability, Coexistence, Replaceability, Portability Compliance)	2
	10

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