FUNDAMENTALS OF SOFTWARE ENGINEERING
(IOT2202)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) Which software development model follows a strict sequential order of phases?
(a) Spiral Model (b) Prototyping Model
(c) Waterfall Model (d) Incremental Model

(ii) Which Agile principle focuses on maintaining a constant pace of work?
(a) Simplicity (b) Sustainable development
(c) Customer collaboration (d) Contract negotiation

(iii) What is the purpose of High-Level Design (HLD)?
(a) To define low-level implementation details
(b) To create an overall architectural view of the system
(c) To write the source code
(d) To test the software

(iv) What is the Unified Modeling Language (UML) used for?
(a) Writing system test cases
(b) Graphically representing software design and architecture
(c) Managing databases
(d) Executing programs

(v) What is the purpose of Code Refactoring?
(a) To introduce new bugs into the code
(b) To improve code structure without changing functionality
(c) To remove important features from the code
(d) To increase code execution time

(vi) The purpose of a Code Review is to:
(a) Identify and fix issues in the code before deployment
(b) Ignore minor errors and proceed with testing
(c) Write test cases automatically
(d) Slow down development

(vii) What is Software Estimation used for?
(a) Optimizing database queries
(b) Predicting user behavior
(c) Creating a software deployment plan
(d) Determining size, effort, duration, and cost of a software project

(viii) The PERT chart is used for
(a) Software development methodology selection
(b) Software testing
(c) Project scheduling and estimating the time required for tasks
(d) Database optimization

(ix) Basic COCOMO estimates effort based on
(a) The number of servers used (b) The number of developers available
(c) The software's market demand (d) Software size and development mode

(x) What is the primary benefit of having a well-defined SRS?
(a) Faster coding
(b) Clear understanding of project requirements and scope
(c) Reduced need for software testing
(d) Elimination of all software bugs.

Fill in the blanks with the correct word

(xi) Lines of Code (LOC) and Function Points (FP) are commonly used for _____ estimation in software engineering.

(xii) _____ review is a self-check performed by a developer before submitting the code for peer review.

(xiii) An _____ is an instance of a class that represents a real-world entity.

(xiv) The _____ approach starts with individual components and integrates them to form a complete system.

(xv) The _____ chart is a statistical tool used for project scheduling and estimating the time required for different activities.

Group - B

2. (a) What is software engineering? What are the objectives of software engineering? *[(CO1)(Remember/LOCQ)]*

(b) Describe the different phases of the software Life Cycle. Explain the importance of each phase in ensuring a successful software project. *[(CO1)(Understand /LOCQ)]*

(2 + 2) + (4 + 4) = 12

3. (a) Discuss about the requirements collection and analysis in software development? *[(CO1)(Understand/LOCQ)]*

(b) What is a Software Requirements Specification (SRS)? Describe its general structure. *[(CO1)(Understand/LOCQ)]*

5 + (2 + 5) = 12

Group - C

4. Draw the use case diagram of an online shopping system and provide descriptions for each use case with the following: precondition, main flow, alternate flow, post condition, and exceptions. *[(CO2)(Create/HOCQ)]*

12

5. Draw the activity diagram of an online shopping system with explaining each sequence as a step-by-step explanation for each workflow and listing constraints and business rules. *[(CO2)(Create/HOCQ)]*

12

Group - D

6. (a) What is the difference between self-review and peer review in software development? *[(CO3)(Remember/LOCQ)]*
   (b) Discuss the objectives of software testing. *[(CO3)(Analyse/IOCQ)]*
   (c) Compare and contrast between static testing and dynamic testing. *[(CO3)(Analyse/IOCQ)]*
   (d) What is the difference between functional and non-functional testing? *[(CO3)(Remember/LOCQ)]*

3 + 3 + 3 + 3 = 12

7. (a) Discuss the white box testing, and how is control flow graph (CFG) used? *[(CO3)(Understand/IOCQ)]*
   (b) Discuss the black box testing, and how are equivalence class partitioning and boundary value analysis used? *[(CO3)(Understand/IOCQ)]*
   (c) What are the different levels of testing? *[(CO3)(Remember /LOCQ)]*
   (d) Discuss the regression testing, and why is it important? *[(CO3)(Understand/IOCQ)]*

3 + 3 + 3 + 3 = 12

Group - E

8. (a) Discuss about the different maintenance process models? *[(CO4)(Understand/IOCQ)]*
   (b) Discuss about the constructive cost model (COCOMO), and what are its types? *[(CO5)(Understand/IOCQ)]*

6 + 6 = 12

9. (a) Discuss about the change management in software maintenance? *[(CO4)(Understand/IOCQ)]*
   (b) Discuss about the work breakdown structure (WBS), and how is it used in project planning? *[(CO5)(Understand/LOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75	31.25	25