

**SOFTWARE ENGINEERING
(CSBS 3201)**

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) When is code review performed during software life cycle?
 - (a) After unit testing
 - (b) After coding and compiling
 - (c) During integration testing
 - (d) During system testing
- (ii) A DFD does not contain
 - (a) External Entity
 - (b) Process
 - (c) Data Store
 - (d) Predicate
- (iii) Coupling is
 - (a) an intra-module activity
 - (b) a design-oriented activity
 - (c) an inter- module activity
 - (d) a measurement-oriented activity
- (iv) Temporal Cohesion means
 - (a) Cohesion with respect to time
 - (b) Cohesion with respect of global data
 - (c) Cohesion with respect of composite data
 - (d) Coincidental cohesion
- (v) Swim lane is defined in
 - (a) State Chart Diagram
 - (b) Activity Diagram
 - (c) Use Case Diagram
 - (d) Sequence Diagram

- (vi) Which of the following attributes of a program can be inferred from the cyclomatic complexity of a program?
 - (a) Computational complexity
 - (b) Lines of code (LoC)
 - (c) Executable code size
 - (d) Understandability
- (vii) The purpose of error seeding is which one of the followings?
 - (a) Determine the origin of the bugs
 - (b) Plant trojans
 - (c) Determine the number of latent bugs
 - (d) Plant insidious bugs before delivery to the customer
- (viii) Function Point describes
 - (a) The SRS document
 - (b) The test plans
 - (c) The functional decomposition
 - (d) The size of a software product directly from its specification
- (ix) Which of the following is a project scheduling method that can be applied to software development?
 - (a) PERT
 - (b) CPM
 - (c) CMM
 - (d) Both PERT and CPM
- (x) The chain of activities that determines the duration of the project
 - (a) Critical Path
 - (b) Duration Path
 - (c) Linear Independent Path
 - (d) None of These

Fill in the blanks with the correct word

- (xi) _____ Specification is also known as SRS document.
- (xii) A _____ is a simple horizontal bar chart that depicts project tasks against a calendar.
- (xiii) An external entity is represented using _____ in a DFD.
- (xiv) _____ is a software measure that provides a quantitative measure of logical complexity of a program.
- (xv) _____ risks threaten the quality and timeliness of the software to be built.

Group - B

- 2. (a) Draw a DFD(Upto 2nd level) for a Vehicle Showroom system that includes the following features:Provides the searching facilities based on various factors such as selling vehicles like cars, bikes from show room, vehicle bookings and

vehicle delivery. Vehicle Showroom Management system also manage the selling vehicles details, customers details, employee details. It tracks all the information of selling vehicles like cars, bikes etc. Manage the information and description of the repaired vehicle.

You must include atleast two entities:(Customer and Admin) and three modules/sub processes in level 1 DFD.

- (b) Write the components of SRS in brief. [[CO2](Create/HOCQ)]
[[CO1](Understand/LOCQ)]
(2 + 4 + 4) + 2 = 12

3. Write short notes on the following topic:(Any Three)

(i) Spiral Model (ii) Prototype Model (iii) Agile Model (iv) Incremental Model

[[CO1](Understand/LOCQ)]
(3 × 4) = 12

Group - C

4. A college runs a student admission system every year for a batch of 30 students for the first year of M.Tech. in ECE course. The procedure includes announcement of the admission in the newspaper advertisement. Applications are invited from the candidates. Written test is administered and a list of 30 qualified students is pasted on the notice board. The selected students are asked to pay an amount of Rs. 60,000/- fee within a week from the date of the notice of the final list. In this context perform the following actions:

(i) Identify actors and use cases. (ii) Draw class diagram. (iii) Draw activity diagram.

[[CO3](Remember/LOCQ)]/[[Create/HOCQ]]
2 + 5 + 5 = 12

5. (a) Explain the following relationship used in class diagram: association, generalization and aggregation.

[[CO3](Remember/LOCQ)]

(b) Differentiate between structured chart and flow chart with an example.

[[CO2](Analyze/IOCQ)]

(2 + 2 + 2) + 6 = 12

Group - D

6. (a) Draw a control flow graph for a C function that finds smallest among three integer numbers. Hence find the cyclomatic complexity.

[[CO4] (Create/HOCQ)]

(b) Differentiate between code walkthrough and code inspection.

[[CO4](Analyze/IOCQ)]

(c) Explain equivalence class partitioning with an example.

[[CO4](Understand/LOCQ)]

(3 + 3) + 3 + 3 = 12

7. (a) Differentiate between verification and validation.

[[CO4](Analyze/IOCQ)]

(b) Explain the term: test case, test suite, test scenario and test script.

[[CO4](Remember/LOCQ)]

(c) What do you understand by the term integration testing? Which types of defects are uncovered during integration testing?

[[CO4](Understand/LOCQ)]

3 + 4 + (3 + 2) = 12

Group - E

8. (a) Consider a project with four major modules of size 100 KLOC, 206 KLOC, 120 KLOC and 41 KLOC. Use COCOMO to determine development effort and development time. Assume that this project will fall in an embedded category. The different cost driver attributes along with their multiplying factors are :
- (i) Complexity High : 1.15
 - (ii) Reliability High : 1.15
 - (iii) Experience Low : 1.13
 - (iv) Programmer's Capability Low : 1.17. Other factors are nominal.
- [[CO5](Apply/IOCQ)]*
- (b) Explain when you should use PERT charts and when you should use Gantt charts while you are performing the duties of a project manager.
- [[CO6](Remember/LOCQ)]*
- (c) How does the change of project duration affect the overall project development effort and development cost?
- [[CO6](Remember/LOCQ)]*
6 + 3 + 3 = 12
9. (a) Draw the PERT diagram for the given set of tasks and dependencies. Also draw the Gantt Chart for the given task with showing critical path. Assume start time = 0.

Subtask	Time to complete	Dependencies
1	7	-----
2	10	-----
3	8	1,2
4	9	1
5	5	2
6	6	3,4
7	3	4,5
8	4	6,7
9	2	5,6

[[CO6/create/HOCQ]]

- (b) Why is intermediate COCOMO expected to give more accurate estimates than the basic COCOMO ?

[[CO5/Analyze/IOCQ]]

(2 + 3 + 4) + 3 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	39.6	21.8	38.6

Course Outcome (CO):

After the completion of the course students will be able to

1. Understand the basic concept of SDLC stages and different SDLC models.
2. Model function-oriented software design.
3. Develop object-oriented software design.
4. Analyze different approaches of testing methodology in a software system.
5. Estimate size, effort, cost and time related to a software project.
6. Prepare software project schedule and staffing plan.

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*