

SOFTWARE ENGINEERING
(CBS3201)

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) Out of the following life cycle models which one can be considered as the most general model, and the others as specialization of it?
 - (a) Classical Waterfall Model
 - (b) Iterative Waterfall Model
 - (c) Prototyping Model
 - (d) Spiral Model
- (ii) Which of the following describes "Is-a-Relationship"?
 - (a) Aggregation
 - (b) Inheritance
 - (c) Dependency
 - (d) None of these
- (iii) A DFD does not contain
 - (a) External Entity
 - (b) Process
 - (c) Data Store
 - (d) Predicate
- (iv) The best type of cohesion is
 - (a) Temporal
 - (b) Sequential
 - (c) Functional
 - (d) Coincidental
- (v) In ____ coupling, the complete data structure is passed from one module to another.
 - (a) Control
 - (b) Stamp
 - (c) External
 - (d) Content
- (vi) Functional independence results in
 - (a) error isolation
 - (b) scope of reuse
 - (c) understandability
 - (d) all of the above
- (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) Regression testing is
 - (a) Testing only new features
 - (b) Checking user interface
 - (c) Validating database
 - (d) Re-testing existing code to ensure new changes don't affect functionality
- (ix) 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
- (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 the above

Fill in the blanks with the correct word

- (xi) _____ is a graphical model that depicts a project as a series of events and milestones that are dependent on one another.
- (xii) The equation for the Basic COCOMO model to estimate effort is_____.
- (xiii) _____ used to estimate the number of residual errors in a system.
- (xiv) The worst type of cohesion is _____ cohesion.
- (xv) A type of failures that occurs for all input values while invoking a function of the system is _____.

Group - B

2. Write short notes on the following topic:

(i) SDLC (ii) Waterfall Model (iii) Incremental Model.

[[CO1](Understand/LOCQ)]

(4 + 4 + 4) = 12

3. (a) Why Spiral Model is called Meta Model?

[[CO1](Understand/LOCQ)]

(b) 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 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 at least two entities:(Customer and Admin) and three modules/sub processes in level 1 DFD.

[[CO2](Create/HOCQ)]

4 + 8 = 12

Group - C

4. (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)]
6 + 6 = 12
5. (a) Explain different types of Cohesion used in software design process. [[CO2](Understand/LOCQ)]
- (b) Draw an activity diagram for Electricity Bill payment system in which user/customer log in the system and then they can view the current bill, previous bill and late fine if any. By using the consumer id user can make payment for current/previous bill. Admin can make changes in the bill, Add/Delete connection. Also user can apply for a new connection in the system, by viewing that request Admin has to take necessity step on the basis of reconnection as a defaulter. You must include the concept of Special states, Normal States, Swimlanes, Fork and Join. [[CO3](Create/HOCQ)]
- (c) Describe the concept of synchronization used in state chart diagram with a suitable diagram. [[CO3](Remember/LOCQ)]
4 + 6 + 2 = 12

Group - D

6. (a) Explain the following term: MTTF, MTTR, ROCOF, MTBF. [[CO4](Understand/LOCQ)]
- (b) Explain different types of failure in software testing method. [[CO4](Remember/LOCQ)]
- (c) Differentiate between failure and defect. [[CO4](Analyze/IOCQ)]
6 + 4 + 2 = 12
7. (a) Draw the Control Flow Graph for the following code snippet. Hence find the cyclomatic complexity.
- ```
begin int x, y, power;
 float z;
 input(x, y);
 if(y<0)
 power = -y;
 else power = y;
 z=1;
 while(power!=0)
 {
 z=z*x;
 power=power-1;
 } if(y<0)
 z=1/z;
 output(z);
end
```
- [[CO4](Create/HOCQ)]
- (b) Explain the different guidelines used for the design of equivalence classes for a problem. [[CO4](Understand/LOCQ)]  
**8 + 4 = 12**

## Group - E

8. (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]Remember/LOCQ]

**9 + 3 = 12**

9. (a) Consider a project with four major modules of size 206 KLOC,109 KLOC,153 KLOC and 341 KLOC. Use COCOMO to determine development effort and development time. Assume that this project will fall in an semidetached category. The different cost driver attributes along with their multiplying factors are :
- (i) Complexity High : 1.21
  - (ii) Reliability High : 1.14
  - (iii) Experience Low : 1.12
  - (iv) Programmer's Capability Low : 1.16. Other factors are nominal.

[[CO5](Apply/IOCQ)]

- (b) Write the merits and demerits of function point analysis.

[[CO6](Understand/IOCQ)]

**6 + 6 = 12**

| Cognition Level         | LOCQ  | IOCQ  | HOCQ  |
|-------------------------|-------|-------|-------|
| Percentage distribution | 56.25 | 20.83 | 22.92 |