

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) 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
- (iii) The best type of cohesion is
 - (a) Temporal
 - (b) Sequential
 - (c) Functional
 - (d) Coincidental
- (iv) Coupling is
 - (a) an intra-module activity
 - (b) a design-oriented activity
 - (c) an inter- module activity
 - (d) a measurement-oriented activity
- (v) The most desirable form of coupling is
 - (a) Control
 - (b) Common
 - (c) Data
 - (d) Stamp
- (vi) Functional independence results in
 - (a) error isolation
 - (b) scope of reuse
 - (c) understandability
 - (d) all of the above
- (vii) 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

- (viii) 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
- (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) Which one is not a size measure for software product?
 (a) Halstead's program length (b) LOC
 (c) Function Count (d) Cyclomatic Complexity

Fill in the blanks with the correct word

- (xi) A _____ is a simple horizontal bar chart that depicts project tasks against a calendar.
- (xii) The worst form of module cohesion is _____.
- (xiii) The equation for the Basic COCOMO model to estimate effort is _____.
- (xiv) _____ used to estimate the number of residual errors in a system.
- (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) Spiral Model, (ii) Prototype Model, (iii) Agile Model.

[[CO1](Understand/LOCQ)]

(4 + 4 + 4) = 12

3. (a) Draw a DFD(up to 2nd level) on online shopping Management System . You should include at least two entities and three modules/sub processes in level 1 DFD.

[[CO2] (Create/HOCQ)]

(b) Write the components of SRS in brief.

[[CO1](Understand/LOCQ)]

9 + 3 = 12

Group - C

4. (a) Write the features of functional independence. Explain different types of Coupling used in software design process.

[[CO2](Understand/LOCQ)]

(b) What are the different types of message used in sequence diagram?

[[CO3](Remember/LOCQ)]

(c) Explain the concept of Fork and join (with example) used in activity diagram.

[[CO3](Remember/LOCQ)]

6 + 3 + 3 = 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) Write down four important coding standards and coding guidelines that you would recommend for any Software organization. [[CO4](Understand/LOCQ)]
- (b) Briefly explain clean room testing strategy. [[CO4](Remember/LOCQ)]
- (c) What do you understand by positive and negative test cases? Give one example of each. [[CO4](Understand/LOCQ)]
- 4 + 4 + 4 = 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) Assume that the size of an semidetached type software product has been estimated to be 105500 lines of source code. Assume that the average salary of software engineers is Rs. 55000/- per month. Determine the effort required to develop the software product and nominal development time. [[CO5] (Analyse/IOCQ)]

- (b) Explain the different types of Metrics used in software project management. [[C05](Understand/LOCQ)]
- (c) Differentiate between Basic COCOMO and Intermediate COCOMO. [[C05](Analyze/IOCQ)]
- 5 + 4 + 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.

| Subtask | Time to complete | Dependencies |
|---------|------------------|--------------|
| 1       | 10               | -----        |
| 2       | 10               | 5            |
| 3       | 10               | 4,6          |
| 4       | 20               | 1,6,2        |
| 5       | 8                | 1,6          |
| 6       | 5                | 1            |

[[C06](Create/HOCQ)]

- (b) List out all the review guidelines used in the software quality assurance. [[C05](Understand/LOCQ)]
- 9 + 3 = 12**

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| Cognition Level         | LOCQ  | IOCQ | HOCQ  |
|-------------------------|-------|------|-------|
| Percentage distribution | 66.66 | 0    | 33.33 |