

SOFTWARE ENGINEERING
(MCAP 2201)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

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

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) _____ is an “umbrella” activity that is applied throughout the software engineering process.
(a) Debugging (b) Testing
(c) Designing (d) Software quality assurance
- (ii) _____ establishes information about when, why and by whom changes are made in a software.
(a) Software Configuration Management (b) Change Control
(c) Version Control (d) An Audit Trail
- (iii) The factors that determine the quality of a software system are
(a) Correctness, reliability
(b) Efficiency, usability, maintainability
(c) Testability, portability, accuracy, error tolerances, expandability, access control, audit
(d) All.
- (iv) The software _____ of a program or a computing system is the structure or structures of the system, which comprise software components, the externally visible properties of those components, and the relationships among them.
(a) design (b) architecture
(c) process (d) requirement.
- (v) Which one of the following is not a source code metric?
(a) Halstead metric (b) Function point metric
(c) Complexity metric (d) Length metric.
- (vi) Requirements prioritization and negotiation belongs to
(a) Requirements validation (b) Requirements elicitation
(c) Feasibility study (d) Requirements reviews.

- (vii) Cohesion is an extension of
(a) Abstraction concept (b) Refinement concept
(c) Information hiding concept (d) Modularity.
- (viii) Which of the following is a tool in design phase?
(a) Abstraction (b) Refinement
(c) Information hiding (d) All.
- (ix) Select the statement true for activity diagrams.
(a) They are used to depict workflow for a particular business activity
(b) Activity diagram do not tell who does what and are difficult to trace back to object models
(c) They can be used to discover parallel activities
(d) All.
- (x) In software testing, how the error, fault and failure are related to each other?
(a) Error leads to failure but fault is not related to error and failure
(b) Fault leads to failure but error is not related to fault and failure
(c) Error leads to fault and fault leads to failure
(d) Fault leads to error and error leads to failure.

Group- B

2. (a) Explain software engineering and software engineering layers.
[[CO1](Remember/LOCQ)]
(b) Explain unified process? Elaborate on the unified process work products.
[[CO2](Understand/LOCQ)]
6 + 6 = 12
3. (a) Explain the characteristics of good SRS document and their components.
[[CO2](Remember/LOCQ)]
(b) Explain at least one scenario "RAD model would be applicable and not the waterfall model."
[[CO3](Analyze/IOCQ)]
6 + 6 = 12

Group - C

4. (a) Explain the concept of requirement engineering. Classify the following requirements as functional or non-functional
(i) The phone shall have a power button.
(ii) The system will be online 23hours/day.
(iii) The system shall not accept credit card.
(iv) Website must be ADA complaint. [[CO3](Understand/LOCQ)]
(b) Compute and prepare function point value for a project with the following information domain characteristics.
No. of external inputs-30
No. of external outputs - 52

No. of external inquiries-22

No. of logical files-12

No. of external interface files-2

Assume complexity adjustment values for the above are average (4, 5, and 4,10,7 respectively). The system requires significant reliability (4), is moderate performance critical (2), system requires moderate online data entry (2) and all other factors are incidental.

[(CO5)(Apply/IOCQ)]

4 + 8 = 12

5. (a) Identify the importance of cost estimation in software development. Use COCOMO II model to estimate the effort required to build software for simple ATM that produces 12 screens with 2 views each for 3 data base tables (1 server side, 2 client side), 10 reports with 2 section each for 3 data base tables (1 server side, 2 client side) and will require approximately 80% as new components. Assume nominal complexity and nominal developer/environment maturity. [(CO5)(Apply/IOCQ)]
- (b) Analyze class diagram with example. [(CO3)(Analyze/IOCQ)]
- 8 + 4 = 12**

Group - D

6. (a) Compose your view about agile software development. [(CO4)(Create/HOCQ)]
- (b) Generalize your view about extreme programming. [(CO4)(Create/HOCQ)]
- 6 + 6 = 12**
7. (a) Consider the following shopping portal:
A customer visits the online shopping portal. A customer may buy item or just visit the page and logout. The customer can select a segment, then a category and brand to get different products in the desired brand.
The customer can select product for purchasing. The process can be repeated for more items. Once the customer finishes selecting product/s the cart can be viewed. The cart can be edited. For the final payment the customer has to login. If the customer is first time user he must register with portal. Finally cart is submitted for payment and card details, addresses are to be confirmed by customer. Customer gets a confirmation with shipment ID and delivery of goods within 7 days. Draw a use case diagram for the above case study.
[(CO4)(Apply/IOCQ)]
- (b) Write about Architecture and specify the importance of architecture.
[(CO4)(Understand/LOCQ)]
- 6 + 6 = 12**

Group - E

8. (a) Measure the performance of equivalence partitioning. Explain the technique using examples. [(CO4)(Evaluate/HOCQ)]
- (b) Identify and analyze the type of maintenance for each of the following:

- (i) Correcting the software faults.
- (ii) Adapting the change in environment.

[(C04)(Analyze/IOCQ)]
6 + (3 + 3) = 12

9. (a) Explain software verification and validation. [(C04)(Remember/LOCQ)]
(b) Between "Statement Coverage and Branch Coverage", Examine which is a stronger criteria? Why? [(C04)(Analyze/IOCQ)]
4 + (4 + 4) = 12
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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	37.50	43.75	18.75

Course Outcome (CO):

After the completion of the course students will be able to

- CO1. Exemplify the software engineering process, systems and security
- CO2. Explain software engineering process by identifying the requirements and system modelling.
- CO3. Design, develop and implement software based on requirement.
- CO4. Illustrate the evolution process, reuse and testing for developing a quality software for customer.
- CO5. Describe the software management, project management, and planning and configuration management

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