Guru Nanak Dev Engineering College, Ludhiana			
Department of Information Technology			
Program	B.Tech.(IT)	**Semester**	6
Subject Code	PEIT-111	**Subject Title**	Software Design & Testing
Mid Semester Test (MST) No.	1	**Course Coordinator(s)**	Dr. Sandeep Kumar Singla
Max. Marks	24	**Time Duration**	1 hour 30 minutes
Date of MST	21st March, 2025	**Roll Number**	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	List the steps of Architecture Trade-off Analysis Methods (ATAM)?	CO3, L2	2
Q2	Compare and contrast layered architecture and data-centered architectural style.	CO3, L4	2
Q3	Explain how the principles of abstraction and decomposition are used to arrive at a good design. Explain why a design approach based on the information hiding principle is likely to lead to a reusable and maintainable design. Illustrate your answer with a suitable example.	CO2, L2	4
Q4	How would you improve a software design that displays very low cohesion and high coupling?	CO1, L4	4
Q5	Draw class diagram and E-R diagram for the Examination Management System of an institute.	CO3, L6	4
Q6	Briefly discuss different types of cohesion and coupling in the context of software design.	CO1, L6	8

Course Outcomes (CO): *Students will be able to*

1	*Use fundamental design principles, methods, patterns and strategies in the creation of a software system and its supporting documents.*
2	*Design and Prototype user interfaces to validate requirements.*
3	*Demonstrate object-oriented design basics like domain models, class diagrams, and interaction (sequence and communication) diagrams.*
4	*Produce test cases, plans, and procedures that can be used to verify that they have defined, designed and implemented a system that meets the needs of the intended users and achieve the quality goal.*
5	*Apply different strategies for unit-level , system-level testing, integration and regression testing.*
6	*Prepare and conduct usability tests to evaluate the usability, utility and efficiency of the developed user interface.*

RBT Classification	**Lower Order Thinking Levels (LOTS)**			**Higher Order Thinking Levels (HOTS)**		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

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Mid Semester Test (MST)	2	**Course Coordinator(s)**	Dr. Sandeep Kumar Singla
Max. Marks	24	**Time Duration**	1 hour 30 minutes
Date of MST	15th May, 2025	**Roll Number**	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Distinguish between software verification and software validation. Can one be used in place of the other? Justify your answer.	CO4, L4	2
Q2	(a) Give appropriate examples of the types of bugs detected during: Unit testing, Integration testing and System testing. (b) For a function that computes the square root of the integer values in the range of 0 and 5000, determine the boundary value test suite.	CO5, L4	2
Q3	How Cyclomatic complexity metric is useful in testing? Write down the formulae to compute the cyclomatic complexity metric. Draw control flow graph of any code and find the cyclomatic complexity metric of that graph.	CO4, L5	4
Q4	Differentiate between black box and white box testing. Enlist types of white box and black box testing. In which cases the black box testing is preferred?	CO5, L4	4
Q5	What do you understand by testability of a program? Suppose an untested program was determined to contain 640 bugs. Three different testing techniques were applied to test the code. Each testing technique is effective to detect 50% of the bugs that exist before the concerned testing technique is applied. While fixing a bug after the application of a test strategy, there is a 50% chance of creating another bug. How many bugs would exist in the code after the three testing and bug-fix cycles have been carried out?	CO6, L5	4
Q6	A function named compute-electricity-bill was written to compute the electricity bill by an electricity distribution company. This function takes two parameters, the number of units consumed by a customer and the corresponding customer type. The customer type is an integer value in the range 1 to 5 indicating whether the customer is domestic, industrial, commercial establishment, etc. The tariff depends not only the customer type, but also on the number of units consumed. The slabs for different charges based on the units consumed are 0 to 100 units, 100 to 200 units, 200 to 500 units, and 500 units and above. How many test cases required for weak equivalence class testing, strong equivalence class testing and strong robust equivalence class testing of the function compute-electricity-bill? Demonstrate through appropriate diagram.	CO6, L5	8

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5	*Apply different strategies for unit-level , system-level testing, integration and regression testing.*
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Please check that this question paper contains__9__ questions and__2__ printed pages within first ten minutes.

[Total No. of Questions:09]
Uni. Roll No. 2203870

[Total No. of Pages:..2..]

Program: B.Tech. (Batch 2018 onward)
Semester: 6th
Name of Subject: Software Design and testing
Subject Code: PEIT-111.
Paper ID: 17211

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A **[Marks: 02 each]**

Q1.

a) What is modularization in software?
b) Differentiate between architecture style and architecture pattern.
c) List the approaches for software design.
d) Write the key aspects of Pseudo Codes.
e) What is significance of design metrics?
f) Outline the different sources of knowledge for black box testing.

Part – B **[Marks: 04 each]**

Q2. Draw and explain the sequence diagram of admission process of an institute.

Q3. Distinguish between White-Box testing and Black-box functional testing

Q4. How does automation tool assist in testing?

Q5. How service oriented architecture defines a way to make software components reusable using the interfaces.

Q6. Discuss the various components of structural charts with example.

Q7. How regression testing is different from mutation testing? Elaborate the mutation process useful for mutation testing.

Part – C **[Marks: 12 each]**

Q8. Distinguish between

a) High level and detailed designs
b) Coupling and cohesion
c) Acceptance and regression testing

OR

a) Discuss testing based on operational profile. b) How do one plan and document the verification &validation effort and its strategy

Q9. **a)** Distinguish between boundary value testing and equivalence class based testing.

b) Assume an untested program was having 600 bugs. Three types of testing technique were applied to each code. While each testing technique was effective to detect 50% of bugs that exist initially. It was also observed that while fixing a bug after applying any testing technique, , there is 50% chances of creating another bug. Find out how many bugs would exist in the code after the three testing and bug-fix cycles carried out?

OR

a) Why do we need UML? Discuss the basic components and formal specification of state diagrams? Draw and explain the state diagram for online order system.

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