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BTECH
(SEM VI) THEORY EXAMINATION 2024-25
SOFTWARE ENGINEERING

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

02 x 7 = 14

Q no.	Question	CO	Level
a.	List various components of software and give their brief description.	1	K1
b.	Justify the statement "Software does not wear out and is not manufactured".	1	K2
c.	What is Software Risk Analysis Management?	2	K1
d.	Define Use Case and write most commonly accepted template for the Use Case giving description of its components.	2	K3
e.	Give a detailed overview of Size Oriented Measures of software.	3	K2
f.	Justify the statement "Exhaustive Testing is not possible "	4	K5
g.	Define software Re-engineering	5	K3

SECTION B

2. Attempt any three of the following:

07 x 3 = 21

Q no.	Question	CO	Level
a.	List various software quality attributes and discuss the procedure for assessment of software quality. Obtain the expression for Error Index (which acts as Quality Indicator for software) through the Statistical Quality Assurance procedure where the defect/error data is collected and categorized for a defined period of time.	1	K2
b.	Suppose you have to develop Library Management Software with common functionalities such as authentication of the user, issue and return of books by the user, report generation by the librarian, and database maintenance by the library administrator etc. Draw a complete (at least up to 2-levels) Data Flow Diagram (DFD) and State Transition Diagram for this software.	2	K3
c.	List various drawbacks of the Line of Code (LOC) based size measure of software. Discuss the Albrecht Function Point count method. Show that the Complexity Adjustment Factor (CAF) adjusts the unadjusted value of Function Point (UFP) to $\pm 35\%$.	3	K4
d.	Discuss following type of testing techniques in details. 1. Unit Testing 2. Integration Testing 3. System Testing	4	K2
e.	Justify the statement "Software Maintenance is Inevitable". Discuss various types of software maintenances along with their relative maintenance cost.	5	K2

SECTION C

3. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Draw a diagram to represent Spiral Model of software development and discuss it in details. Also discuss the criteria for selection of model for software development.	1	K3
b.	Define software and software engineering. Write various components of software and give their brief description. Why there is a crisis in software development industry?	1	K4



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4. Attempt any one part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Discuss the Requirements Engineering Process. Write down the most generalized template used for describing Use Cases. Give description of its various components taking a suitable example.	2	K3
b.	Discuss all nine (9) types of UML diagrams under static and dynamic category which are used for specifying various concepts notations in Object Oriented Design/development of software.	2	K4

5. Attempt any one part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Write down various attributes/properties of a good/stable software design. Discuss the concept of coupling and cohesion measures and their use to determine strength of a software design.	3	K2
b.	Discuss the SEI Capability Maturity Model and compare it with the ISO 9000 certification giving various distinctive features of each model.	3	K2

6. Attempt any one part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Consider a program for determination of the nature of roots of a quadratic equation. Its input is a triple of positive integers (say a, b, c) and values may be from interval [0, 10]. The program output may have one of the following words: Not a quadratic equation, Real roots, Imaginary roots, Equal roots. Design the Boundary value and Equivalence Partitioning test cases for the program.	4	K5
b.	Draw the Control Flow Graph (CFG) for the following program and calculate its Cyclomatic Complexity. Also write various independent/basis paths available in the program/CFG. <pre> int compute_gcd(x,y) int x,y; { while (x != y) { if(x>y) then x=x-y; else y=y-x; } return x; } </pre>	4	K4

7. Attempt any one part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Give the structure of CASE development environment and discuss its various components in brief. Write various benefits of using CASE tools?	5	K2
b.	Write a brief description of various categories of software maintenances? Give a proportionate distribution of maintenance cost to these categories. Discuss the role of Reverse Engineering in software maintenance.	5	K3