TBC–305/TBI–305

B. C. A./B. SC. (IT) (THIRD SEMESTER) END SEMESTER EXAMINATION, Dec., 2023

SOFTWARE ENGINEERING

Time : Three Hours

Maximum Marks : 100

Note : (i)   All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Define software engineering and explain its significance in the modern world. Discuss the evolving role of software.

(CO1)

P. T. O.

(b) Describe the key characteristics of software and its components. How do software applications vary in their nature and purpose ?   (CO1)

(c) Compare and contrast the Waterfall Model and Spiral Model.   (CO1)

2. (a) Explain the process of requirements elicitation and the role of problem analysis in software development. Why are clear requirement specifications important ?

(CO2)

(b) Discuss design principles in software engineering. Compare top-down and bottom-up design approaches. What is the significance of cohesion and coupling in design ?   (CO2)

(c) Draw flowchart, a two level DFD and ER diagram for student attendance management system.   (CO2)

3. (a) Explain the different testing strategies involves in testing phase. Also explain different types of testing.   (CO3)

(b) Explain the concept of software maintenance. What are the different types of maintenance.   (CO3)

(c) Design the test suites for valid and invalid test cases for score of students in examination. Use the equivalnce and boundary values analysis :   (CO3)

$90 <= score <= 100$: Message is grade 'O'

$80 <= score < 90$: Message is grade 'A'

$70 <= score < 80$: Message is grade 'B'

$60 <= score < 70$: Message is grade 'C'

$0 <= score < 60$: Message is grade 'D'

All other values considered as invalid including positive and negative : Message is grade 'INVALID'.

4. (a) Differentiate between ISO and CMM. Also explain software quality assurance.

(CO4)

(b) Explore reliability issues in software engineering and discuss common reliability metrics. How do matrices and measurements contribute to quality assurance ?   (CO4)

(c) Suppose you have a critical server in a data center. You have collected data and determined the following :   (CO4)

MTBF (Mean Time Between Failures) for the server is 400 hours.

MTTR (Mean Time To Repair) for the server is 2 hours.

Now, let's calculate the availability of the server.

5. (a) Explain the management spectrum in software project management, highlighting the role of management in software development.   (CO5)

(b) Discuss the importance of software configuration management and quality assurance in software project management. How does project monitoring contribute to project success ?   (CO5)

(c) Define CASE and its scope in the software development process. Explain how CASE supports documentation and project management.   (CO5)