**Seat No./Enrollment No.: _____**

# GUJARAT TECHNOLOGICAL UNIVERSITY
## BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

**Subject Code: 3164901** **Date: 08/06/2026**

**Subject Name: SOFTWARE ENGINEERING AND TESTING**

**Time: 10:30 AM TO 01:00 PM** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

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|---|---|---|---|
| **Q.1** | **(a)** | A company wants to develop a real-time flight-control system. Evaluate which SDLC model (Waterfall, Agile, Spiral, or RAD) is MOST suitable and justify your answer. Clearly state why the other models are REJECTED. | **03** |
| | **(b)** | Differentiate between Functional and Non-Functional Requirements. A student exam portal system has: 'Login must use OTP', 'System must support 10,000 concurrent users', 'Data must be encrypted'. Classify each and explain their impact on design. | **04** |
| | **(c)** | A project has: EI=12(avg), EO=8(avg), EQ=6(simple), ILF=4(complex), EIF=3(avg). It is given that the complexity weighting factors for EI, EQ, EO, ILF and EIF are 4, 3, 5,15 and 7 respectively. The sum of all 14 GSC ratings (Fi) = 38. After finding AFP, assume 1 FP = 105 LOC (Java). Using Basic COCOMO (Organic: a=2.4, b=1.05, c=2.5, d=0.38), find Effort, Duration and Productivity (FP/PM). | **07** |
| **Q.2** | **(a)** | Explain the Waterfall (Linear Sequential) Model with its phases, advantages, and disadvantages. | **03** |
| | **(b)** | List any five principles of the Agile Manifesto. Explain which principle is hardest to follow in a distributed global team and why. | **04** |
| | **(c)** | What is Extreme Programming (XP)? Explain its core values and practices in detail. | **07** |
| | | OR | |
| **Q.2** | **(c)** | Explain Evolutionary Process Models. Describe the Spiral Model in detail with a diagram. | **07** |
| **Q.3** | **(a)** | Define Risk in software projects. Discuss RMMM concept. Give a real-world software project risk example for each phase. | **03** |
| | **(b)** | What is Software Project Scheduling? Explain any one scheduling technique used in project management. | **04** |
| | **(c)** | Explain Software Requirement Specification (SRS). What are the key components and characteristics of a good SRS document? | **07** |
| | | OR | |
| **Q.3** | **(a)** | Explain Coupling in software design. Rank Content, Data, Control, Common, and Stamp Coupling from worst to best. Justify each rank with a scenario. | **03** |
| | **(b)** | What is Software Architectural Design? Compare Client-Server, Layered, and Pipe-and-Filter architectures with suitable scenarios. | **04** |

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|---|---|---|---|
| | **(c)** | A company is manufacturing a new product and must coordinate several departments. The product starts out as a raw marketing idea that goes to engineering. Engineering simulates the function of the product and prepares a design. Manufacturing reviews the design and adjusts it to conform to existing machinery. Engineering approves the revisions and customer service then looks at the design - a good design must enable ready repair. Engineering approves the customer service proposals and ensures that the resulting design still meets the target functionality.<br>Construct an activity diagram for this process. Use swimlanes to show the various interactions. Show the changes in the state of the design as the activity diagram proceeds. | **07** |
| **Q.4** | **(a)** | Define Software Quality. List and explain at least four software quality factors. | **03** |
| | **(b)** | Differentiate between Verification and Validation with examples. A test team reports '0 defects found' after extensive testing. Does this mean the product has zero defects? Justify your answer using the concept of Quality and Testing limitations. | **04** |
| | **(c)** | Compare and contrast the three major software quality standards: ISO 9001, CMMI and Six Sigma. | **07** |
| | | OR | |
| **Q.4** | **(a)** | What is DevOps? List its key benefits in modern software development. | **03** |
| | **(b)** | Explain DevOps Principles and Practices. What are the major challenges faced during DevOps implementation? | **04** |
| | **(c)** | Explain the 7 C's of DevOps Lifecycle for Business Agility with examples. | **07** |
| **Q.5** | **(a)** | Define White Box Testing. List and briefly explain its types. | **03** |
| | **(b)** | Design a complete test suite using Boundary Value Analysis (BVA) for a function that accepts a student's percentage (valid range: 0–100) and returns Grade A (>=80), B (60–79), C (40–59), or Fail (<40). List all boundary test cases and their expected outputs. | **04** |
| | **(c)** | Explain Software Testing Strategies: Unit, Integration, and System Testing. How does the V-Model relate to testing? | **07** |
| | | OR | |
| **Q.5** | **(a)** | Explain Black Box Testing techniques with suitable example. Discuss its advantages and limitations. | **03** |
| | **(b)** | Explain Automated Testing. What are the advantages of using Selenium WebDriver for automated testing? | **04** |
| | **(c)** | What are CASE (Computer-Aided Software Engineering) tools? Explain their direct effect and contribution to improving overall software quality. | **07** |

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