


VIT

Vellore Institute of Technology

Reg. [REDACTED]

Final Assessment Test - April 2026

Course: BITE307L - Software Engineering

Class NBR(s): 2945 / 2947 / 2956 / 2959

Time: Three Hours

Slot: B1+TB1

Max. Marks: 100

KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Use appropriate software process models for given software project scenarios.
CO2	Analyse software requirements and develop software requirements specification.
CO3	Develop abstract models and architectural design for software development.
CO4	Choose appropriate software testing and evolution strategies.
CO5	Create an outline of software project management plan including risk, configuration and quality aspects.

BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)

Answer ALL Questions

(10 X 10 = 100 Marks)

Scenario 01: A software development company has been assigned multiple projects for different clients such as an online retail system, a healthcare monitoring application, and a startup-based mobile service platform. During the project planning meeting, the team leader explains that selecting an appropriate software process model depends on factors such as requirement stability, project size, risk level, need for user feedback, and development flexibility. While discussing these factors, the team also observes that some development models share similar characteristics and operational approaches.

CO1 BL4

Based on the process models and their selection conditions illustrated in the scenario, identify any two software process models that are closely related or similar in their development approach. Justify your answer by comparing their characteristics and explaining why they can be considered closely related.

Based on the above scenario 01, prepare a structured requirement catalogue for the proposed systems by specifying suitable Functional Requirements and Non-Functional Requirements. The catalogue should include at least ten functional requirements and ten non-functional

CO2 BL6

requirements that would commonly apply to such multi-domain software projects. Present the requirements in a well-organized tabular format with appropriate requirement identifiers.

CO3

BL6

3.

Vellore Institute of Technology plans to develop a Remote Patient Monitoring Application to support students who require regular health monitoring within the campus. The application will allow students to create their profiles and record basic health parameters such as heart rate, blood pressure, and temperature using connected devices or manual input. The recorded health data will be stored in the system and can be accessed by authorized university medical staff. Doctors in the university health center can review the student's medical records, monitor health reports, and provide medical advice or prescriptions when necessary. The system will also manage appointments between students and doctors and maintain a history of previous consultations for reference.

During the system design phase, the development team decides to represent the structural design of the application using a UML Class Diagram to clearly show the system entities and their relationships.

Based on the above scenario, design and draw a UML Class Diagram for the Remote Patient Monitoring Application. Clearly identify the relevant classes, their attributes, methods, and relationships.

4.
1. point

A hospital plans to develop a security monitoring system to track the movement of people entering and leaving the hospital premises. The system includes several components such as gate entry registration, staff ID verification, visitor logging, and exit tracking. Before integrating these components into the complete application, the development team decides to verify whether each individual program component, class, and method performs its intended function correctly. The testing team focuses on examining each component independently to identify possible errors at an early stage of development.

CO4

BL6

Based on the above scenario, identify the type of testing being performed. Explain its purpose and describe how testing individual classes or methods helps ensure the correct functioning of the hospital security monitoring system before integrating all modules.

Define Commercial-Off-The-Shelf (COTS) product reuse in software engineering. Discuss the benefits of COTS reuse and explain the problems or limitations associated with using COTS products. Also differentiate between COTS-based solutions and COTS-integrated systems with suitable explanations.

CO5 BL1

A financial technology company is developing a digital banking platform that allows customers to perform services such as online transactions, account management, loan applications, and digital payments. The system will be used by a large number of customers and must integrate with several external systems such as payment gateways and regulatory databases. Because of the scale of the system and its impact on the company's business operations, the development team needs to analyze possible software risks associated with the project.

CO5 BL2

Based on the above scenario, explain the potential risks associated with the digital banking platform by considering factors related to product size and business impact. Discuss how attributes such as system size, number of users, requirement changes, project deadlines, customer usage, and business consequences of system failure can influence project risk.

Discuss the key safety-related terminology used in dependable systems. The explanation should include concepts related to unplanned events that cause harm, conditions that may lead to such events, the extent of loss caused, the seriousness of potential consequences, the likelihood of hazardous events occurring, and the overall measure used to evaluate the chance of an accident occurring in a system.

CO5 BL4

Suggest an appropriate software architecture for a system designed to automate the selection of eligible candidates through a sequence of interview processes.

CO3 BL5

Draw the architecture diagram for the proposed system and justify your choice of architecture by explaining its key benefits.

A software development project consists of 11 interrelated activities, each with a specific duration required to complete the task. The activities and their respective durations are provided in the table below. The project manager needs to analyze the sequence of activities to determine the longest path of dependent tasks that controls the completion time of the project.

CO5 BL6

Based on the given activity information, determine the critical path using the "Activity on Node" diagram and compute the total duration required to complete the entire project

Activities	Precedence	Duration in weeks
A	-	6
B	A	8
C	-	15
D	-	6
E	A	5
F	D	4
G	D	5
H	C,E,F	9
I	C,E,F	7
J	B	7
K	G, I	2

OR

9.b)

The following table shows the activities involved in a software development project along with their precedence relationships and three-time estimates (optimistic, most likely, and pessimistic).

CO5 BL6

Using the PERT method, compute the expected duration of each activity, draw the network diagram, and determine the critical path and expected completion time of the project. Find the probability that the project will be completed in 26 Weeks.

Activity	Precedence	Optimistic (a)	Most Likely (m)	Pessimistic (b)
A	-	4	7	10
B	A	3	4	6
C	B	3	5	8
D	-	2	6	9
E	A	6	9	12
F	D	4	6	8
G	E, F	6	9	13

10.a) Consider the following C program and perform the necessary analysis. Draw the Control Flow Graph (CFG) for the given program and use it to determine all the independent execution paths present in the program. From the constructed control flow graph, identify the critical path. Further, calculate the Cyclomatic Complexity of the program using an appropriate method and, based on the obtained complexity value, determine whether the program is suitable for testing.

```
#include <stdio.h>
#include <string.h>
int main()
{
    char userId[20];
    char password[20];
    1. printf("Enter User ID: ");
    2. scanf("%s", userId);
    3. printf("Enter Password: ");
    4. scanf("%s", password);
    5. if(strcmp(userId, "admin") == 0)
    6.     {
    7.         if(strcmp(password, "pass123") == 0)
    8.             {
    9.                 printf("Login Successful\n");
    10.            }
    11.        else
    12.            {
    13.                printf("Invalid Password\n");
    14.            }
    15.    }
    16.    else
    17.        {
    18.            printf("Invalid User ID\n");
    19.        }
    20.    return 0;
    21. }
```

OR

CO4

BL6

10.b)

A university is developing an online scholarship application system for students. The system allows students to apply for a scholarship based on their academic percentage. According to the eligibility criteria, students can apply only if their percentage is between 60 and 90 (inclusive). If the percentage entered is below 60, the application will be rejected due to insufficient academic performance. If the percentage is above 90, the application will not be accepted because the scholarship is limited to the specified range.

During the testing phase, the quality assurance team needs to design test cases to validate the input field for the academic percentage.

Based on the above scenario:

- i. Identify the equivalence classes for the percentage input and classify them as valid and invalid.
- ii. Design suitable test cases using Equivalence Class Partitioning (ECP).
- iii. Determine the boundary values for the percentage input and design test cases using Boundary Value Analysis (BVA).

⇔⇔⇔ X/D/TZ ⇔⇔⇔