The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEI5467 Software Testing and Quality Assurance**
Academic Year	: 2024/25
Date	:14th August 2025
Time	: 0930 - 1230hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Four (4)** questions in **Four (4)** pages.
3. Answer **all** questions.
4. Answers should be written in the book provided, and each question should commence on a **new** page.
5. This is a Closed Book Test **(CBT).**
6. Answers should be in clear hand writing.
7. Do not use red colour pen.

(Essay Questions) Answer All Questions

Question 1 [25 marks]

A university is developing an online course registration system. Students must meet the conditions mentioned below to successfully enroll in a course.

- The student must have paid all outstanding fees.
- The student's registration status must be "active."
- The course must have available seats.
- Some courses require meeting prerequisites (e.g., completion of an earlier course).

Depending on the combination of these input conditions, the system either allows the registration or rejects it, stating the reason.

A. Using the scenario above, identify all input conditions and possible actions for course registration. (5 marks)
B. Construct a decision table for the above scenario, showing all possible combinations of the conditions and the resulting action for each rule. (Clearly label all conditions and actions and show at least four complete rules in your table.) (8 marks)
C. Explain how decision table testing ensures better test coverage for complex business logic compared to other black-box techniques. (6 marks)
D. Derive test cases from your decision table. (6 marks)

Question 2 [25 marks]

A university is launching an Online Library Management System. The system should allow students to search for books, reserve them, renew loans, pay fines online, and receive overdue notifications. Administrators can add/remove books, update book information, and generate various reports. Security and usability are both important to the system.

A. List and briefly describe the key features/fields that should be included in a standard test case document for the Online Library Management System. (5 marks)

B. From which document(s) or sources should the test case document be prepared? Explain your answer. (4 marks)

C. Who is responsible for preparing the test case document? Justify why this role is most appropriate. (3 marks)

D. Discuss how you would assign priority and severity to test cases in this system. (5 marks)

E. Choose one functional requirement from the given scenario and develop a sample test case for it, clearly filling key fields and showing how priority and severity are set. (8 marks)

Question 3 [25 marks]

You have joined a team responsible for ensuring quality in the launch of a new Online Food Delivery System for a university canteen. The system must accurately process orders, apply student discounts, handle secure payments, and send confirmation notifications. The project manager wants to ensure that all requirements are clear, correct, and that the final product meets user and business needs.

A. Define software verification and software validation. Clearly explain how they differ, using examples from the Online Food Delivery System scenario. (6 marks)

B. List and briefly describe three verification techniques and three validation techniques. (9 marks)

C. Suppose the team only performed validation activities and skipped verification of documents and deliverables. Explain at least two risks or problems that could arise as a result. (5 marks)

D. Describe five main steps in test plan creation for the Online Food Delivery System project. (5 Marks)

Question 4 [25 marks]

You are a quality assurance engineer for a team developing a university event management application. The system must allow staff to create and manage events, students to register for them, and automate reminders. Event approval can be manual or automatic, depending on event type. An event may be cancelled if registrations fall below a threshold or if an administrator decides to cancel. The team wishes to measure the complexity of several modules to manage testing effort and improve maintainability.

Consider the following pseudo-code for the registration approval component:

```
ApproveRegistration(studentID, eventID)
If event is CANCELLED
Print "Event is cancelled"
Else if event type is "internal" OR manager approval is TRUE
If registrationCount < eventMin
Print "Registration waitlist"
Else
Print "Registration approved"
EndIf
Else
Print "Manager approval required"
EndIf
End
```

A. Define cyclomatic complexity and describe why it is useful in software quality assurance. (5 Marks)

B. Draw the flow graph for the given pseudo-code. Label all decision and action nodes clearly. (5 Marks)

C. Calculate the cyclomatic complexity for the given code. Clearly show your steps and reasoning. (5 Marks)

D. Select one white-box technique from the list below and describe how it improves the test quality. (5 Marks)

   i. Statement Coverage
   ii. Branch Coverage
   iii. Path Coverage

E. List two software quality attributes. For each attribute, briefly describe using an example that demonstrates how that attribute can be evaluated or observed in practice. (5 Marks)

~ End of the Paper~