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

Study Programme	: Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: EEX5467 Software Testing and Quality Assurance**
Academic Year	: 2023/2024
Date	: 7th March 2025
Time	: 1400-1700hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Four (4)** questions in **Three (03)** pages (including this cover page).
3. Answer **all** questions.
4. Answer for each question should commence from a **new page**.
6. This is a **Closed Book Test (CBT).**
7. Answers should be in clear handwriting and do not use red colour pens.

Question 1 (25 marks)

a) Compare and contrast the following views of the quality (6 marks)
- Producer view
- Provider View
- Supplier view

b) List the **five** (5) main quality attributes of software. (5 marks)

c) What is meant by **CMMI**? What is the impact of adopting CMMI by a Software Development Company? (2 marks)

d) What does the term "**Six Sigma**" stand for? Assume that you are working as a CMM/CMMI consultant and found that Six Sigma may complement CMMI level 4 and level 5 implementations. Would you agree? (5 Marks)

e) What is a Test plan? List down **five (5)** main components of a test plan, according to IEEE 829-1998 Test Plan Structure, describing each component in brief. (7 marks)

Question 2 (25 marks)

a) Explain the methods of static testing below based on their **strengths** and **situations** in which each technique best applies. (6 marks)

i. Peer Reviews

ii. Walkthroughs

iii. Inspections

b) "Validation assures that the end product (system) meets requirements and expectations under defined operating conditions." List and briefly explain **four (4)** major types of **validation** techniques. (8 Marks)

c) What is the process of evaluating software at the end of the software development process to ensure compliance with software requirements? Who should be part of the team executing this process? (6 Marks)

d) What is the difference between Alpha testing and Beta testing? (2 Marks)

e) What is meant by regression testing? (3 Marks)

Question 3 (25 marks)

a) What type of testing is conducted based on an analysis of the specification of a piece of software, without reference to its internal workings? (2 Marks)

b) A GUI application is used to get the user inputs to register swimmers for a swimming meet to be held in Colombo. The swimmer who is the user, has to enter the age in one of the text boxes. The following are the requirements.

- There are 3 categories of swimmers based on the age.
- In the Secondary School category, the applicant's age should be between 12 and 18.
- In the Primary School category, the applicant's age should be between 7 and 11.
- In the Open Category, the applicant's age must be more than 19 years.
- The text box should allow only numeric values.

i. State **two (2)** techniques that you can use to generate test scenarios for effectively testing these text boxes. (4 Marks)

ii. Why is it necessary to develop test cases for both valid and invalid input conditions? (2 Marks)

iii. What are the boundary values to test all age categories? Please provide test case values. (9 marks)

iv. Write down **three (3)** important test cases to test the Primary School category. (Test cases should be written in test case format.) (6 marks)

v. How do you ensure that only numeric data is entered into the text box? (2 marks)

Question 4 (25 marks)

00015

a) Draw a flow graph for the code snippet given below (08 marks)

```
int arr[] = {2, 4, 6, 8, 10, 12, 14};
int size = sizeof(arr) / sizeof(arr[0]);
int target;

printf("Enter the target element to search: ");
scanf("%d", &target);


// Function for binary search
int binarySearch(int arr[], int size, int target)
{ int low = 0,
  high = size - 1;

while (low <= high)

{ int mid = low + (high - low) / 2;

if (arr[mid] == target)
      { return mid; }

// If the target is greater, ignore the left half
else if (arr[mid] < target)
     { low = mid + 1; }

// If the target is smaller, ignore the right half
     else { high = mid - 1; } }

// Target not found
return -1;
}
```

b) Calculate the cyclomatic complexity for the flow graph related to the above code snippet. (06 marks)

c) How many test cases are needed for branch coverage, and what are the test values? (11 marks)