

**UCSC****University of Colombo, Sri Lanka***University of Colombo School of Computing***DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY
(EXTERNAL)**Academic Year 2025 — 3rd Year Examination — Semester 6**IT6206 — Software Quality Assurance***Structured Question Paper*
(2 Hours)**To be completed by the candidate****Index Number**

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Important Instructions

- The duration of the paper is **2 hours**.
- The medium of instructions and questions is English. Students should answer in the medium of English language only.
- This paper has **4 questions** on **13 pages**. Answer **all** questions.
- All questions **do not** carry **equal** marks.
- Write your answers **only on the space provided** on this question paper.
- Do not tear off any part of this question paper. Under no circumstances may this paper (or any part of this paper), used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper. If a page or part of a page is not printed, please inform the supervisor/invigilator immediately.
- Any electronic device capable of storing and retrieving text, including electronic dictionaries, smartwatches, and mobile phones, is not allowed.
- Calculators are **not allowed**.
- *All Rights Reserved*. This question paper can NOT be used without proper permission from the University of Colombo School of Computing.

**To be completed by
the examiners**

1	
2	
3	
4	
Total	

1)

- (a) Define the concept of **Software Quality Assurance (SQA)** and explain two objectives of SQA in Maintenance. (03 Marks)

ANSWER IN THIS BOX

- (b) There are four *Software Testing Levels* listed in the answer box. Select the correct **Primary Objective** for each testing level using the list of objectives given below. Write down the correspond letter of the correct objective in the box provided. (1x4 = 04 marks)

List of Objectives

- A. Verify complete system requirements
- B. Verify individual components
- C. Verify interaction between modules
- D. Verify business/user requirements

ANSWER IN THIS BOX

Testing Level	Answer
1. Unit Testing	
2. Integration Testing	
3. System Testing	
4. Acceptance Testing	

- (c) A software company develops an e-commerce website that is updated every two weeks. The QA team is considering introducing automated testing for regression testing, while continuing manual testing for exploratory testing.

(I) Explain three (03) advantages of using automated testing in this project. (03 Marks)

ANSWER IN THIS BOX

[illegible]

(II) Explain three (03) disadvantages or risks associated with automated testing.

(03 Marks)

ANSWER IN THIS BOX

ANSWER IN THIS BOX

- (III) Based on the given scenario in part (c), justify whether the company should invest in test automation. (02 Marks)

ANSWER IN THIS BOX

- (d) State whether the following statements are True (T) or False (F) based on Standard Software Testing Techniques and their characteristics. (1 × 10 = 10 marks)

- | | | |
|----|--|----------------------|
| 1 | Exhaustive testing is achievable for large-scale software systems. | <input type="text"/> |
| 2 | Early testing helps reduce the cost of fixing defects. | <input type="text"/> |
| 3 | Software defects are usually distributed evenly across all modules. | <input type="text"/> |
| 4 | Testing can prove that a software system is completely defect-free. | <input type="text"/> |
| 5 | Testing techniques should be selected according to the application context. | <input type="text"/> |
| 6 | Reusing the same test cases forever guarantees the discovery of new defects. | <input type="text"/> |
| 7 | Most defects are often found in a small number of modules. | <input type="text"/> |
| 8 | A software product with no known defects will always satisfy users. | <input type="text"/> |
| 9 | Testing should start only after coding is completed. | <input type="text"/> |
| 10 | Testing demonstrates the presence of defects rather than their absence. | <input type="text"/> |

2) (a) Define & compare *Software Static Testing* vs *Software Dynamic Testing*. (04 Marks)

ANSWER IN THIS BOX

(b)	List four (04) Static Testing Techniques.	(04 Marks)
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ANSWER IN THIS BOX

- (c) A software company is preparing a test environment for a newly developed online banking system before conducting system testing.

(I) What is meant by a *Test Environment* and discuss its purpose in software testing.

(02 Marks)

ANSWER IN THIS BOX

- (II) Describe three (03) activities that have to be performed when designing and setting up a Test Environment.

(03 Marks)

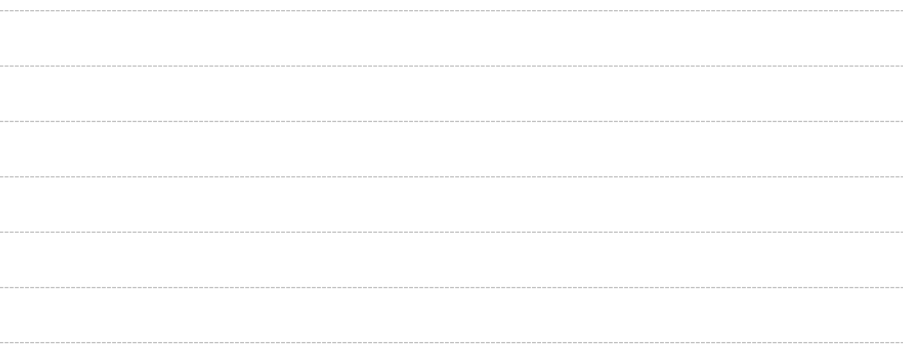
ANSWER IN THIS BOX

- (d) A smart home system consists of multiple sensors (temperature, motion, and smoke sensors), a mobile application, and cloud services that continuously exchange data to monitor and control household devices.

(I) Explain the importance of *Interoperability Testing* for this smart home system.

(04 Marks)

ANSWER IN THIS BOX

A large rectangular box with horizontal dashed lines for writing. The box is empty and occupies the majority of the page below the header.

- (II) Describe any two (02) types of Interoperability Testing that should be performed on this system. For each type, provide a suitable example related to the above scenario. (08 Marks)

ANSWER IN THIS BOX

[illegible]

3)

- (a) Write down whether each of the following statements is true (T) or false (F) with regard to XML-Based Test Automation. (1x10 = 10 marks)

- | | | |
|----|---|--------------------------|
| 1 | XPath can be used to locate dynamic elements in a web page. | ☐ |
| 2 | ClassName locator identifies elements using the HTML tag name. | ☐ |
| 3 | Link Text locator is used to find hyperlinks based on visible text. | ☐ |
| 4 | CSS Selector cannot locate elements without ID, class, or name attributes. | ☐ |
| 5 | XPath is only used for locating elements with static attributes. | ☐ |
| 6 | CSS Selector is an alternative method to XPath for locating web elements. | ☐ |
| 7 | ID locator is used to find elements based on the element's unique ID attribute. | ☐ |
| 8 | Name locator is used to find elements using the name attribute. | ☐ |
| 9 | XPath can traverse between different elements in the DOM structure. | ☐ |
| 10 | Locators are used in Selenium to find web elements on a web page. | ☐ |

- (b) Sample XML structure for inventory records for is given below

```
<database>
  <inventory>
    <product code="P101" category="Electronics">Samsung
    TV</product> <product code="P102" category="Furniture">Wooden
    Chair</product> <product code="P103"
    category="Electronics">Sony Speaker</product> <product
    code="P104" category="Clothing">Cotton Shirt</product>
    <product code="P105" category="Electronics">Apple
    Laptop</product>
    <product code="P106" category="Furniture">Steel
    Table</product>
  </inventory>
```


- (I) Write the **Absolute XPath** to get the product with code "**P103**". (03 Marks)

ANSWER IN THIS BOX

- (II) Write the **Relative XPath** to get all products that belong to the "**Electronics**" category. (03 Marks)

ANSWER IN THIS BOX

- (III) Write the **Relative XPath** to get all products that have the word "**Sony**" in their name. (03 Marks)

ANSWER IN THIS BOX

- (c) (I) Explain the purpose of a *Test Report* in software testing. (02 Marks)

ANSWER IN THIS BOX

(II) Describe four (04) key information type that should be included in a Test Report.
(04 Marks)

ANSWER IN THIS BOX

(04)

(a) Briefly explain the term *Continuous Integration (CI)* and *Continuous Delivery (CD)*. (04 Marks)

ANSWER IN THIS BOX

- (b) *Version Control* is one of the most important practices in software development.

- (I) Briefly explain why version control is needed in Software Quality Assurance using a suitable example. (04 Marks)

ANSWER IN THIS BOX

[illegible]

- (II) List four (04) Features of Version Control Systems (VCS). (02 Marks)

ANSWER IN THIS BOX

ANSWER IN THIS BOX

- (III) You are working on a Git repository called "*shopproject*" that contains the following files: "*home.html*", "*product.css*", and "*cart.js*". Write the appropriate Git commands for each of the following tasks. (05 Marks)

	Task	Git Command
1	Initialize a new Git repository called "shopproject"	
2	Add all the files to the staging area	
3	Commit the files with the message "initial shop setup"	
4	Create a new branch called "payment-feature"	
5	Push the committed files to the remote repository	

- (c) Mobile applications can be categorized into different types based on how they are built and accessed. Compare Native mobile applications and Browser-based mobile applications in terms of platform, installation, connectivity, and features.

(04 Marks)

[illegible]

- (d) Examine the following TestNG program carefully and predict the output by filling in the given box. Apply your understanding of how TestNG annotations are executed in sequence.

(06 Marks)

```
import org.testng.annotations.*;
public class IT6206 {
    @Test
        public void testCase1()
            { System.out.println("Test1"); }
    @BeforeMethod
        public void beforeMethod()
            { System.out.println("Before"); }
    @AfterMethod
        public void afterMethod()
            { System.out.println("After"); }
    @BeforeTest
        public void beforeTest()
            { System.out.println("Start"); }
    @AfterTest
        public void afterTest()
            { System.out.println("End"); }
}
```

Output
