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THE OPEN UNIVERSITY OF SRI LANKA
BACHELOR OF SOFTWARE ENGINEERING – LEVEL 05
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECI 5267 – SOFTWARE TESTING AND QUALITY ASSURANCE

FINAL EXAMINATION – 2015 / 2016

Date: 21st November 2016 **Time: 0930-1230 hrs**

INSTRUCTIONS

1. Answer **Question 1** in **Part A**, which is compulsory.
2. Answer **3 questions out of 5** given in **Part B.**
3. This is a closed book exam and no reference books and materials are allowed.

PART A (Compulsory question)

Question 1

Consider the following scenario.

> Sankalpa has been assigned as the QA Lead for a project involving a web application. He is given an approved business requirement document from the client side. According to the requirements, the specific client server application will be accessed by 1000 customers in different geographic locations with 400 - 500 concurrent users approximately. It would be storing customer details in an Oracle database and would be involved in performing customer transactions. The development of the web application system would NOT be using iterative phases/builds.

Some test types which can be used to test the above are as follows:

I. Functional Testing
II. Regression Testing
III. Integration Testing
IV. Acceptance Testing
V. Performance Testing
VI. Automated Testing
VII. Ad hoc Testing
VIII. Usability Testing
IX. Accessibility Testing
X. Security Testing

a) Briefly explain each of above test types. (10 Marks)

b) State what are the **4 most important Test types** out of the following that Sankalpa should select as the QA Lead to test the above application **as per given information** and **justify your answer.** (8 marks)

c) Give reasons for the non selection of other 6 test types. (12 marks)

d) Why is the value for cyclomatic complexity important for testers? (3 marks)

e) Assume that your organization is ISO certified. Do you still need to go for Capability Maturity Model (CMM) standard quality models? Justify your answer. (5 marks)

f) If a software company is considering **continuous improvement on process quality**, what quality model should they adapt? (2 marks)

PART B (Select 3 Questions only)
Question 2

Read the given scenario and answer the questions.

Patient Monitoring System (PMS)

PMS is intended to improve the efficiency of a general intensive care unit of a small hospital, providing a better level of customer service while reducing the cost of trained medical staff to operate it.

Sensors attached to the patient will monitor vital signs such as heart beat, respiration, blood pressure, temperature and brain activity. The set of parameters to be recorded will vary from patient to patient. For example, a diabetic patient will require to have blood sugar levels measured in addition to the usual signs.

Drugs will be supplied intravenously by pumps which are controlled by the system. The operation of these pumps and dosage administered are also recorded.

The signals from the sensors and pumps come to a centralized location called Parameter Analysis Node (PAN) beside the bed. Complete data is held for the past four hours on a local file and essential information (deviation of vital signs from normal values) is transmitted via a communication link to nurse's station, and the status of each patient is displayed on a monitor screen.It sounds an alarm to call the nurse to bedside if necessary.

a) What are the 3 most important quality attributes of PMS? Justify your answer. (6 marks)

b) What data would you record about any incident which occurred during the operation of PMS to enable you measure these 3 attributes? (6 marks)

c) Why is exception handling very important in this kind of situation? (4 marks)

d) Briefly describe how severity is classified in software faults. (4 marks)

Question 3

Student registration form for an ODL institute will have below (main) fields

- Name
- Country
- Email
- Contact No
- Province
- City
- Selected stream (Electrical Engineering, Electronics, Economics, Computer, Political Science)
- Select a local university for practical labs sessions and tests (List of local universities)
- Student ID (Auto generated based on the country)
- Course wish to follow (List of courses from selected stream)

a) Name a Test Design Technique that can be used to design the test cases for above form explaining why you select that technique. (4 marks)

b) Write down 2 non-functional test cases in detail. (12 marks)

c) Explain how you are planning test the application for non-functional requirements. (4 marks)

Question 4

A GUI application used to get the user inputs to register a new member for the cricket team of a local cricket club. Age of a player need to be entered a text box. Following are given as the requirements.

i. Age of the applicant must be between 18 and 35
ii. The text box must allow only numeric values.

a) Differentiate between Boundary Value Analysis and Equivalent Partitioning. (4 marks)

b) For each test case generated by boundary values analysis, specify the boundary values covered, input values and expected outputs. (10 marks)

c) Write one test case to test the text box complete with *Test Case no, Type (UI/Fun), Prerequisites, Description, Steps and details, Test Data, Expected Output, Execution Status* etc. (6 marks)

Question 5

a) List 3 quality assurance activities. (3 marks)

b) What is the importance of quality models? (2 marks)

c) Compare and contrast the ***software quality assessment models***: McCall's model, Boehm's model and ISO9126. (9 marks)

d) Briefly describe three major post-QA activities that are used for quality assessment and feedback. (6 marks)

Question 6

A service providing company has missed several software release deadlines recently and the clients have expressed their dissatisfaction over this matter. The management has decided to find out the reasons for not being able to keep to client deadlines and want to take immediate action in order to prevent this happening again. They found following reasons for missing deadlines.

- Competency on testing lacking
- Delay in getting test data
- Developers delay in their release to QA
- Business clarifications are not addressed in time

(a) Briefly describe three risks associated with software development. (6 marks)

(b) What could have prevented the company from missing the deadlines? (4 marks)

(c) What are the major identification methods that can be used to find the cause for the above situation? (4 marks)

(d) Explain one of the methods mentioned in (c) and how it can be used in practice. (6 marks)