THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY .
BACHELOR OF SOFTWARE ENGINEERING – LEVEL 5
FINAL EXAMINATION – ACADEMIC YEAR 2010/2011
ECI5267 – SOFTWARE TESTING AND QUALITY ASSURANCE

Date : March 06, 2011   **Time: 0930 - 1230 hrs**

Important:
1. This examination paper has 2 Sections.
2. Section 1 has **mandatory** questions (30 MCQs & 1 Essay Question) and Section 2 has optional questions (4 Essay Question).
3. Answer both **Q1** and **Q2** in **Section 1.** Answer **2 questions** out of 4 in **Section 2**

SECTION 1 [Answer All Questions]

The following two main questions (Q01 & Q02) are Mandatory. Answer both questions. This section will provide you 50 marks in total. The marks belonging to each part is displayed separately.

Q1. MULTIPLE CHOICE QUESTIONS *(Select the most likely answer)*
Please transfer the answers to **MULTIPLE CHOICE QUESTIONS ANSWER SHEET** and attached to your answer sheet.

Q. 1: Which of the following is a MAJOR task of test planning?

A. Scheduling test analysis and design tasks.
B. Initiating corrective actions.
C. Monitoring progress and test coverage.
D. Measuring and analyzing results.

Q. 2: Which of the following BEST describes the difference between an inspection and a walkthrough?

A. Both inspections and walkthroughs are led by the author.
B. An inspection is led by a moderator and a walkthrough is led by the author.
C. Both inspections and walkthroughs are led by a trained moderator.
D. A walkthrough is led by the author. The author is not present during inspections.

Q. 3: Where may functional testing be performed?

A. At system and acceptance testing levels only.
B. At all test levels.
C. At all levels above integration testing.
D. At the acceptance testing level only.

Q. 4: What is the MAIN objective when reviewing a software deliverable?

A. To identify potential application failures by use of a test specification.
B. To identify defects in any software work product.
C. To identify spelling mistakes in a requirements specification.
D. To identify standards inconsistencies in the code.

A. 3
B. 4
C. 2
D. 1

Q. 10: As part of which test process do you determine the exit criteria?

A. Test planning.
B. Evaluating exit criteria and reporting.
C. Test closure.
D. Test control.

Q. 11: A thermometer measures temperature in whole degrees only. If the temperature falls below 18 degrees, the heating is switched off. It is switched on again when the temperature reaches 21 degrees. What are the best values in degrees to cover all equivalence partitions?

A. 15, 19 and 25.
B. 17, 18 and19.
C. 18, 20 and22.
D. 16, 26 and 32.

Q. 12: Which of the following are characteristic of regression testing?

i) Regression testing is run ONLY once
ii) Regression testing is used after fixes have been made
iii) Regression testing is often automated
iv) Regression tests need not be maintained

Options:
A. ii, iv.
B. ii, iii.
C. i, iii, iv.
D. iii.

Q. 13: A wholesaler sells printer cartridges. The minimum order quantity is 5. There is a 20% discount for orders of 100 or more printer cartridges. You have been asked to prepare test cases using various values for the number of printer cartridges ordered.
Which of the following groups contain three test inputs that would be generated using Boundary Value Analysis?

A. 5, 6, 20
B. 4, 5, 80
C. 4, 5, 99
D. 1, 20, 100

Q. 14: Which of the following activities should be performed during the selection and implementation of a testing tool?

i) Investigate the organization's test process.
ii) Conduct a proof of concept.
iii) Implement the selected tool on a project behind schedule to save time.
iv) Identify coaching and mentoring requirements for the use of the selected tool.

Options:
A. i, ii, iii.
B. ii, iii, iv.
C. i, iii, iv.
D. i, ii, iv.

Q. 15: What is the MAIN benefit of designing tests early in the life cycle?

A. It is cheaper than designing tests during the test phases.
B. It helps prevent defects from being introduced into the code.
C. Tests designed early are more effective than tests designed later.
D. It saves time during the testing phases when testers are busy.

Q. 16: Which of the following benefits are MOST likely to be achieved by using test tools?

i) Easy to access information about tests and testing.
ii) Reduced maintenance of testware.
iii) Easy and cheap to implement.
iv) Greater consistency of tests.

Options:
A. ii and iv
B. ii and iii
C. i and iv
D. i and iii

Q. 17: What is the KEY difference between preventative and reactive approaches to testing?

A. Preventative tests and reactive tests are designed as early as possible.
B. Preventative tests are designed early; reactive tests are designed after the software has been produced.
C. Preventative testing is always analytical; reactive testing is always heuristic.
D. Preventative tests are designed after the software has been produced; reactive tests are designed early in response to review comments.

Q. 18: What is the purpose of exit criteria?

A. To define when a test level is complete.
B. To determine when a test has completed.
C. To identify when a software system should be retired.
D. To determine whether a test has passed.

Q. 19: What determines the level of risk?

A. The cost of dealing with an adverse event if it occurs.
B. The probability that an adverse event will occur.
C. The amount of testing planned before release of a system.
D. The likelihood of an adverse event and the impact of the event.

Q. 20: Which activities form part of test planning?

i) Developing test cases.
ii) Defining the overall approach to testing.
iii) Assigning resources.

Q. 5: Which of the following would you NOT usually find on a software incident (i.e. defect) report?

A. The name and/or organizational position of the person raising the problem.
B. Version of the Software Under Test.
C. Suggestions as to how to fix the problem.
D. Actual and expected results.

Q. 6: Who would USUALLY perform debugging activities?

A. Developers.
B. Analysts.
C. Testers.
D. Incident Managers.

Q. 7: Some tools are geared more for development use. For the 5 tools listed, which statement BEST details those for developers:

i) Performance testing tools.
ii) Coverage measurement tools.
iii) Test comparators.
iv) Dynamic analysis tools.
v) Incident management tools.

A. i, iii. and iv. are more for developers.
B. ii. and iv. are more for developers.
C. ii, iii. and iv. are more for developers.
D. ii. and iii. are more for developers.

Q. 8: Which of the following is correct?

A. Impact analysis assesses the effect on the system of a defect found in regression testing.
B. Impact analysis assesses the effect of a new person joining the regression test team.
C. Impact analysis assesses whether or not a defect found in regression testing has been fixed correctly.
D. Impact analysis assesses the effect of a change to the system to determine how much regression testing to do.

Q. 9: Given the following fragment of code, how many tests are required for 100% decision coverage?

```
if width > length then
        biggest_dimension = width
        if height > width then
                biggest_dimension = height
        end_if
else
        biggest_dimension = length
        if height > length then
                biggest_dimension = height
        end_if
end_if
```

iv) Building the test environment

v) Writing test conditions.

A. i, ii & iv are true, iii & v are false.

B. ii & iii are true, i, iv & v are false.

C. iv & v are true, i, ii & iii are false.

D. i, ii & iii are true iv & v are false.

Q. 21: Which type of test design techniques does the following statement best describe a procedure to derive test cases based on the specification of a component?

A. Black Box Techniques.

B. White Box Techniques.

C. Glass Box Techniques.

D. Experience Based Techniques.

Q. 22: Which of the following is MOST important in the selection of a test approach?

A. Availability of tools to support the proposed techniques.

B. The budget allowed for training in proposed techniques.

C. Available skills and experience in the proposed techniques.

D. The willingness of the test team to learn new techniques.

Q. 23: Which of the following is a benefit of test independence?

A. It does not require familiarity with the code.

B. It is cheaper than using developers to test their own code.

C. It avoids author bias in defining effective tests.

D. Testers are better at finding defects than developers.

Q. 24: Which of the following is MOST characteristic of black-box techniques?

A. Test cases can be easily automated.

B. Test cases are independent of each other.

C. Test cases are derived systematically from models of the system.

D. Test cases are derived systematically from the delivered code.

Q. 25: Reviews, static analysis and dynamic testing have the same objective

A. Identifying defects.

B. Fixing defects.

C. A. and B

D. None of the above

Q. 26: System testing should investigate

A. Non-functional requirements only not Functional requirements

B. Functional requirements only not Non-functional requirements

C. Non-functional requirements and Functional requirements

D. Non-functional requirements or Functional requirements

Q. 27: Find the correct flow of the phases of a formal review

A. Planning, Review meeting, Rework, Kick off

B. Planning, Individual preparation, Kick off, Rework

C. Planning, Review meeting, Rework, Follow up

D. Planning, Individual preparation, Follow up, Kick off

Q. 28: Which is not the testing objective?

A. Finding defects

B. Gaining confidence about the level of quality and providing information

C. Preventing defects.

D. Debugging defects

Q. 29: Maintenance releases and technical assistance centers are examples of which of the following costs of quality?

A. External failure

B. Internal failure

C. Appraisal

D. Prevention

Q. 30: Which is not a project risks?

A. Supplier issues

B. Organization factors

C. Technical issues

D. Error-prone software delivered

(30 Marks)

Q2.

i) Write the correct answers (*i.e. Answers should be one line answers*) for the following questions:

a) State the type of testing conducted not based on any knowledge of internal design or code where the tests are based on requirements and functionality.

b) What is the type of testing where the testers do continuous testing of an application as new functionality is added; requires that various aspects of an application's functionality be independent enough to work separately?

c) State the test type where we provide evidence that gives a high degree of assurance to a product, service, or system accomplishes its intended requirements.

d) Name the test type which uses to ensure that the system meets the needs of the organization and user or customer requirements?

e) State the technique for documenting potential requirements of a new system or software change.

*(2*5 Marks)*

ii) "Quality IT" is a company that is very interested in maintaining the quality of their deliverables and they are looking for a way to ensure that they àre on track. Thèy have hired you for this company as a Process Consultant who is primarily responsible in advising them on what to focus on. You explained to them that the company has to improve the process handling in order to maintain the quality of their deliverables. As a result, you have to help the company in selecting the best process improvement model/tool.

(a) Briefly define the meaning of "Quality Management" with regard to ISO 9000 family **(1 Mark)**

(b) Introduce them, what is ISO and CMMi by explaining them in detail. Your explanation should contain the following.
- Briefly explain about ISO and CMMi models **(2 Marks)**
- Compare and contrast the differences of these two models. **(6 Marks)**
- Name another model other than CMM and ISO. **(1 Mark)**

---*END OF SECTION 1*--

SECTION 2

Essay Questions

Answer **TWO** questions out of the following four questions. (e.g. Q03, Q04, Q05, Q06) This section will provide you 50 marks in total. The marks belonging to each part is displayed separately.

Q3.

A. You are a tester who is in a testing team where you have to test a web based application for internal usage. This application is for the project managers to get details of employees who are allocated for their projects. There are number of features implemented in this application, but you have to test only the Login page.

Functionality:
Login page will validate the users and will allow only the authorized users to be logged in. Once the user is logged in, he will be directed to his/her profile.
- User ID and password fields should not be empty
- Password field should be masked [i.e. displayed in dots (.)]

S.No	Field Name	Description	Field Length	Data Type	Editable (Y/N)
1	User ID	User needs to enter his user ID information. This should be the "Quality IT" mail id.	15	Alpha Numeric	Y
2	Password	User needs to enter his Password. This will be his Windows login password.	15	Alpha Numeric	Y
3	Login Button	Allows user to login to the system if valid, else error message is displayed.			
4	Cancel Button	Exits from the Application			

Your lead has asked you to write test cases for this screen and asked you to cover all possible scenarios as this is the most critical functionality in the application.

a. List two test case design techniques you would use to write the test cases. Briefly explain with examples   *(4 Marks)*

b. List two advantages of using the above mentioned test types   *(2 Marks)*

c. Write 9 test cases to cover the most critical scenarios   *(9 Marks)*

B. Explain the following with some examples.   *(2 Marks*5)*
   a. Walkthrough
   b. Software life cycle
   c. Defect
   d. Metric
   e. Standard

Q4. "Industry IT Solutions" is a service providing company. Recently they noted that the number of customer reported defects are getting high and the severity of those is high too. Due to these defects, the customer satisfaction was getting reduced and complains made against the systems delivered were in a critical situation. Hence the management decided to conduct a root cause analysis to find the reasons behind this. During the root cause analysis they found the following reasons for having a high number of customer reported defects.

- Competency on testing was lacking
- Test Tools were not provided on time
- Business clarifications were not addressed on time
- Schedule or Budget for Testing was not enough

(a) What is a risk and how it differs from an issue? *(3 Marks)*

(b) State 3 common ways to identify risks in testing and describe them. *(6 Marks)*

(c) State the 4 aspects of risk management and explain them in detail with regard to the above scenario. *(10 Marks)*

(d) What is the V model? Explain using a diagram. *(6 Marks)*

Q5.

I. *"Even though the testing was done thoroughly for software, there are bugs in products delivered"*

    a. Do you agree with the above statement? Give reasons for your answer?
(3 Marks)

    b. List 3 common problems in the software development process? *(3 Marks)*

II. *"A process can be defined as a set of activities that represent the way work is performed"*

    a. List the 2 views used to visually represent the processes. *(2 Marks)*

    b. Graphically illustrate one of the ways with a brief explanation. *(2 Marks)*

III. *"The Cost of Quality is all the costs that occur beyond the cost of producing the product "right the first time.""*

    a. What is "Cost of Quality"? *(2 Marks)*

    b. Mention types of Cost of Quality and explain each *(6 Marks)*

II. *"Testing is a Quality Control Activity."*

    a. Is the above statement correct? State 2 reasons for your answer. *(3 Marks)*

    b. What is Quality Control? How it differ from Quality Assurance? *(4 Marks)*

Q6. "Ealmo" is a web based application which is developed and tested by your team. This site is developed for a company called "Ealmo" and it's a company which sells mugs in various designs. Hence they are having a variety of mugs; they are planning to display the images in their site and to sell them online. They have a well developed delivery system and they need a site which will help them to enhance their sales internationally.

Following are the major functionalities of the system.

- Home page should consist of user login and user registration. Employees in the company can use their own user name and password given by the admin. Users outside the company have to register with the site using their personal email ID. Once registered they have to confirm the registration and once confirmed they can login with the system.
- Since the site is designed to be used by a large customer base (both internal and external users), the site has to maintain different authorization levels. This has to be done by validating the user name used to login.
- The site has separate pages to display the varieties of available mugs and images have to be displayed very clearly with accurate colours. The designs drawn in mugs should be very clear in the image when it is displayed in the site.
- Online payments will happen using a credit card payment gateway site which has been developed in house. The "Ealmo" application has to direct the user automatically to this web site when the customer is going to make the payment. Once the payment is successful, it should redirect the user to the "Ealmo" site.
- The brand name is mostly popular among the young parents who are having small children due to the mugs having colourful cartoon characters. Hence the colour coordination is very important for the company to keep the consistency of their sales.

Based on the above scenario answer the below question.

i) As the test lead of the team, what are the test types you recommend for this application based on the available information? Select the best 4 test types from the below list. *(2 Marks)*

Functional Testing	Security Testing
Regression Testing	Internationalization Testing
Integration Testing	Usability Testing
Acceptance Testing	Accessibility Testing
Performance Testing	Ad hoc Testing

ii) Briefly explain three test types from the four you have selected above. *(3 Marks)*

iii) Explain why you have selected those test types for this particular scenario and justify them using the information provided. *(8 Marks)*

iv) Justify why you have <u>not</u> selected each of the other listed test types for this particular scenario and give examples when/where these test types are mostly suited. *(12 Marks)*

--*END OF SECTION 2*--

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MULTIPLE CHOICE QUESTIONS ANSWER SHEET
ADMISSION NUMBER: ……………………………………..

Q.01	A	B	C	D
Q.02	A	B	C	D
Q.03	A	B	C	D
Q.04	A	B	C	D
Q.05	A	B	C	D
Q.06	A	B	C	D
Q.07	A	B	C	D
Q.08	A	B	C	D
Q.09	A	B	C	D
Q.10	A	B	C	D
Q.11	A	B	C	D
Q.12	A	B	C	D
Q.13	A	B	C	D
Q.14	A	B	C	D
Q.15	A	B	C	D
Q.16	A	B	C	D
Q.17	A	B	C	D
Q.18	A	B	C	D
Q.19	A	B	C	D
Q.20	A	B	C	D
Q.21	A	B	C	D
Q.22	A	B	C	D
Q.23	A	B	C	D
Q.24	A	B	C	D
Q.25	A	B	C	D
Q.26	A	B	C	D
Q.27	A	B	C	D
Q.28	A	B	C	D
Q.29	A	B	C	D
Q.30	A	B	C	D