UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2012/2013 – 2nd Year Examination – Semester 3

IT3204: Software Engineering I

PART I – Multiple Choice Question Paper

02nd March 2013

(ONE HOUR)

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- The paper has **25** questions and **6** pages.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 (*All the incorrect choices are marked & no correct choices are marked*) to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

Consider the following description and answer the questions 1 to 15 which follow.

Suppose you are working in a software engineering team which has been assigned the task of developing a system for the Meteorological Department of Sri Lanka to predict landslides and alert villagers who are in risk from landslides. The system will obtain information from multiple sensors located at different locations and use satellite images to predict landslides.

This new system must perform tasks such as reading sensors, obtaining satellite images and issuing alerts to mobile phones. The system is planned to be installed at regional meteorological sites at the end of the year.

The new system will be tested before real use with high volumes of sensor data and satellite images. It is also expected to be tested along with Meteorological Department officials before launch.

In order to make it easier to maintain the system in future, the project manager has insisted on using good design principles and proper programming practices.

The contract states that the system be revised every year up to a maximum of ten years. The maintenance activities planned are aimed at correcting problems which will be uncovered after the system is in operation and adding new requirements.

1) Which of the following process model(s) is/are suitable for the development of the operation logic of the above system?

(a) agile software development
(b) rational unified process model
(c) waterfall model
(d) evolutionary prototyping
(e) rapid application development

2) Which of the following are the 2 most important non-functional requirements that the system must possess from among the following?

(a) portability
(b) accuracy
(c) safety
(d) interoperability
(e) maintainability

3) Which of the following types of software best describe the above system?

(a) application software and customized software
(b) real time software and system software
(c) generic software and web-based software
(d) business software and system software
(e) customized software and safety critical software

4) Which of the following is a/are stakeholder(s) of the system?

(a) software project manager
(b) villagers
(c) Department of Meteorology
(d) software engineers
(e) sensor manufacturers

5) Which of the following is a/are functional requirement(s) of the system?

(a) The system must issue alerts to villagers about possible landslides.	(b) The system must ensure confidentiality of data.
(c) The system must use the hardware resources in an optimal way.	(d) The system must read sensor data and obtain satellite images.
(e) The system must ensure the accuracy of its predictions.	

6) Select the language(s) from among the following which can be used for the development of the system?

(a) Pascal	(b) C
(c) Prolog	(d) SQL
(e) Java	

7) Which of the following category pairs of testing are expected to be done, according to the information given in the description?

(a) stress testing and unit testing	(b) alpha testing and beta testing	(c) regression testing and usability evaluation
(d) static testing and dynamic testing	(e) stress testing and acceptance testing	

8) Which of the following can be good design principles, the project manager insists to use?

(a) modularity	(b) cohesion	(c) reuse
(d) coupling	(e) stepwise refinement and partitioning	

9) Which of the following can be (a) good programming practice(s) the project manager insists to use?

(a) The pre-conditions and post-conditions have to be documented for each module.
(b) The program must contain as many modules as possible.
(c) Complex code must not be simplified to make execution of the software efficient.
(d) The developers must use meaningful variable names for better readability of the program.
(e) Design patterns must be used to enhance reliability of the software.

10) Which type(s) of maintenance could happen after the system starts operating in the regional meteorological sites?

(a) preventive maintenance	(b) corrective maintenance	(c) perfective maintenance
(d) after sales service	(e) adaptive maintenance	

11) Suppose your project manager has assigned different parts of the system to each individual of the software team and you are required to speak with others to obtain information and share your views with others. Which professional skills do you think you must have in order to do this effectively?

(a) risk management skills	(b) writing skills	(c) team management skills
(d) presentation skills	(e) listening skills	

12) Which output media pair(s) do you think should be mainly used to send alerts to villagers?

(a) graphics and sound	(b) touch and graphics	(c) text and graphics
(d) text and sound	(e) graphics and smell	

13) Which of the following is/are the correct statements with respect to the system's destiny after 10 years of service?

(a) The system may be continued forever by incorporating changes from time to time.
(b) The system may be discontinued from operation after 10 years.
(c) The system may be re-engineered to suit the new technical and demographical context.
(d) The system may be continued with a patch to suit the new technical context.
(e) The system may be sold to another company as the contract with the Department of Meteorology has lapsed.

14) Consider the following situations.

i. You are expected to gather requirements from villagers about landslides.
ii. You are expected to study similar systems developed earlier.

Which of the requirement gathering technique pair(s) best suit(s) the situations described above?

(a) interviewing and prototyping	(b) case studies and questionnaire	(c) prototyping and document analysis
(d) observation and prototyping	(e) questionnaire and document analysis	

15) Which of the following should be a duty/duties of the project manager with respect to managing this project?

(a) estimate project costs based on the nature of the project	(b) divide and allocate tasks to each team member
(c) communicate with the villagers to gather requirements	(d) plan the project in a way to minimize risks
(e) design the system for the team	

16) Which of the following statement(s) is/are valid with respect to the use of CASE tools?

(a) CASE tools are computer tools which can be used to assist in software engineering.
(b) Debugging tools and version management software are upper case tools.
(c) Prototyping tools can be regarded as upper case tools.
(d) Each activity of the lifecycle can be automated by the use of CASE tools.
(e) The use of CASE tools greatly improve the productivity of software development.

17) Which of the following measures of modularity are considered appropriate with respect to maintainability of software?

(a) high coupling	(b) high cohesion	(c) low modularity
(d) low coupling	(e) low cohesion	

18) Which of the following is a/are characteristic(s) of a crisis situation in software development?

(a) Software is delivered with less quality.	(b) Application diversity is prominent.	(c) Software projects are late.
(d) CASE tools usage is extremely rare.	(e) Software development is over budgeted.	

19) Which of the following product qualities are directly enforced by using design patterns when designing software?

(a) Usability	(b) Reliability	(c) verification
(d) modularity	(e) validation	

20) Which of the following elements are usually contained in a project plan?

(a) estimated duration	(b) schedule	(c) risks
(d) work breakdown	(e) estimated cost	

21) Which of the following faults **cannot** be uncovered by the use of static testing?

(a) usability problems	(b) run time failures	(c) inefficient code
(d) duplicate variables	(e) non-commented code	

22) Which of the following testing technique(s) ensure(s) that the software product runs correctly after the changes during maintenance?

(a) white box testing	(b) path testing	(c) integration testing
(d) unit testing	(e) regression testing	

23) Which of the following statements is/are correct with respect to agile software engineering?

(a) Agile process may compromise reliability of safety critical software because informal techniques are used.
(b) Agile software development requires no documentation.
(c) Scrum is an example of an agile method which is widely used.
(d) Refactoring is a technique used in extreme programming.
(e) One of the advantages of agile techniques is that they require minimal documentation.

24) Consider the following code fragment of a module.

if sensor 1 = on then
read sensor 2
else
while sensor 3= on
read sensor 4

Which testing technique pair best describe the method you would adopt to test each path of execution with sample test cases?

(a) black box testing and white box testing	(b) path testing and white box testing	(c) dynamic testing and path testing
(d) black box testing and static testing	(e) static testing and path testing	

25) Which of the following is a/are configuration item(s) which may need to be referred to during maintenance?

(a) test-cases	(b) design document
(c) user logins	(d) CASE tools
(e) requirements specification	

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