



**UNIVERSITY OF COLOMBO, SRI LANKA**

**UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING**

**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)**  
**Academic Year 2010/2011 – 2<sup>nd</sup> Year Examination – Semester 3**

***IT3204 Software Engineering 1***  
***PART 1 - Multiple Choice Question Paper***

**26<sup>th</sup> March, 2011**  
**(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 **08** 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 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.**

1) Which of the following statements is/are correct regarding System Software?

- (a) System software is a collection of programs written to service other programs.
- (b) System software consists of standalone programs that solve a specific business need.
- (c) Compilers, editors, file management utilities and drivers are examples of systems software.
- (d) Systems software area is characterized by heavy interaction with computer hardware.
- (e) Systems software mostly makes use of conventional numerical algorithms.

2) Identify the correct statement(s) regarding the 'Usability' of a software system.

- (a) Software should be written in such a way that it may evolve to meet the changing needs of customers.
- (b) Software must be usable without undue effort, by the type of user for whom it is designed.
- (c) Usability includes characteristics such as responsiveness, processing time, memory utilisation.
- (d) The Usability of a software system is not of much importance if the Efficiency and Maintainability of the system are very high.
- (e) Software should have an appropriate user interface and adequate documentation.

3) Which of the following statements is/are correct regarding the characteristics of software?

- (a) Software is developed or engineered; it is not manufactured as in the classical sense.
- (b) The failure rate for software as a function of time can be depicted by the "bathtub curve".
- (c) Software does not wear-out in the traditional sense of the term, but software does tend to deteriorate as it evolves.
- (d) Component reuse is a feature that is limited only to software development.
- (e) Software maintenance involves considerably more complexity than hardware maintenance.

4) In XP Programming,

- (a) requirements are recorded on story cards.
- (b) an automated unit test framework is used in writing tests even before starting implementation.
- (c) system design has the capability to anticipate future changes.
- (d) a particular developer becomes an expert for the module he develops.
- (e) developers are expected to refactor the code continuously.

5) Select the correct statement(s) from among the following.

- (a) CASE tools can be applied to automate the whole software development process.
- (b) CASE technology is available for most routine activities in the software process.
- (c) CASE tools can be integrated with one another.
- (d) Maintenance costs can be reduced by using CASE tools.
- (e) Re-engineering CASE tools are normally used in the Specification and Design stages of software development.

- 6) The statements given below are associated with Rapid Application Development.
- (i) It is an iterative approach suitable for developing business systems.
  - (ii) It is suitable for developing large and complex systems.
  - (iii) Most RAD systems now also include visual programming tools that allow the system to be developed interactively.
  - (iv) It usually involves a larger development team.

Which of the above is/are true?

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (i) only
- (d) (i) and (iii)
- (e) (ii) only

- 7) The Software process models in column X have to be matched with the software systems given in column Y.

Column X		Column Y	
1	RAD	A	Automate the manual system for student record maintenance in a school
2	Incremental Development	B	A virtual Reality System for simulating vehicle navigation in a highway
3	Waterfall Model	C	Management Information System for a supermarket to be developed within three months
4	Prototyping	D	e-business software that starts with only the basic functionalities and then moves on to more advanced features

Which of the following is a /are the most suitable match (es)?

- (a) 1&B, 2&A, 3&C, 4&D
- (b) 1&C, 2&B, 3&D, 4&A
- (c) 1&C, 2&D, 3&A, 4&B
- (d) 1&B, 2&A, 3&D, 4&C
- (e) 1&D, 2&B, 3&A, 4&C

- 8) Which of the following is an /are advantage(s) of agile software development?

- (a) Well suited to large-scale systems development with the development teams in different places
- (b) Allows the software team to focus on the software itself rather than its design and documentation
- (c) Suitable to support business application development where the system requirements usually change rapidly during the development process
- (d) Can be used for critical systems development where a detailed analysis of all of the system requirements is necessary
- (e) Intended to deliver working software quickly to customers, who can then propose new and changed requirements to be included in later iterations of the system

9) Which of the following statement(s) is/are true with regard to domain requirements?

- (a) Domain requirements are derived from the application domain of the system rather than from the specific needs of system users.
- (b) It is possible to make the system work satisfactorily even if the domain requirements are not satisfied.
- (c) Domain experts may be useful to help the software engineers to properly understand the domain requirements.
- (d) Domain requirements sometimes might introduce design constraints for the system.
- (e) Domain requirements usually include specialized domain terminology or reference to domain concepts.

10) A set of requirements associated with an airline reservation system is listed below. Which of them is a/are functional requirement(s) of the system?

- (a) Users should be able to search for flights based on carrier name, destination, class of service and number of passengers.
- (b) Response time for a search query should be less than 30 seconds.
- (c) Users must be able to make reservations online.
- (d) The payment gateway must be secure and should protect user's financial information.
- (e) Users should be able to select multiple destinations for a single journey.

11) Which of the following statement(s) is/are correct with regard to requirements validation?

- (a) The cost of fixing a requirements problem by making a system change is much less than repairing design or coding errors.
- (b) Requirements validation is concerned with showing that the requirements actually define the system that the customer wants.
- (c) Consistency checks make sure that there are no contradictory constraints or descriptions of the same system function.
- (d) It is very important that the requirements are always written in a verifiable manner.
- (e) Requirements reviews, prototyping and test-case generation are some of the techniques that can be used for requirements validation.

12) The following systems are to be developed.

- (i). A Neural Network for Sinhala character recognition
- (ii). A file management software
- (iii). A network application
- (iv). An expert system for answering simple queries on Sri Lankan Cricket history

What are the most suitable programming languages to develop these systems?

- |                 |                   |              |              |
|-----------------|-------------------|--------------|--------------|
| (a) (i)- C      | (ii)-Fortran      | (iii)-Java   | (iv)-Pascal  |
| (b) (i)- Matlab | (ii)-C            | (iii)-Java   | (iv)-Prolog  |
| (c) (i)- C      | (ii)-Visual Basic | (iii)-Java   | (iv)-Prolog  |
| (d) (i)- Java   | (ii)-C            | (iii)-Pascal | (iv)-Fortran |
| (e) (i)- Pascal | (ii)-C            | (iii)-Java   | (iv)-Fortran |

- 13) Items in column X have to be matched with the descriptions in column Y.

Column X		Column Y	
1	Use-cases	A	An observational technique that can be used to understand social and organizational requirements
2	Interviewing	B	Suitable for getting an overall understanding of what stakeholders do, how they interact with the system and the difficulties that they face with current systems
3	Viewpoints	C	Can be used to identify the individual interactions with the system
4	Ethnography	D	Can be used to recognize multiple perspectives and provide a framework for discovering conflicts in the requirements

Which of the following is the most appropriate match?

- (a) 1&C, 2&A, 3&B, 4&D  
 (b) 1&C, 2&B, 3&D, 4&A  
 (c) 1&C, 2&A, 3&D, 4&B  
 (d) 1&D, 2&A, 3&B, 4&C  
 (e) 1&D, 2&B, 3&A, 4&C

- 14) Items in column X have to be matched with the descriptions in column Y.

Column X		Column Y	
1	Abstraction	A	The division of software into separately named, addressable components
2	Information Hiding	B	A measure of the strength of the interconnections between system components
3	Cohesion	C	An intellectual tool which permits one to concentrate on a problem at some level of generalization without regard to irrelevant low level details
4	Coupling	D	Interaction within a module A measure of how well a component fits together
5	Modularity	E	Specifying and designing modules so that information (procedure and data) contained within a module is directly inaccessible to other modules

Which of the following is the most appropriate match?

- (a) 1&C, 2&A, 3&B, 4&E, 5&D  
 (b) 1&C, 2&E, 3&D, 4&A, 5&B  
 (c) 1&C, 2&E, 3&D, 4&B, 5&A  
 (d) 1&E, 2&A, 3&B, 4&C, 5&D  
 (e) 1&D, 2&B, 3&E, 4&C, 5&A

- 15) What would be the most suitable architecture to develop an automated ticket issuing system to be used by passengers at a railway station?
- (a) Client-server model
  - (b) Spiral model
  - (c) RAD model
  - (d) A centralized model with a shared repository
  - (e) Peer-to-peer model
- 16) Which of the following is/are true with respect to modular decomposition?
- (a) Sub-systems are composed of modules and have defined interfaces, which are used for communication with other sub-systems.
  - (b) Object-oriented decomposition decomposes a system into a set of non-communicating objects.
  - (c) In the object-oriented approach, objects are normally tightly coupled.
  - (d) Objects are often representations of real-world entities, so that the structure of the system is readily understandable.
  - (e) Function-oriented pipelining decomposes a system into functional modules that accept input data and transform it into output data.
- 17) What would be the best interaction style for a video game application?
- (a) Direct Manipulation
  - (b) Menu Selection
  - (c) Command Language
  - (d) Form Fill-in
  - (e) Natural Language
- 18) Which of the following is an/are advantage(s) of using command language as an Interaction Style?
- (a) Avoids user errors
  - (b) Flexible
  - (c) Powerful
  - (d) Accessible to casual users
  - (e) Easy to learn
- 19) Which of the following is a/are good practice(s) which guide the coding tasks?
- (a) Coding style should be consistent throughout a program (eg, use of brackets, indentations, naming conventions, etc.)
  - (b) Use simple data structures wherever possible.
  - (c) Make extensive use of error handling procedures and status and error logging.
  - (d) Select the most widely used programming language in the industry.
  - (e) Use of comments are recommended for junior programmers but is not necessary for experienced programmers.

20) Identify the correct statement(s) with regard to Software Testing from among the following.

- (a) Software inspection is a dynamic verification and validation process in which software is reviewed to find errors, omissions and anomalies.
- (b) Acceptance testing is a type of 'black-box' testing to make sure that the system does or does not work properly.
- (c) Interface errors in a composite component cannot be detected by testing the individual objects or components.
- (d) Alpha testing is normally done by testers or programmers when the development is nearing completion.
- (e) In Extreme Programming, all tests are written as executable code where the test input and the expected outputs are specified and automatically checked.

21) Following are some software testing activities in software development projects.

- (i) Beta testing
- (ii) Code walkthroughs
- (iii) Integration testing
- (iv) Requirement reviews
- (v) Design reviews

Identify the correct classification of these activities into:

- (A) Static testing
- (B) Dynamic testing

- |                           |                        |
|---------------------------|------------------------|
| (a) (A) – (ii), (iv)      | (B) – (i), (iii), (v)  |
| (b) (A) – (i), (iii)      | (B) – (ii), (iv), (v)  |
| (c) (A) – (i), (iv)       | (B) – (ii), (iii), (v) |
| (d) (A) – (i), (iv), (v)  | (B) – (ii), (iii), (v) |
| (e) (A) – (ii), (iv), (v) | (B) – (i), (iii)       |

22) The Capability Maturity Model Integration (CMMI)

- (a) is a model of process 'maturity' in delivering quality software.
- (b) is a standard developed by IEEE.
- (c) is a standard that consists of 5 levels.
- (d) level 1 is given to organizations with a focus on continuous process improvement.
- (e) is a documentation standard.

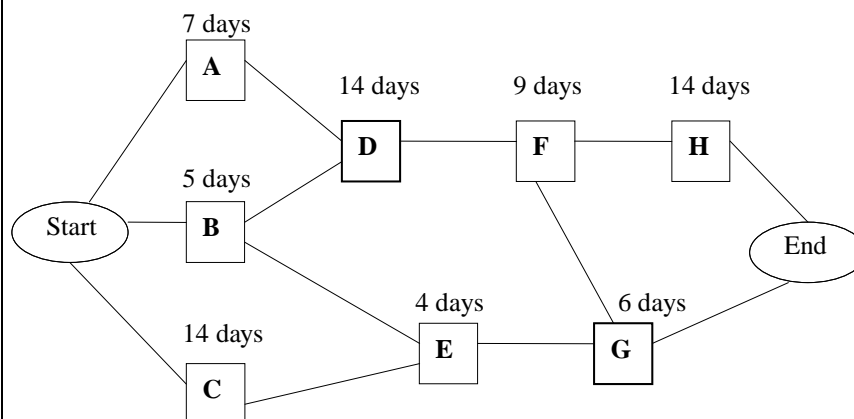
23) Identify the correct statement(s) from among the following with regard to software maintenance.

- (a) Coding errors are the most expensive to repair.
- (b) Perfective maintenance means adding or modifying the system's functionality or improving its structure and its performance.
- (c) Adaptive maintenance is used to refer to maintenance for fault repair.
- (d) Software re-engineering techniques may be applied to improve the system structure and understandability.
- (e) Preventive maintenance includes improving the software structure without adding to its functionality.

24) Which of the following best defines the term 'release'?

- (a) An instance of a system which is functionally identical to other instances, but designed for different hardware/software configurations
- (b) An instance of a system that differs, in some way, from other instances
- (c) An instance of a system that is distributed to customers
- (d) An instance of a system created within an organization for internal development or testing
- (e) An instance of the software usually developed a few years later

25) An Activity Diagram which relates to the first phase of a software project is given below.



Task Description	Depend on
A. Establish functional requirements	-
B. Establish non-functional requirements	-
C. Implement prototype	-
D. Implement core program	A, B
E. Implement network components	B, C
F. Implement non-core components	D
G. Implement interfaces	E, F
H. Unit Test	F

Identify the critical path and the duration of the critical path from among the following.

- (a) Start → B → E → G → End, 15 days
- (b) Start → B → D → F → H → End, 42 days
- (c) Start → A → D → F → G → End, 36 days
- (d) Start → A → D → F → H → End, 44 days
- (e) Start → C → E → G → End, 24 days

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