



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2009/2010 – 2nd Year Examination – Semester 3

*IT3103 – Object-Oriented Analysis and Design
PART 1 - Multiple Choice Question Paper*

20th March, 2010
(ONE HOUR)

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- The paper has **30** questions and **09** 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.**

In questions 1-5, fill in the blanks with the most appropriate answer.

1) is some thing that an object can do.

- | | | |
|---------------------|-------------------|----------|
| (a) Behaviour | (b) Encapsulation | (c) Data |
| (d) Object instance | (e) Service | |

2) Packaging of several items together into one unit is called

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|---------------------|---------------------|--------------------|
| (a) Polymorphism. | (b) Generalization. | (c) Encapsulation. |
| (d) Specialization. | (e) Overloading. | |

3) An entity that contains attributes and behaviours which are common to one or more class subtypes is called a

- | | | |
|------------------|------------------------|--------------------|
| (a) super type. | (b) sub class. | (c) derived class. |
| (d) child class. | (e) generalized class. | |

4) A/An Diagram focuses on the structural organization of objects in a network format.

- | | | |
|----------------|-------------------|--------------|
| (a) Use case | (b) Communication | (c) Sequence |
| (d) Deployment | (e) State | |

5) A Diagram graphically shows how objects interact with each other via messages in the execution of a use case or operation.

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|----------------|--------------------------|-------------------------|
| (a) Component | (b) Interaction overview | (c) Composite structure |
| (d) Deployment | (e) Sequence | |

6) Examine the following contents of **Column A** against those of **Column B**.

Column A	Column B
(A) Composite Structure	(i) Emphasizes the structural organization of the objects which send and receive messages.
(B) Communication diagram	(ii) Decomposes the internal structure of a class, component or use case.
(C) Sequence diagram	(iii) Especially useful when designing embedded software for devices
(D) Timing diagram	(iv) Shows how and where the system will be deployed.
(E) Deployment diagram	(v) Shows how messages are sent and received between objects and in what sequence.

Which of following gives a correct matching of the contents of **Column A** with those of **Column B**?

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

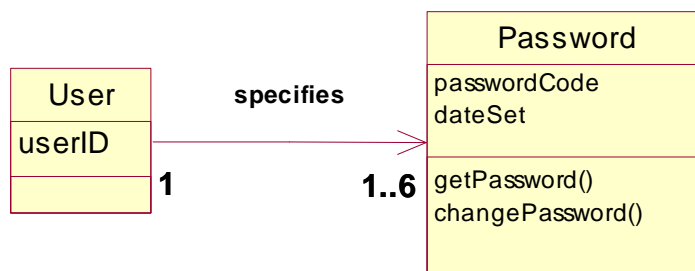
7) Which of the following statements is/are correct regarding the Rational Unified Process (RUP)?

- (a) It is a software development process in which we turn user requirements into software.
- (b) Elaboration phase establishes the business case for the project.
- (c) RUP consists of a sequence of four phases, called Inception, Elaboration, Construction and Transition.
- (d) RUP is a modeling method.
- (e) During the inception phase, the problem domain analysis is made and the architecture of the project gets its basic form.

8) Which of the following statements is/are correct regarding the relationship of a class diagram?

- (a) Association relationship in a class diagram may have an association name, role name, multiplicity and navigability.
- (b) In UML *composition* is drawn as a filled diamond.
- (c) The notation 0..5 represents a specific range from 0 to 5 including 0 and 5.
- (d) One can give a role name to the classes on one end or both ends of an association.
- (e) In *composition* relationship, multiplicity is not stated.

Consider the following diagram to answer questions 9-10



9) Consider the following statements with regard to the above diagram.

- (i) The given relationship is a unidirectional association.
- (ii) *specifies* represent the role name of the association.
- (iii) The given relationship is a bidirectional association.

Which of above statements is/are correct?

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|-----------------------|---------------|------------------------|
| (a) Only (i) | (b) Only (ii) | (c) Only (i) and (iii) |
| (d) Only (i) and (ii) | (e) All | |

10) Consider the following statements related to above diagram.

- (i) It would not make sense that, for a given password, one would want to identify the corresponding user.
- (ii) User must change his password every 30 days. When the password is changed, the new password cannot be one that he has used for the past six months. Upto 6 passwords can be stored in the system.
- (iii) For a given password, the system needs to identify the corresponding user.

Which of the above statements is / are correct?

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

11) Which of the following is / are correct regarding *Class* diagrams?

- (a) It shows the system's object structure.
- (b) Whether a relationship is an *association* or a *composition* is not domain dependent.
- (c) It shows the object classes which the system is composed of as well as the relationships between those object classes.
- (d) Association names should be verb phrases because they indicate an action that the source object is performing on the target object.
- (e) In UML 2.0, the notation for *Composition* has been dropped.

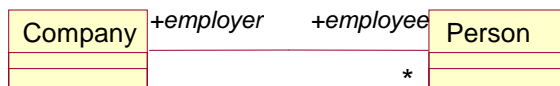
12) Which of the following statements is/are correct regarding UML class diagrams?

- (a) Role names are noun phrases which indicate the roles played by objects linked by the instance of the association.
- (b) One can specify role names to the classes only on one end of the association.
- (c) Imagine Company and Person are two classes in a class diagram. A Company object will play the role of *employee* and the person object will play the role of *employer* when they are linked by the instance of this *association*.
- (d) The relationship between Person and the Company class given in (c) is always a unidirectional association.
- (e) It is a common modelling error to assume that an undecided multiplicity defaults to multiplicity of one.

13) Which of the following statements is/are correct regarding UML class diagrams?

- (a) Multiplicity 0..* in UML indicates *zero or more*.
- (b) Multiplicity * in UML indicates *one or more*.
- (c) Multiplicity 1..3,15,19..* indicates 1 to 3 *or* 15 exactly *or* 19 to many.
- (d) Reflexive association means that the objects of a class have links to other objects of the same class.
- (e) It shows the object interactions arranged in time sequence.

14) Consider the following Class diagrams.



Which of the following statements is/are correct regarding the above diagram?

- (a) A company can have exactly one employee.
- (b) A company can have one or many Persons.
- (c) A company can have zero or many Persons.
- (d) A Person object can only be employed by one company at a time.
- (e) Person objects must always be employed.

15) Which of the following statements is/are correct regarding Use case modelling?

- (a) An actor specifies a role that some external entity adopts when interacting with the system directly.
- (b) Extends relationship shows the optional behaviour of a Use Case.
- (c) Include relationship shows the compulsory behaviour of a Use Case.
- (d) A use case describes behaviour that the system exhibits to benefit one or more actors.
- (e) Actor should always be a person.

16) Which of the following is/are correct regarding Use case modelling?

- (a) Use cases are the best choice for requirements capture when the system has many types of users to which it delivers different functionality.
- (b) Actors are always the classes identified in Class Diagrams.
- (c) Actors are roles played by things external to the system that interact directly with the system.
- (d) You can find actors by considering who or what uses or interacts directly with the system.
- (e) Use case modelling is most appropriate for systems which are dominated by non-functional requirements.

17) Which of the following statements is /are correct regarding Object Oriented Design and Modelling using UML?

- (a) Entity classes usually correspond to items in real life and contain information known as *attributes* which describe the different instances of the entity.
- (b) An Entity class is an object class that contains business related information.
- (c) Users communicate with the system through the user interface, implemented as Boundary or Interface classes.
- (d) Use case model is refined to reflect the implementation environment.
- (e) Control class is an object class that provides functionality to read and write persistent attributes in a database.

18) Take a look at the contents in column B in relation to those in column A.

Column A	Column B
(i) Persistent Class	(A) is an object class that provides the means by which an actor can interface with the system.
(ii) Interface class	(B) is an object class that contains application logic.
(iii) Control class	(C) is an object class that provides functionality to read and write persistent attributes in a database.
(iv) System Class	(D) is used to model the association between two classes in two instances to indicate that, when a change occurs in one class it may affect the other class.
(v) Dependency Relationship	(E) is an object class that handles operating system-specific functionality.

Which of the following represents (a) correct matching(s) of the contents in column B in relation to those in column A?

- (a) (i)-C, (ii)-E, (iii)-B, (iv)-A, (v)-D
- (b) (i)-B (ii)-A, (iii)-D, (iv)-E, (v)-C
- (c) (i)-B, (ii)-A, (iii)-C, (iv)-E, (v)-D
- (d) (i)-C, (ii)-D, (iii)-A, (iv)-B, (v)-E
- (e) (i)-C, (ii)-A, (iii)-B, (iv)-E, (v)-D

19) Consider the following activities.

- (i) Transforming the 'Analysis' Use cases to 'Design' Use cases
- (ii) Identify class attributes, class behaviours and responsibilities
- (iii) Model object states

Which of above statements is/are activities of Object-Oriented Design?

- | | | |
|------------------------|---------------|-------------------------|
| (a) Only (i) | (b) Only (ii) | (c) Only (ii) and (iii) |
| (d) Only (i) and (iii) | (e) All | |

20) Some questions related to UML diagrams with possible answers are given below.

- (i) Q. What is the usefulness of a sequence diagram?
A. It is useful when you want to study the behaviour of several classes within a single Use case.
- (ii) Q. What is the diagram used to model the interaction of objects via messages, focussing on the structural organization of objects in a network format.
A. Communication Diagram
- (iii) Q. What are activation bars in a sequence diagram?
A. They are the bars which are set over the life lines indicating the period of time during which each object instance exists.

Which of the above pairs is/are correct?

- | | | |
|-------------------------|---------------|-----------------------|
| (a) Only (i) | (b) Only (ii) | (c) Only (i) and (ii) |
| (d) Only (ii) and (iii) | (e) All | |

21) Which of the following statements is/are correct regarding State Diagrams?

- | |
|---|
| (a) They model aspects of the dynamic behaviour of a system. |
| (b) They show the interaction between all the object classes involved in the scenario. |
| (c) Three key elements of State Diagrams are <i>States</i> , <i>Events</i> and <i>Transitions</i> . |
| (d) They show the events which cause an object to change state over time and the rules which govern the object's transition between states. |
| (e) They are used to model business processes in which several objects participate. |

- 22) Consider the following incomplete statements related to a UML diagrams.
- (i) tend to be used for modeling business processes in which several objects participate.
 - (ii) In UML Activity diagrams are represented as rectangles with rounded edges , are drawn as directed arrows and decision points are shows as
 - (iii) In a State diagram, the behaviour in an activity, entry action, or exit action can include sending an event to some other object. In this case, the activity, entry action, or exit action is preceded by a character.

Identify from among the following, the correct order to fill the above blanks.

- | |
|---|
| <ul style="list-style-type: none">(a) State diagrams, events, transitions, synchronization bars, ^(b) Sequence diagrams, activities, folks, activities, *(c) Activity diagram, activities, joins, diamonds, ^(d) Activity diagrams, activities, transitions , diamonds, ^(e) State diagrams, events, transitions, synchronization bars, * |
|---|

- 23) Consider the following statements related to UML 2.0 Sequence diagrams.
- (i) Sequence diagrams show interactions between participants in an interaction as a time ordered sequence of events.
 - (ii) It is possible to draw sequence diagrams when following structured methodologies.
 - (iii) It is possible to start drawing a sequence diagram before finalising the classes

Which of above statements is/are correct?

- | |
|---|
| <ul style="list-style-type: none">(a) Only (i)(b) Only (i) and (ii)(c) Only (ii) and (iii)(d) Only (i) and (iii)(e) All |
|---|

- 24) Consider the following statements related to UML 2.0 Sequence diagrams.
- (i) Activation bar indicates the period of time the object instance is active in the interaction.
 - (ii) The focus of control is a small rectangle that will let you know which object has control at a particular point in time.
 - (iii) Frames in sequence diagram can show loops, alternative fragments or optional steps.

Which of the above statements is/are correct?

- | |
|---|
| <ul style="list-style-type: none">(a) Only (i)(b) Only (ii)(c) Only (i) and (ii)(d) Only (i) and (iii)(e) All |
|---|

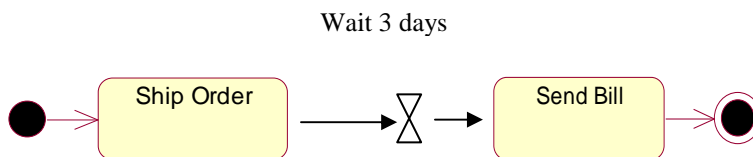
25) Examine the contents of the following **Column A** against those of **Column B**.

Column A	Column B
(i) Communication Diagram (ii) Component Diagram (iii) Deployment Diagram (iv) Composite Structure Diagram (v) Timing Diagram	(A) models the physical architecture of the hardware. (B) models the physical implementation of the software. (C) shows the classes internal structure. (D) shows how long an object is in a state. (E) models the messages on top of an object diagram rather than modelling messages in sequential order.


Which of the following gives a correct matching of the contents of **Column A** with those of **Column B**.

- (a) A-(ii), B-(iii), C-(iv), D-(v), E-(i)
 (b) A-(iii), B-(ii), C-(i), D-(v), E-(iv)
 (c) A-(ii), B-(v), C-(iv), D-(iii), E-(i)
 (d) A-(iii), B-(ii), C-(iv), D-(v), E-(i)
 (e) A-(iv), B-(ii), C-(i), D-(v), E-(iii)

26) Consider the following diagram.



Which of the following statements is/are correct?

- (a) The diagram given is a UML 2.0 Activity diagram.
 (b) Ship Order and Send Bill are two activities in the system.
 (c) You may need to wait for 3 days after shipping an order to send a bill.
 (d) One has to settle the bill within three days after receiving it.
 (e)  is a symbol introduced in UML 2.0 to represent duration of time events

27) Consider the following statements in relation to Activity diagrams.

- (i) Activity diagrams are newly added in UML 2.0.
 (ii) In an activity diagram, there may be more than one starting activity.
 (iii) In an Activity diagram, a synchronization bar specifies the activities which can be done concurrently.

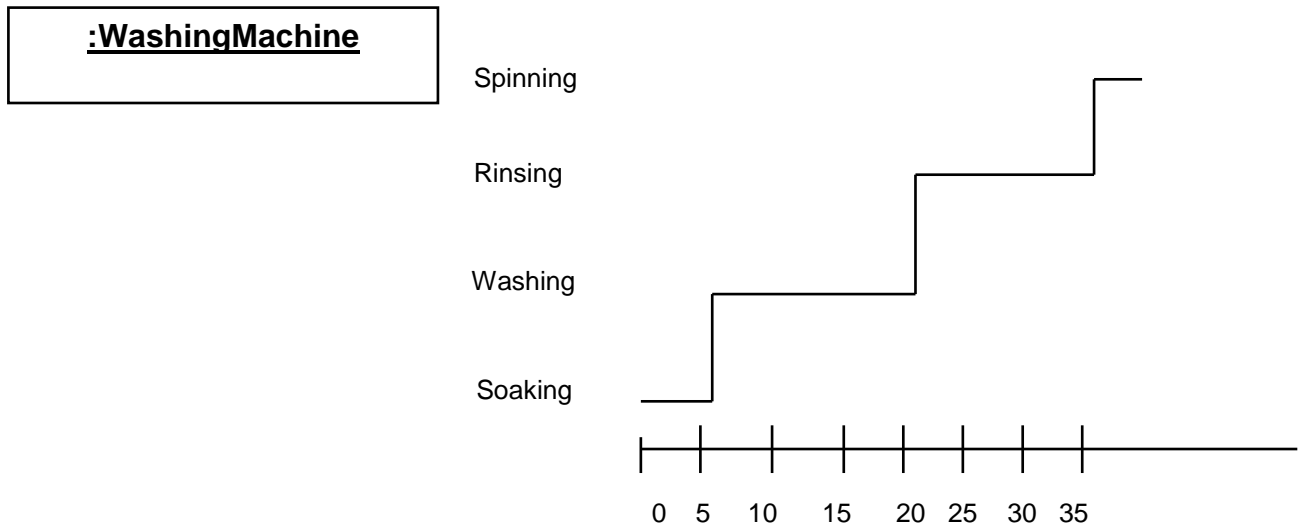
Which of the above statements is/ are true?

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

28)

Consider the following statements in relation to new UML 2.0 diagrams.

- (i) Component diagrams are renamed as Communication diagrams.
- (ii) Composite Structure Diagram is a new diagram added to expand the Activity diagram.
- (iii) The following diagram is an example of a Timing diagram.



Which of the above statements is/ are true?

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

29)

Which of the following is/are correct in relation to Object Oriented Methodology?

- (a) Rational Unified Process (RUP) is a commercial version of Unified Process from IBM, who took over Rational Corporation in 2003.
- (b) Extreme Programming is an Object Oriented Methodology.
- (c) Rational Unified Process is well defined and supported by Rational Rose a Rational Modelling tool.
- (d) RUP is best suited for small scale projects
- (e) RUP strongly emphasizes iterative and incremental development.

30)

Which of the following is/are correct regarding the UML 2.0 diagrams?

- (a) State diagrams are drawn for objects having significant behaviour.
- (b) In an Interaction diagram, a dynamic object receives and sends many messages,
- (c) Class diagrams and object diagrams also show dynamic aspects of a system.
- (d) The following symbol in an Activity diagram shows an action invoking another activity.



- (e) Connection points in State diagrams represent points of entry into a state or exit out of state.
