UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2020 – 2nd Year Examination – Semester 3

IT3105 – Object-Oriented Analysis and Design
PART 1 - Multiple Choice Question Paper

(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 **12 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.**
- Calculators are **not** allowed.
-

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

1) In the object-oriented paradigm, …….. implies using operations in different ways, depending upon the instance they are operating upon.

(a) Inheritance	(b) Encapsulation	(c) Polymorphism
(d) Abstraction	(e) Specialization	

2) Through ……, the internal details of a class can be hidden from outside. It permits the elements of the class to be accessed from outside only through the interface provided by the class.

(a) Polymorphism	(b) Specialization	(c) Encapsulation
(d) Generalization	(e) Composition	

3) …….. is the process of taking out common properties and functionalities from two or more classes and combining them together into another class which acts as the parent class of those classes.

(a) Encapsulation	(b) Inheritance	(c) Generalization
(d) Polymorphism	(e) Specialization	

4) …….. diagrams are usually referred to as behavior diagrams used to describe a set of actions that some system should or can perform in collaboration with one or more external users of the system.

(a) component	(b) use case	(c) sequence
(d) class	(e) state	

5) A …… diagram is a structure diagram which describes a lightweight extension mechanism in UML by defining custom stereotypes, tagged values, and constraints.

(a) Use Case	(b) State	(c) Profile
(d) Component	(e) Deployment	

6) Which of the following diagrams is/are UML *Interaction* diagrams?

(a) Use Case
(b) Sequence
(c) Composite Structure
(d) Activity
(e) Timing

7) Which of the following statements is/are correct regarding the Software Development Processes?

(a) They are often used together in large system development.
(b) A software process model is a simplified representation of a software process.
(c) The Waterfall model of the software development process is the most appropriate process model for projects with unstable requirements.
(d) Spiral model is a software process represented as a sequence of activities with some backtracking from one activity to another.
(e) Iterative processes can be very expensive if iterations are not small enough to mitigate risk.

8) Which of the following is/are correct regarding *Use Case* modelling?

(a) A use case diagram is a diagram in UML.
(b) Use cases are sets of actions, services, and functions that the system needs to perform.
(c) A Use-case model shows the functional decomposition of a system.
(d) A system is not included as an actor in a use case model if it is outside the system being developed, though it is directly interacting.
(e) Use Case diagrams cannot be drawn for SCRUM.

9) Consider the following statements related to Use Case diagrams.

(i) An *include* relationship between use cases means that the base use case explicitly incorporates the behaviour of another use case at a location specified in the base.
(ii) A Use Case model should describe all of the implementation specifics of an application.
(iii) They enable visualizing different types of roles in a system and how those roles interact with the system.

Which of the above statements is/are correct?

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

10) Consider the following statements related to Use Case modelling.

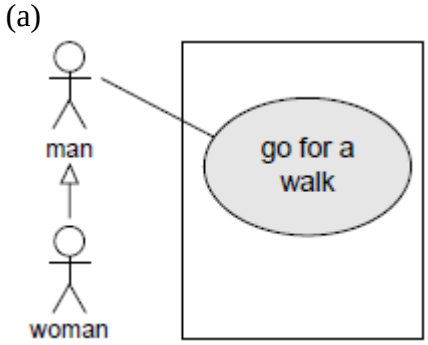
(i) Business requirements Use Case captures the interactions between a user and the system free of technology implementation details.
(ii) Actors are named with a noun phrase specifying the goal of an actor.
(iii) If the system has several subsystems, one may draw several use case model diagrams.

Which of the above statements is/are correct?

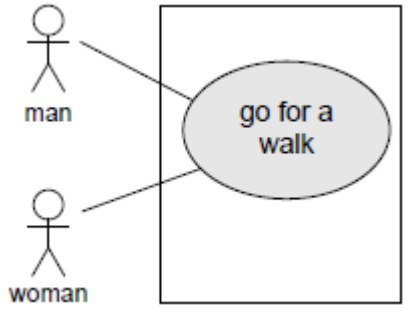
(a) Only (ii) (b) Only (iii) (c) Only (i) and (ii)
(d) Only (i) and (iii) (e) All

11) How would you model the following situation with a UML2 Use Case diagram?
A man and a woman together go for a walk.

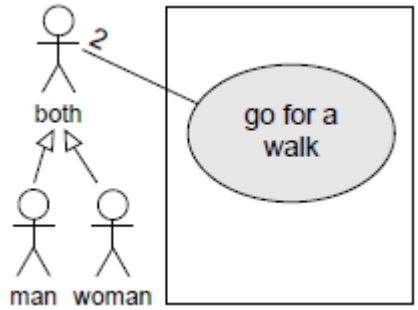
(a)



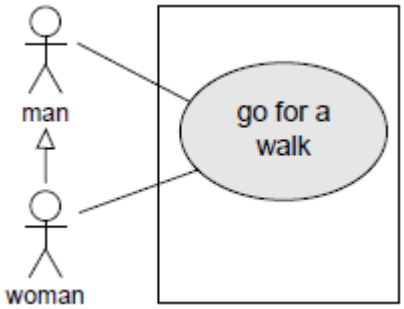
(b)


man
woman
go for a walk

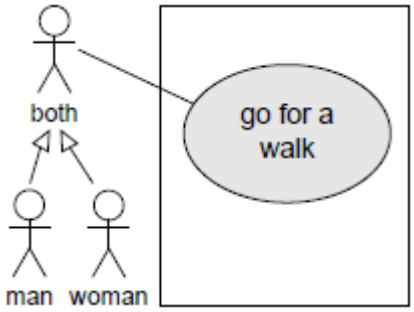
(c)


2
both
man
woman
go for a walk

(d)

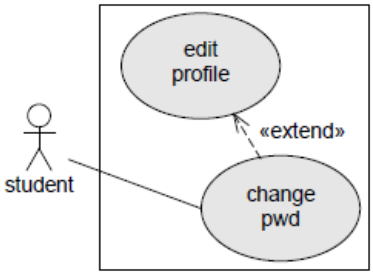

man
woman
go for a walk

(e)

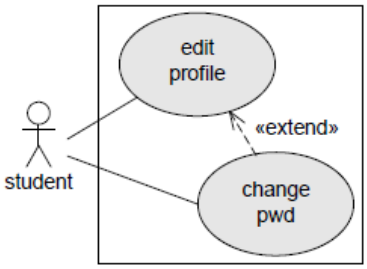

both
man
woman
go for a walk

12) Consider the following statement.
A student edits his user profile. In the course of doing that, he can also change his password if he likes.
Some students were asked to model the above situation with a UML2 *Use case diagram*.
The following are three different diagrams drawn.

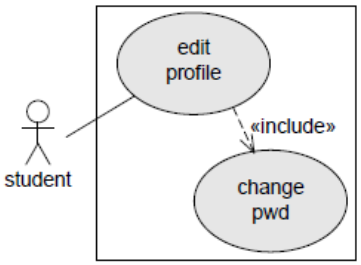
(i)



(ii)



(iii)

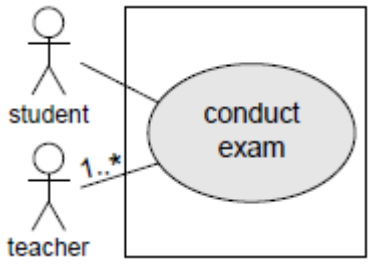


Which of the above diagrams is/are correct?

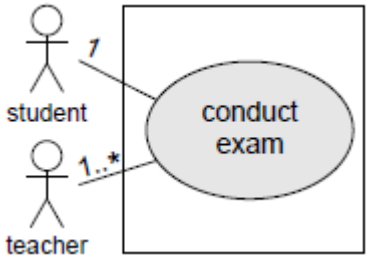
(a) Only (i)
(b) Only (ii)
(c) Only (iii)
(d) Only (i) and (ii)
(e) Only (ii) and (iii)

13) Consider the following statement.
To conduct an exam, one student and at least one teacher are necessary.
Students were asked to model the above situation with a UML2 Use case diagram. The following are three different diagrams drawn.

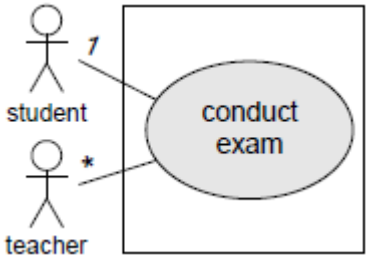
(i)



(ii)



(iii)



Which of the above diagrams is/are correct?

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

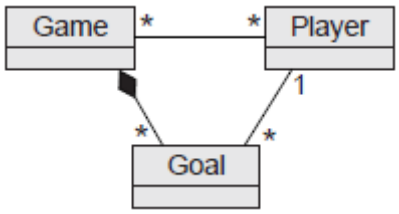
14) Consider the following situation.

In a football league, multiple players participate in multiple games. Each player may score in each game a certain number of goals.

Some students were asked to model the above situation with a UML2 Class diagram.

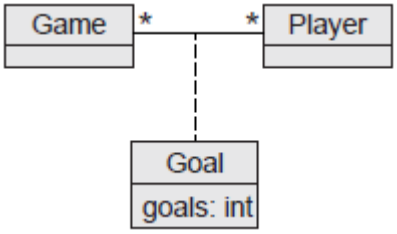
The following are three possible answers they have produced.

(i)



(ii)

(iii)

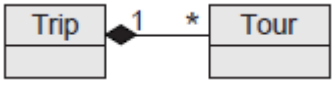


Which of the above diagrams is/are true?

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

15) Which of the following statements related to class diagrams is/are correct?

(a) A class can have a relationship with itself.
(b) You can specify the names of the roles the classes play in the relationship on the association ends.
(c) Class diagrams are used for a wide variety of purposes, including both conceptual/domain modelling and detailed design modelling.
(d) Consider a situation where a trip might comprise of multiple tours, one tour can be included in several trips. The following diagram matches the above situation

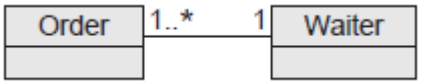


(e) Class diagrams show object interactions organized around the objects and their links to each other.

16) Consider the following scenario.
"An order is made with exactly one waiter, one waiter handles one or more orders."
Three students have modelled the above situation with UML2 *Class diagrams* as given below.

(i)

(ii)

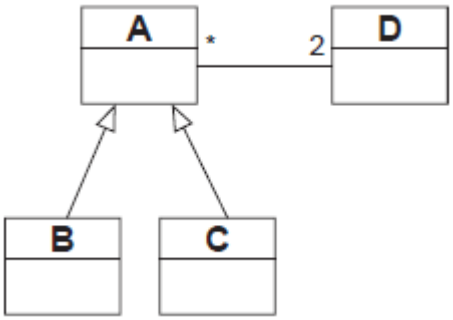


(iii)

Which of the above diagrams is/are correct ?

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

17) Consider the following UML2 Class diagram and the statements given below.

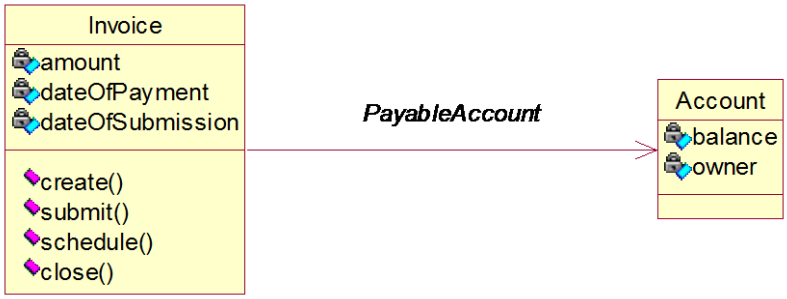


(i) One object of B must be associated with exactly two objects of D.
(ii) One object of D is associated with zero or more objects of A
(iii) One object of D may be associated with multiple objects of C.

Which of the above statements related to the given diagram is/are correct?

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

18) Consider the following segment of a Class diagram.



The arrow in the above diagram indicates,

(a) Generalization
(b) Association
(c) Dependency
(d) Navigability
(e) Composition

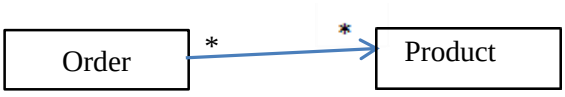
19) Some questions related to UML class diagrams with possible answers are given below.

(i). Q. How do you represent the following multiplicity in UML2?
1 to 3 *or* 6
A. 1..6
(ii). Q. What is a reflexive association in a class diagram?
A It is an association from a class to itself
(iii). Q. What is an *association class* in UML?
A. It is a UML construct that enables an association to have attributes and operations

Which of the above pairs is/are correct?

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

20) Consider the following statements related to the given UML2 class diagram.



Which of the following statements is/are represented in this diagram?

(a) Order objects can send messages to Product objects.
(b) *Product* objects can send messages to *Order* objects.
(c) An *Order* object stores a list of *Products* whereas a *Product* object does not store a list of *Orders*.
(d) The arrow indicate generalization
(e) Order consists of one or more products.

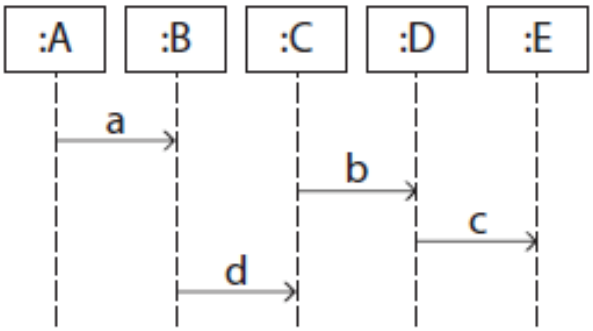
21) Which of the following tasks are accomplished in the Object Oriented Design phase?

(a) Identify control classes in the class diagram that process messages from the interface class and respond to them by sending and receiving messages from the entity classes.
(b) Use Case models are refined in the design stage to reflect the implementation environment.
(c) Class interactions are modelled in the design stage to support the use case scenarios.
(d) Business Use Case models are drawn.
(e) Developer applies implementation constraints to the conceptual model produced in object-oriented analysis.

22) Which of the following statements related to State diagrams is/are correct?

(a) They define different states of an object during its lifetime and these states are changed by events.
(b) They show the life history showing the different states of objects in a scenario.
(c) Both actions and guards in State diagrams are behaviours of the object, and they typically become operations in the corresponding class.
(d) They are mainly used to analyze the object states influenced by events.
(e) They show the objects and classes involved in a scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

23) *Consider the following sequence diagram.*



Identify the correct sequence of the messages that will be executed.

(a) a,d,b,c
(b) a,d,c,b
(c) a,b,c,d
(d) c,b,d,a
(e) d,c,b,a

24) Consider the following statements with respect to UML sequence diagrams.

(i) They can be used to show complex interactions such as alternative flows and loops in a more structured way.

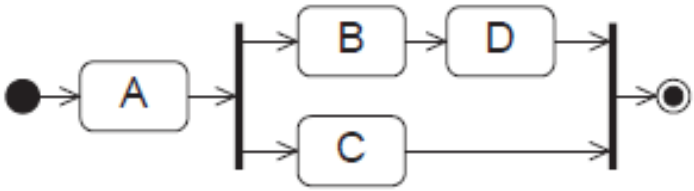
(ii) The Loop fragment in a UML2 Sequence diagram is used to represent a repetitive sequence.

(iii) The following is an example for a message return where receiver of an earlier message returns focus of control to the sender of that message.

Which of the above statements is/are correct?

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

25) The following activity diagram is given to some students following a Software engineering course and they are asked to identify the possible sequence of actions.



They have identified three possible action sequences as given below.

(i) A->B- >D
(ii) A->B->C->D
(iii) A->B->D->C

Which of the above answers is/are correct?

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

26) Which of the following statements related to sequence diagrams is/are correct?

(a) Activation bar is the box placed on the lifeline which is used to indicate that an object is active (or instantiated) during an interaction between two objects.
(b) The length of the rectangle of the activation bar indicates the duration of the objects staying active.
(c) In a sequence diagram, an interaction between two objects occurs when one object sends a message to another.
(d) When an object sends a message to another object, it is called a reflexive message.
(e) Time is represented in a sequence diagram as proceeding in the downward direction.

27) Which of the following statements is/are correct regarding UML Activity diagrams?

(a) Synchronization bars visualize the activities that can be performed in parallel.
(b) *Activity* diagrams are useful for communicating logic to programmers
(c) The following is a *Join* symbol used to split a single activity flow into two concurrent activities.

(d) The following symbol shows the starting point of a process' flow.

(e) *Activity diagrams* may be created to represent the workflow of an operation.

28) Consider the following statements related to diagrams in UML2.
(i) An *Interaction Overview diagram* is a form of activity diagram in which the nodes represent interaction diagrams.
(ii) Timing diagrams are used to display the change in state or value of one or more elements over time.
(iii) *Deployment diagrams* show how elements of software and hardware are connected to one another.

Which of the above statements is/are correct?

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

29) Consider the following statements related to Executable UML:
(i) Executable UML approach aims at defining UML models with a behavioral specification precise enough to be effectively executed.
(ii) Executable UML eliminates the need of programming the software system.
(iii) Executable UML or namely xUML uses MDA as a basis and broadens the concept one step further.

Which of the above statements is/are correct?

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

30) Consider the following statements regarding Model Driven Engineering (MDE).
(i)) A Platform Independent Model (PIM) models the important domain abstractions used in the system and are sometimes called domain models.
(ii) A Computation independent model (CIM) can be usually described using UML models.
(iii) Commercial tools are available that provide translators from PIMs to Common platforms such as Java.

Which of the above statements is/are correct?

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

******