



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2007/2008 – 2nd Year Examination – Semester 3

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

15th March, 2008
(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 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) In an operation can have the same name in different classes and proceed differently in each class.

(a) polymorphism	(b) encapsulation	(c) information hiding
(d) message passing	(e) aggregation	

- 2) is a relationship in which one larger “whole” class contains one or more smaller “parts” classes.

(a) Association	(b) Gen/Spec	(c) Multiplicity
(d) Communication	(e) Aggregation	

- 3) states that when designing an object, one should separate what he knows about the object according to the minimum information needed to use the object and the information required to make the object work properly.

(a) Polymorphism	(b) Encapsulation	(c) Abstraction
(d) Object	(e) Class	

- 4) During the phase in RUP , the business case for the project will be established and the project’s scope will be defined.

(a) Transition	(b) Construction	(c) Elaboration
(d) Inception	(e) Testing	

- 5) During the phase in RUP, the software will be deployed to the user community.

(a) Inception	(b) Elaboration	(c) Transition
(d) Construction	(e) Analysis	

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

Column A	Column B
(A) Deployment diagram	(i) Emphasizes the structural organization of the objects which send and receive messages.
(B) Communication diagram	(ii) Shows the configuration of run time processing nodes and the components live on them.
(C) Sequential diagram	(iii) Consists of transitions, events and activities.
(D) State diagram	(iv) Addresses the static view of a system.
(E) Component diagram	(v) Is an Interaction diagram that emphasizes the time-ordering of messages.

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

(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)

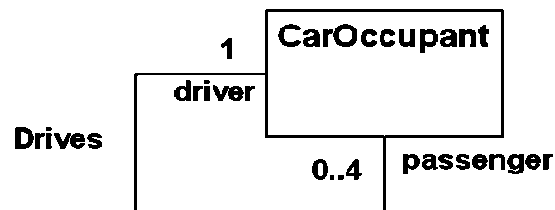
7) Which of the following statements is/are correct regarding the Rational Unified Process (RUP)?

- (a) It is an iterative software development process framework created by the Rational Software Corporation.
- (b) It can be used with UML to develop high quality software.
- (c) During the transition phase of the RUP, component diagrams are created to show the compile time dependencies between the components.
- (d) The process focuses on the early development and baseline of a software architecture
- (e) It does not focus on early development of software architecture.

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

- (a) Multiplicity is the number of objects from one class which relate with a single object in an associated class.
- (b) Multiplicity is an association that may contain instances.
- (c) The notation 5..8 represents a specific range from 5 to 8 including 5 and 8.
- (d) The notation 5..8 represents a specific range from 5 to 8 excluding 5 and 8.
- (e) The notation * represents the multiplicity zero or more.

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



- (i) A carOccupant can be either a driver or a passenger.
- (ii) *Drives* represent the name of the association.
- (iii) In the role of the driver, one carOccupant drives maximum of four additional carOccupants who play the role of passenger.

Which of above statements is/are correct?

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

10) Consider the following statements.

- (i) A class may have zero or more attributes.
- (ii) An object diagram gives information about specific instances of a class and how they link up at specific instants in time.
- (iii) A class diagram represents the dynamic behavior of a system.

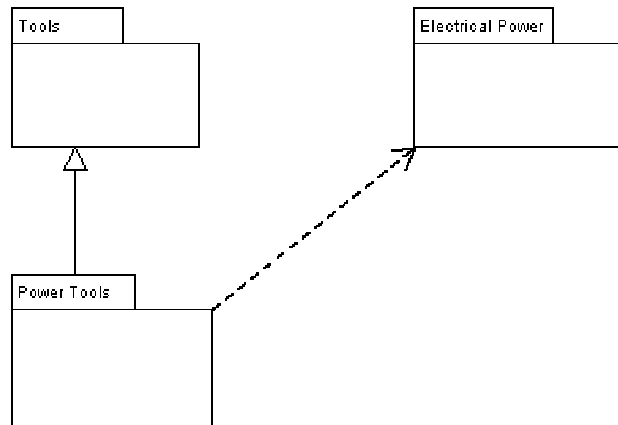
Which of the above statements is / are correct?

- | | | |
|-----------------------|------------------------|----------------|
| (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 the Gen/Spec relationship?

- (a) Root class is a another name given to the base class
- (b) A class that does not have any parents is called a leaf class.
- (c) A class that does not have any children is called a base class.
- (d) Interest cheque A/C is a kind of Savings A/C and also a kind of Current A/C which is an example for multiple inheritances.
- (e) In UML, an abstract class is indicated by writing the name of the class in italics.

12) Consider the following diagram.



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

- (a) This is an example for an inter-package relationship.
- (b) The package Power tools depends on the package Electrical Power.
- (c) The package Electrical Power depends on the package Power tools.
- (d) The relationship between Tools and Power Tools is a Generalization.
- (e) Power Tools is a collection of classes

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

- (a) An interface can be modelled using a rectangle icon.
- (b) An interface may have zero or more attributes.
- (c) Realization is the relationship between a class and its interface.
- (d) A Composite structure diagram visualizes the internal structure of a class by showing classes nested inside that class.
- (e) *Packages* let one create a navigable and well structured model by allowing grouping of things which have close semantic ties.

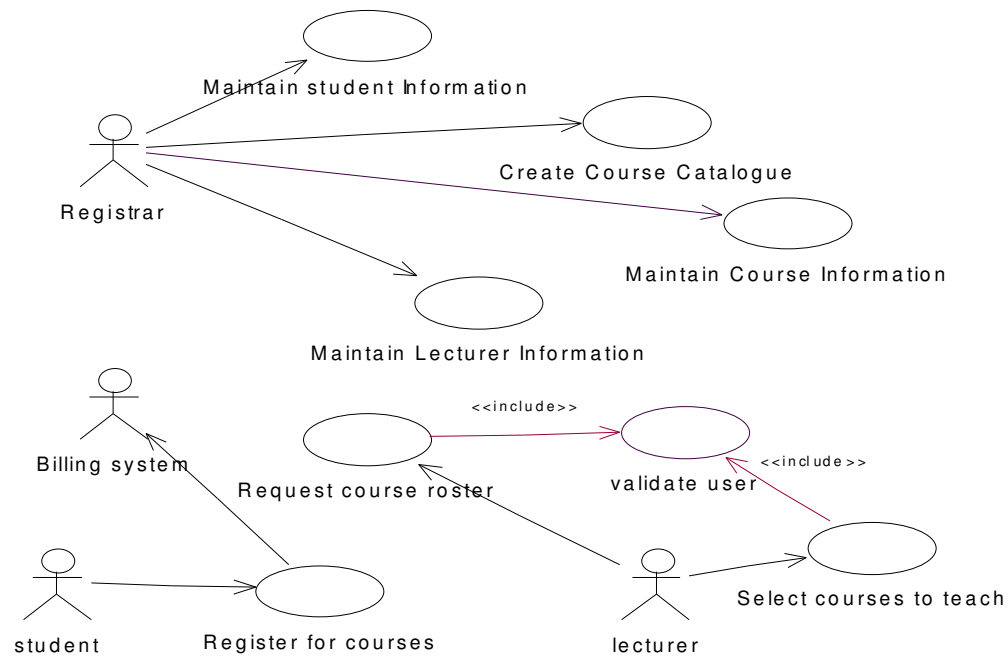
14) Consider the following questions.

- (i) Who / What provides inputs to the system?
- (ii) What information does the actor provide to the system?
- (iii) Does the system use an external resource?

Which of the above questions should be asked when searching for actors?

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

15) Consider the following use-case diagram.



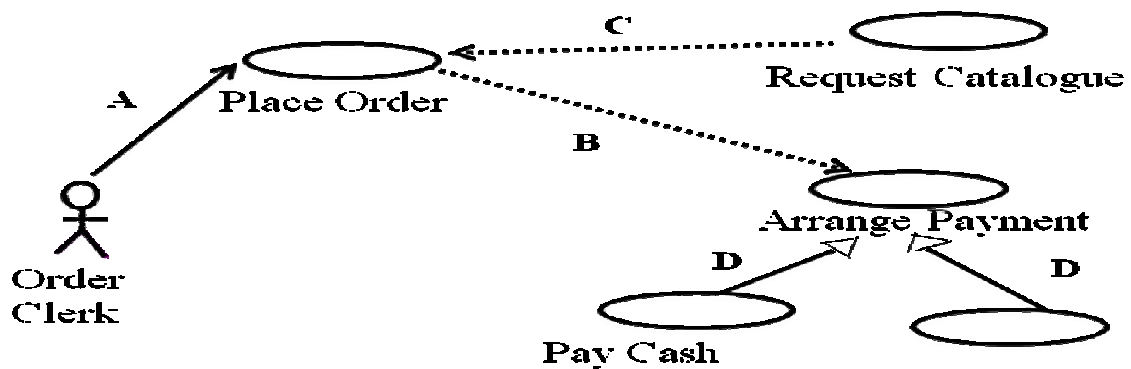
What are the business actors in the given use case?

- | |
|--|
| (a) Registrar, Lecturer |
| (b) Registrar, Lecturer, Billing system |
| (c) Registrar, Lecturer, Student |
| (d) Registrar, Lecturer, Student, Billing system |
| (e) Lecturer, Student |

16) Which of the following statements is/are correct regarding use-case modelling?

- | |
|---|
| (a) Use case diagrams visualize use cases and facilitate communication between analysts and users as well as between analysts and clients. |
| (b) <i>Extends</i> relationship shows the compulsory behaviour of a Use Case. |
| (c) <i>Include</i> relationship shows the compulsory behaviour of a Use Case. |
| (d) The goal of a Use Case diagram is to identify all the features which the clients expect the system to support and reveals all the details about the implementation of these features. |
| (e) Use case modelling facilitates and encourages user involvement. |

- 17) Consider the following use case diagram.



Which of the following gives the correct matching(s) for A-D?

- | | |
|-----|--|
| (a) | A-Communication, B-Extend, C-Include, D- Association |
| (b) | A-Communication, B-Include, C-Extend, D- Inheritance |
| (c) | A-Inheritance, B-Extend, C-Inheritance, D- Include |
| (d) | A-Association, B-Include, C-Extend, D- Inheritance |
| (e) | A-Association, B-Extend, C-Include, D- Inheritance |

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

- | | |
|-----|--|
| (a) | A design pattern is a common solution to a given problem in a given context which supports reuse of proven approaches and techniques. |
| (b) | Coupling is the degree to which the attributes and behaviours of a single class are related to each other. |
| (c) | During OOD, the use cases and objects are refined to reflect the actual environment of the proposed solution. |
| (d) | Private attributes can be accessed and private methods can be invoked by any method in the class in which the attribute or method is defined or in subclasses of that class. |
| (e) | Visibility is the level of access an external object has to an attribute or method. |

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

Column A	Column B
(i) Entity class	(A) An object class that provides functionality to read and write attributes in a database
(ii) Interface class	(B) An object class that contains business related information
(iii) Control class	(C) A dialogue box
(iv) Persistence class	(D) Business rules and calculations
(v) System class	(E) Isolates the other objects from 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)-A, (ii)-E, (iii)-C, (iv)-D, (v)-B
(b) (i)-B (ii)-A, (iii)-D, (iv)-E, (v)-C
(c) (i)-B, (ii)-C, (iii)-D, (iv)-A, (v)-E
(d) (i)-D, (ii)-C, (iii)-A, (iv)-B, (v)-E
(e) (i)-C, (ii)-E, (iii)-A, (iv)-B, (v)-D

- 20) Consider the following statements related to discovering object interactions in UML:

- (i) The flow of events for a use case is captured in an interaction diagram, whereas scenarios are captured in text.
(ii) In UML, an object in a sequence diagram is drawn as a rectangle containing the name of the class, underlined.
(iii) During the early analysis phases, boundary classes are shown on a sequence diagram only to capture and document the interface requirements.

Which of above statements is/are correct?

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

- 21) Some questions related to UML with possible answers are given below.

- (i). Q. How does one represent an object's *lifeline* in a sequence diagram?
A. The *lifeline* is a dashed line descending from an object that represents the existence over time of an object.
- (ii). Q. What is the type of arrow used to show a return message in a sequence diagram?
A. Open-stick arrowhead with a dashed line
- (iii). Q. In a sequence diagram, how does one show an *activation* and what does it represent?
A. *Activation* is represented by a small narrow rectangle on an object's life line. It represents the time period during which the object performs an action

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

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

- (a) Substates come in two varieties namely Sequential and Concurrent.
- (b) They help analysts, designers and developers to understand the behaviour of the objects in a system.
- (c) They represent the static aspects of a system.
- (d) The focus of control is shown only on a state diagram.
- (e) Boundary classes are added to state diagrams to show the interaction with the user or another system.

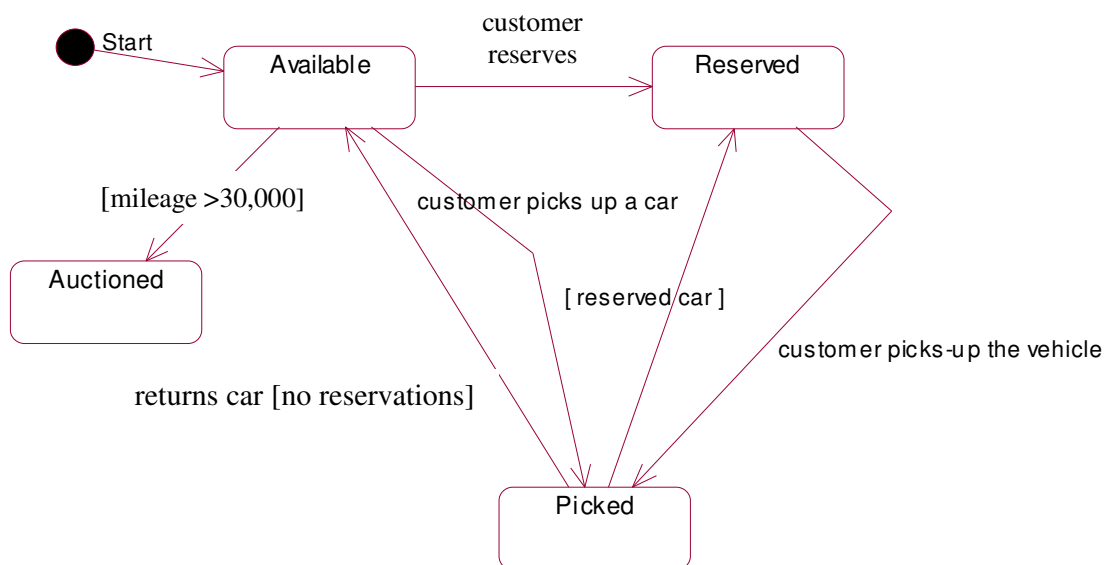
23) Consider the following incomplete statements.

- (i) show the changes a particular object goes through.
- (ii) In a State diagram, a..... represents a change from an originating state to a successor state.
- (iii) Each state diagram must have one and only one
- (iv) in a state diagram is the behaviour that an object carries out while it is in a particular state.
- (v) Entry action in a state diagram is shown inside the state, preceded by the word and colon.

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

- (a) State diagrams, State Transition, Start state, Activity, Entry
- (b) Sequence diagrams, message, End state, Transition, Exit
- (c) State diagrams, Action, Start state, Transition, Start
- (d) Activity diagrams, State Transition, Start state, Action, Start
- (e) State diagrams, Activity, initial State, Action, Entry

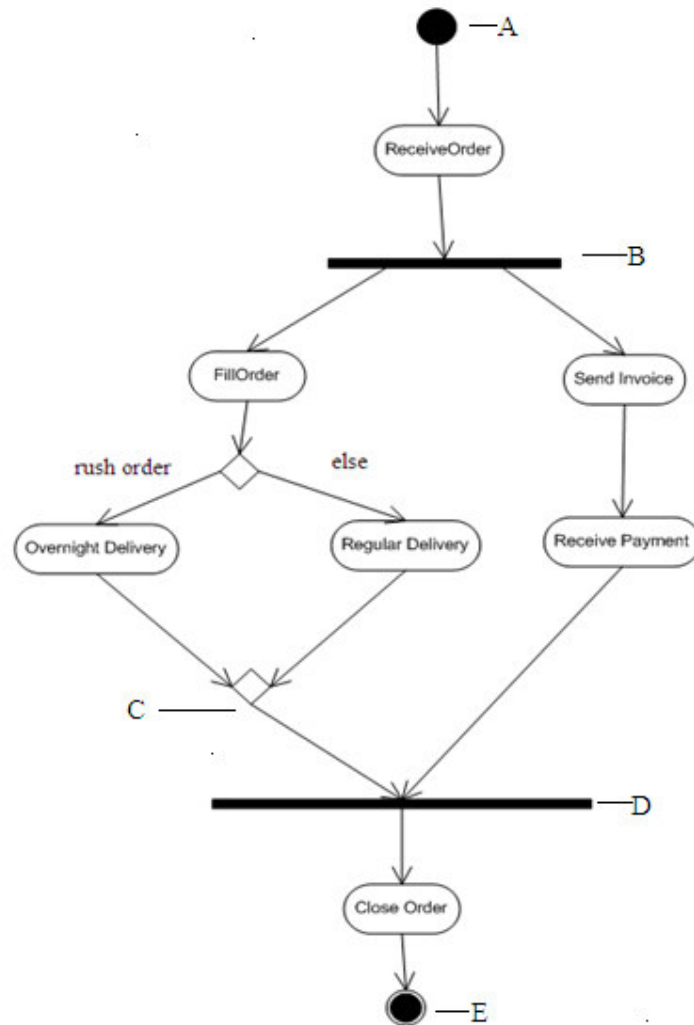
24) Consider the following diagram drawn for a car rental company.



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

- (a) This is an example for a state diagram.
- (b) This is an example for an activity diagram.
- (c) mileage > 30000 is the only guard condition that can be seen in the above diagram.
- (d) Available, Reserved, Auctioned and Picked are the transition names.
- (e) Available is the state of the object when it is created.

Questions 25-26 will be based on the following diagram drawn for a processing order use case.



25) Which of the following gives the best matching for the labels A-E?

- (a) A-Start, B-Join, C-Fork, D-Merge, E-End
- (b) A-Start, B-Fork, C-Merge, D-Join, E-End
- (c) A-End, B-Fork, C-Merge, D-Join, E-Start
- (d) A-Start, B-Join, C-Merge, D-Fork, E-End
- (e) A-Start, B-Fork, C- Join, D-Merge , E-End

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

- (a) The activities Fill Order and Send Invoice can be done in parallel.
- (b) The method of delivery is decided conditionally after performing the send invoice activity.
- (c) The activity Close Order is performed after combining all parallel activities.
- (d) The activity Regular delivery is done before performing Receive Payment activity.
- (e) The activities Overnight Delivery and Regular Delivery can be done in parallel.

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

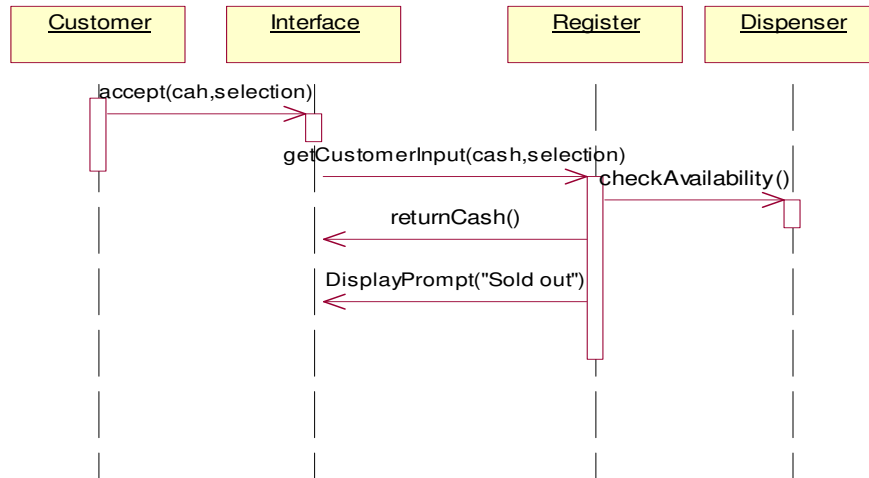
Column A	Column B
<ul style="list-style-type: none">(i) Collaboration diagram(ii) Asynchronous(iii) Synchronous(iv) Class diagram(v) Sequence diagram(vi) a message	<ul style="list-style-type: none">(A) processing can continue while the message is being executed(B) Sender waits for the receiver to carry out the operation.(C) is an Interaction diagram.(D) Shows a scenario in a time based order.(E) An Arrow that starts at one lifeline and ends at another

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

- 28) Consider the following Sequence diagram drawn for the scenario related to buying a drink from a drink dispenser machine.

When a customer wants to buy a drink from the drink dispenser he first makes a selection and inserts the money. The register checks for the availability of the selected drink in the dispenser. If it is not in the stock returns the money and displays message “Sold Out”. If the selected drink is in stock the register checks for the money input. If it is insufficient, the dispenser returns the money and displays message “Insufficient cash”. Otherwise the dispenser releases the drink. If there is an excess of money, dispenser returns the balance.,



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

- (a) Customer is the actor responsible for the use case.
- (b) This models the scenario where selected drink is not available.
- (c) This models the scenario where selected drink is available and the input money is sufficient.
- (d) checkAvailability method must be implemented by the Dispenser class.
- (e) Dispenser is a boundary class.

- 29) Consider the following statements in relation to Activity diagrams.

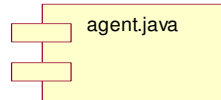
- (i) Activity diagrams are similar to flow charts.
- (ii) In an activity diagram, there may be more than one ending activity.
- (iii) In an Activity diagram, a synchronization bar specifies the activities which can be done concurrently.

Which of the above statement(s) is/ are true?

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

30) Which of the following statements is / are correct regarding component and deployment diagrams?

- (a) A Component Diagram helps to model the physical aspect of an Object-Oriented software system.
- (b) A Deployment diagram can be drawn only for distributed systems.
- (c) One uses components to model logical things which may reside on a node, such as executables, libraries, tables, files and documents.
- (d) The UML 2.0 notation for a *component* is given below.



- (e) The relationship between a component and an interface is known as realization
