Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech (IT)/SEM-2/ITM-202/2013

2013
ADVANCED SOFTWARE ENGINEERING USING UML

Time Allotted : 3 Hours   *Full Marks :* 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

    i) Which of the following is not a behavioral diagram ?

    a) Sequence diagram

    b) Collaboration diagram

    c) Component diagram

    d) Statechart diagram.

    ii) Which expression is used to denote the multiplicity of one-to-many ?

    a) $* .. 1$ b) $1 .. *$

    c) $0 .. *$ d) $1 .. 0$

    iii) In object-oriented design of software, objects have

    a) attributes & name

    b) operations & name

    c) attributes & operations

    d) attributes operations & name.

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iv) Peacock is a type of bird - what type of relationship does this statement signify ?

a) Association   b) Specialization

c) Realization   d) Generalization.

v) For showing scenarios, which one of the following OOAD artifacts is the MOST useful ?

a) Interaction diagrams

b) Activity diagrams

c) Use cases

d) State diagrams

e) Class diagrams.

vi) In sequence diagram, the time period during which an object is performing an action is known as

a) Lifeline   b) Life of control

c) Focus of control   d) Line of focus.

vii) Activity diagram CANNOT be used in which of the following situation ?

a) understanding workflow

b) dealing with multithreaded applications

c) procedural flow of control

d) representing complex conditional logic.

viii) Which of the following are for concurrent processes ?

     I. activity diagrams

     II. state diagrams

     III. class diagrams

     IV. sequence diagrams.

Of these

a) I & II   b) I, II & III

c) II, III & IV   d) I, II & IV.

ix) Which of the following objects are not parts of the ATM application described below ?

An Automated Teller Machine (ATM) is offered to bank customers as a convenience. At the ATM, customers can make deposits to or withdrawls from their account(s). They can also transfer funds between their accounts and can make inquiries as to account balances. In order to access the services of the ATM, customers must have an ATM card and Personal Identification Number (PIN). The components of the ATM include a User Interface, a card reader, an envelope slot, a cash drawer and a printer. The User Interface has a display and buttons. There are 10 numeric entry buttons, 4 transaction selection buttons, an "Enter" button and a "Cancel" button. Each ATM is connected to the bank computer via a network. Each ATM has a unique network identification number. The ATM validates account balances and account status by communicating with the bank computer. ATM's require periodic servicing. This servicing can include maintenance, restocking cash in the money holder, and removing deposited envelopes from the envelope repository. When the rear service panel is open, the ATM suspends interactions with the customers. Each ATM has a particular branch of the bank that is responsible for service and maintenance.

    I.   Transaction

    II.   Funds

    III. Services

    IV. ATM card.

Of these

a)   I, II & III   b)   II & III

c)   II, III & IV   d)   All of these.

x) A good OO development is

    a) Use case driven

    b) Data driven

    c) Responsibility driven

    d) All of these

    e) (a) and (c) only.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. What do you understand by multiplicity ? Explain with a suitable example.

3. What do you understand by the terms 'Forking' and 'Joining' ? Explain with an example.

4. Define SDLC in UML. What are the different views in UML ?

5. What do you mean by an Activity and an Action ? Mention the differences between an Activity state and an Action state.

6. What is the difference between Static and Dynamic Diagrams in UML ? What are the adornments of Association ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. A bank has installed ATM to offer basic services round the clock. The functional requirements of the system are :

a) The bank client must be able to deposit/withdraw an amount to/from his account using the ATM counter. Each transaction has to be recorded

b) PIN code allows access to the a/c of the bank client

c) The system should be designed such that it automatically checks the amount in the client a/c. If the amount to be withdrawn exceeds the amount in the account of the client then it should issue a message like "Insufficient Balance".

Develop a **Use Case Diagram** and **Class Diagram** according to the above scenario. You can incorporate details of your own in the diagram in addition to the above mentioned requirements. 8 + 7
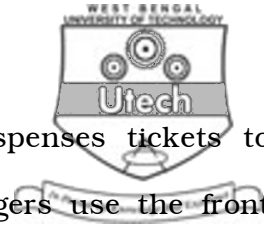
8. A Ticket Vending Machine (TVM) dispenses tickets to passengers at a railway station. Passengers use the front panel to specify their boarding and destination place, details of passengers (number of adults and children) and date of travel. The machine displays the fare for the requested ticket. The passenger then deposits cash in the bin provided and presses "Accept cash". The machine checks the cash, If it is more, the balance cash is paid out and the ticket requested is printed. The system is also used by the operator who might want to know the cash held in the machine, the break-up of small change available in the machine, withdraw or deposit cash when needed. And the report options also include the detailed report of transactions, summary report of the number of tickets sold for each destination, opening balance, cash collected, cash dispensed and current balance in the machine . Draw a suitable **Activity Diagram** and **Sequence Diagram** to represent the above TVM.   7 + 8

9. What are the different kinds of messages which can be represented by sequence diagram ? Explain with example. How do we represent an abstract class and interface in UML ? What is reflexive association ?   6 + 6 + 3
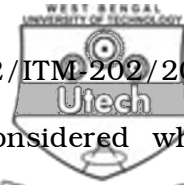
10. What are the different views that are considered when building an object-oriented software system ? Discuss the evaluation of UML with respect to different generations of S/W development methodology. Give a comparative study view on RUP, OMT and UML. 4 + 6 + 5

11. Explain 'Extend' and 'Include' in use cases. How do you represent private, public and protected in class diagrams ? What is the difference between aggregation and composition ? Explain all above with suitable example.

3 + 6 + 6

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