

Total No. of Questions : 10]

SEAT No. :

P3240

[Total No. of Pages : 3

[4859] - 1059

**B.E. (IT) (Semester - I)**

**SOFTWARE MODELING AND DESIGN**

**(2012 Pattern)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

**Instructions to the candidates :**

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Use UML.2 notations for drawing UML diagrams.

- Q1)** a) What is an association class? What is a ternary association? Elaborate both with an example. [6]
- b) In the context of state diagram, what are concurrent substates? Elaborate with an example. [4]

OR

- Q2)** a) Draw a class diagram for the given description with appropriate relationships, relationship names, and multiplicity. [6]
- A person owns multiple documents. Each document is composed of paragraphs that are, in turn, composed of characters. The copy operation propagates from document to paragraph to characters. Copying a paragraph copies all the characters in it. The operation does not propagate in reverse direction; a paragraph can be copied without copying the whole document.
- b) In the context of use case diagram, elaborate what is include and extend with the help of an example. [4]

- Q3)** a) Construct the activity diagram of the given description using swim lanes. A customer decides to purchase a DVD player. He begins by calling the sales department of the DVD shop. They tell him to talk to customer support. He then calls customer support; they put him on hold while talking to engineering. Finally customer support tells the customer about several DVD player options. The customer chooses a DVD player and makes payment to the accounts department. The DVD player is shipped by the dispatch department. The customer receives the DVD player. [6]

**P.T.O.**

- b) The use case 'Login' accepts userid and password from the user. The system validates them and displays a message 'Log in is successful'. Draw a sequence diagram for this. [4]

OR

- Q4)** a) Draw state diagram for ATM machine. [6]

ATM machine is idle until an ATM card is inserted. Then it becomes active. Within being in the active state, it validates the card( validating) first. After card validation, it can process a transaction like (transaction processing) a withdrawal or deposit cash or a view balance or print receipt. After the processing is complete, card is ejected and it goes to idle state.

- b) State the steps to construct the domain state model. [4]

- Q5)** a) Elaborate how a software designer organizes a system into a subsystem. [8]

- b) Describe batch transformation and continuous transformation. [8]

OR

- Q6)** a) In the context of reuse in system design elaborate 'libraries' and 'pattern'. [8]

- b) In the context of system design elaborate management of data storage. [8]

- Q7)** a) Define a design pattern. What is the basis on which the design patterns are classified? Name the types of design pattern with one example of each type. [8]

- b) For the description given below, draw the class diagram and identify the roles for a state design pattern. Mention the roles identified for each class and its relevant behaviour in the class diagram.

When a book has isbn number, price, title and one or more authors. When it is bought in the library it gets 'purchased' state, when it is added to a catalogue it goes to 'catalogued' state. When the cataloguing is complete it goes to 'Available on stack' state. When it is borrowed by a member it goes to 'borrowed' state. When it is returned by a member it goes to 'available on stack' state. [8]

OR

- Q8)** a) Write complete documentation of adapter design pattern. [8]  
b) For the description given below, draw the class diagram and identify the roles for a strategy design pattern. Mention the roles identified for each class and its relevant behaviour in the class diagram.

Grand health club offers a scheme for membership of the health club. The options available for registering are 'yoga' and 'aerobics'. The monthly charges for aerobics membership are 2000.00. The monthly charges for yoga membership are 1000.00. The members can avail a single option out of the two options. If a person books for three months, he gets 20% discount. If he books for six months, he gets 25 percent discount. If he books for nine months, he gets 35% discount. If he books for one year, he gets 50% discount. [8]

- Q9)** a) Define the following terms : [8]  
i) fault  
ii) failure  
iii) software validation  
iv) software verification  
v) white box testing  
vi) black box testing  
b) Elaborate the V model of testing in detail. [10]

OR

- Q10)** a) What is testing driven development approach of development? Elaborate. [8]  
b) A strong password for a system is defined as, [10]  
It should be of at least 8 characters  
It should not contain space character  
It should contain at least 1 special character  
It should contain at least 1 digit  
It should contain at least 1 capital letter  
Write 5 test cases to check that system accepts correct password & rejects incorrect (one which do not follow above rules) password.

