

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.E Sem-I Regular Examination January / February 2011****Subject code: 712303N****Subject Name: Object Oriented Methodology****Date: 02 /02 /2011****Time: 02.30 pm – 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Which special attribute reduces the effective multiplicity of an association? **03**  
Explain with example. Does it always reduce multiplicity from many to one?
- (ii) On early television sets, a dial was used to change channels. When channel surfing, the viewer was required to move the dial through each channel position, regardless of whether or not that channel had reception. On modern television sets, a next and previous button are used. When the viewer selects the "next" button, the next tuned channel will be displayed. Consider watching television in a hotel room in a strange city. When surfing through channels, the channel number is not important, but the programming is. If the programming on one channel is not of interest, the viewer can request the next channel, without knowing its number. Which design pattern will be used? explain **04**
- (b) (i) Explain the synchronization of concurrent activities in dynamic modeling. **03**  
(ii) Explain Reflection : Using the Class Object in Java. **04**
- Q.2** (a) (i) Prepare an object model to describe undirected graphs. An undirected graph consists of a set of vertices and a set of edges. Edges connect pairs of vertices. **03**  
(ii) Describe the Use-case for the club information system. Member of the club searches for the event in the club and club officer adds an event to the system. Show exception and alternative scenario. **04**
- (b) Write about the following issues in storing and retrieving objects. **03**  
(i) Reconstruction and complexity  
(ii) Serialization **04**
- OR**
- (b) Prepare a data flow diagram for computing the mean of a sequence of input values. **07**  
A separate control input is provided to reset the computation. Each time a new value is input, the mean of all values input since the last reset command should be output. Since there is no way of knowing how many values will be processed between resets, the amount of data storage used should not depend on the number of input values. Detail the diagram down to the level of multiplication, divisions and additions.
- Q.3** (a) (i) Prepare object diagram showing at least 10 relationships among the mentioned classes. Include associations, aggregations and generalizations. Use qualified associations and show multiplicity balls. Automobile, engine, wheel, brake, brake **03**  
light, door, battery, muffler, tail pipe
- (ii) What is a pitfall in using serialization with a singleton? **04**
- (b) (i) Consider a situation where a library wants to add a feature that enables the librarian to print a list of all the books that have been checked out at a given point in time. Construct a sequence diagram for this use case. **03**  
(ii) What is Façade pattern? **04**

**OR**

- Q.3** (a) (i) What are the reasons that inheritance by subclassing is not always the best strategy? **03**  
(ii) What is the purpose of component diagram? Draw a component diagram that shows how the Order System component depends on other components such as inventory system and customer repository. **04**
- (b) (i) Explain the Cloneable interface. **03**  
(ii) An extension ladder has a rope, pulley and latch for raising, lowering and locking the extension. When the latch is locked, the extension is mechanically supported and one may safely climb the ladder. To release the latch, raise the extension slightly with the rope. One may then freely raise or lower the extension. The latch produces a clacking sound as it passes over rungs of ladder. The latch may be reengaged while raising the extension by reversing direction just as the latch is passing a rung, Prepare a state diagram of an extension ladder. **04**
- Q.4** (a) (i) What is the Runnable Interface? **03**  
(ii) Explain the concept of repeated inheritance. **04**
- (b) A room has the following options for climate control: blow a fan, use an air conditioner, employ a heater, or do nothing. A temperature regulator for the room operates can be set in one of the four different modes to choose the desired option, **07**
- a) Do nothing: None of the three devices(fan, air-conditioner and heater) is active.
  - b) Fan : The fan blows for 10 minutes and then stays inactive for another 10 minutes; the cycle repeats.
  - c) Air conditioner : The air conditioner immediately turn on. If the room temperature is too high, it operates an air conditioner until the room temperature hits the set temperature.
  - d) Heater: The heater immediately turn on. If the room is too cold, it operates a heater until the room temperature hits the set temperature.

Develop the state transition table and diagram.

**OR**

- Q.4** (a) (i) Explain the design of the controller subsystem in MVC(model view controller architecture). **03**  
(ii) How can the difficulty in accessing objects running in a different Java Virtual Machine be handled? **04**
- (b) Consider a simple CD player with following buttons: **07**
- a) Insert/Eject
  - b) Play
  - c) Stop
  - d) Fast forward
  - e) Rewind

Develop a state transition table and diagram.

- Q.5** (a) (i) Explain the design of the view subsystem in MVC(model view controller architecture). **03**  
(ii) Write use of delegation with example. **04**
- (b) (i) Prepare a portion of an object diagram for a library book checkout system that shows the date a book is due and the late charges for an overdue book as derived objects. **03**  
(ii) Explain the concept of candidate keys in object modeling **04**

**OR**

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|------------|--|------------------------|
| <b>Q.5</b> | <b>(a)</b> (i) Give an example when association is modeled as class? When it is useful to model an association as a class?<br>(ii) Explain Patterns and Metadata in object modeling. | <b>03</b><br><b>04</b> |
|            | <b>(b)</b> (i) How control flow is shown in data flow diagram?<br>(ii) Draw the one shot state diagram for chess game.   | <b>03</b><br><b>04</b> |

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