Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – IV • EXAMINATION – WINTER 2017

Subject Code:140703 Date: 21/11/ 2017

Subject Name: Object Oriented Analysis Design and UML

Time: 02.30PM 05.00PM 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)** Briefly explain following characteristics and themes of object oriented systems: Classification, identity, inheritance, encapsulation, polymorphism, sharing, Synergy. **07**

(b) **(i)** Prepare a class diagram for group of classes. **04**
Sink, freezer, refrigerator, table, light, switch, window, smoke alarm, burglar alarm, cabinet, bread, cheese, ice, door, kitchen.

(ii) Define Model. Briefly discuss its purposes. **03**

Q.2 **(a)** Describe in detail the stages of Object oriented methodology. **07**

(b) Draw a sequence diagram for issuing a book and renewing a book in online library management system. **07**

OR

(b) Consider the following system for Online Theatre Booking (for multiplex). **07**
Following are the minimum requirement of the system from the perspective of a user who is going to use this online system.
• User should be a registered member.
• User can book any number of tickets on availability.
• User should be able to search for the availability of tickets on selecting a particular movie.
• Once user books the ticket a token number will be generated so that on providing this token he will be able to collect tickets before show from theatre premises.
• User can cancel all or some seats of the ticket by providing token number before 1 Hr of scheduled time for that movie.
(I) Describe the system boundary for this application in a few sentences.
(II) Identify the actors for the application and draw the use case diagram.

Q.3 **(a)** **(i)** Explain the following steps in constructing an application interaction model with suitable example. **03**
(a) Determine the system boundary
(b) Find actors
(c)Find use cases

(ii) Prepare a class diagram for the dining philosopher problem. There are 5 philosophers and 5 forks around a circular table. Each philosopher has access to 2 forks, one on either side. Each fork is shared by 2 philosophers. Each fork may be either on the table or in use by one philosopher. A philosopher must have 2 forks to eat. **04**

(b) What is concurrency? Explain following concept with example. **07**
i) Aggregation concurrency
ii) Concurrency within object

OR

Q.3 **(a)** **(i)** Define Event, State and Transition. Using example draw state diagram. **03**

(ii) Draw the use-case diagram for Hotel Information System. There are two types of customers: Tour-group customers and Individual customers. Both can book, cancel, check-in and check-out of a room by Phone or via the Internet. There are booking process clerk and reception staff who manages it. A customer can pay his bill by credit card or pay utility bill. **04**

(b) What is the purpose of one shot state diagram? What is the difference between continuous loops or one shot life cycle state diagrams? Draw the one shot diagram for the chess game with entry and exit points. **07**

Q.4 **(a)** Explain the following terms in relation to generalization and inheritance. **07**

a. Generalization set name

b. override

(b) Differentiate state and event. List different types of events. Identify states and events for a Photocopier (Zerox) machine from the description given below and draw the state diagram for the same. **07**

Initially the machine is off. When the operator switches on the machine, it first warms up during which it performs some internal tests. Once the tests are over, machine is ready for making copies. When operator loads a page to be photocopied and press 'start' button, machine starts making copies according to the number of copies selected. While machine is making copies, machine may go out of paper. Once operator loads sufficient pages, it can start making copies again. During the photocopy process, if paper jam occurs in the machine, operator may need to clean the path by removing the jammed paper to make the machine ready.

OR

Q.4 **(a)** Differentiate active, passive and transient object in sequence diagram. Draw sequence diagram for 'process transaction' use case of ATM based banking system. **07**

(b) Prepare an activity diagram for computing a restaurant bill. There should be a charge for each delivered item. The total amount should be subject to tax and service charge of 18% for groups of six of more. For smaller groups, there should be a blank entry for a gratuity according to the customer's discretion. Any coupons or gift certificates submitted by the customer should be subtracted. **07**

Q.5 **(a)** List out the decisions you make during system design and briefly explain the objectives of following: **07**

i)frame works ii) patterns iii) libraries ii) layers iii) partition

(b) What is the purpose of design optimization? Briefly discuss the tasks of design optimization. **07**

OR

Q.5 **(a)** List and explain the steps to design algorithms with respect to class design. **07**

(b) Which prototypical architectural styles are common in existing systems? **07**

****