

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- IV<sup>th</sup> SEMESTER-EXAMINATION – MAY/JUNE- 2012****Subject code: 140703****Date: 25/05/2012****Subject Name: Object Oriented Analysis Design and UML****Time: 10:30 am – 01:00 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) Briefly explain following characteristics and themes of object oriented systems: **07**  
Classification, identity, inheritance, encapsulation, polymorphism, sharing, synergy
- (b) Why model is required in analysis and design? What is the role of UML in preparing the model? Explain the types of model with their purpose in brief. Which of these models belong to structural group and which of them fall under behavioral group? **07**

- Q.2** (a) Define the purpose of following terms with suitable example and UML notations with respect to class model. **07**  
(i) Qualified association (ii) Association class (iii) Aggregation  
(iv) Multiplicity (v) Constraint (vi) Derived data (vii) Package
- (b) Prepare a class model for the hotel management system. **07**  
The system should supports chain of hotels. A hotel contains two categories of rooms: executive and normal, both AC and non-AC. The customers of executive rooms can avail extra facilities like games, swimming, food service in rooms, etc. The booking is possible by internet or by phone. If the booking is through phone, process is done by receptionist, and if booking is done through internet the process is carried out by customer through hotel website. Depending on the number of days customer stays, appropriate bill is generated. The bill also contains amount for transport, food and other facilities enjoyed by the customer along with necessary taxes. The manager should be able to generate reports like list of customers staying in the hotel, list of rooms empty, monthly/yearly income, etc.

**OR**

- (b) Differentiate state and event. List different types of events. Identify states and events for a Photocopier (Zerex) 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.
- Q.3** (a) What is concurrency? Explain 'aggregation concurrency' and 'concurrency within an object' represented by state model with suitable example. **07**
- (b) Differentiate active, passive and transient object in sequence diagram. Draw sequence diagram for 'process transaction' use case of ATM based banking system. **07**

**OR**

- Q.3** (a) Explain the purpose of activity diagram? In which situation activity diagram is not necessary? Explain the use of followings concepts for activity diagram: synchronization bar, swimlane, and sending-receiving signals. **07**
- (b) What is software development process? Enlist steps of software development process? Differentiate iterative process model from waterfall model. **07**

- Q.4** (a) What is the importance of use case diagram? Explain relationships between use cases with suitable example and proper UML notations. Draw use case diagram for an 'Online railway ticket reservation system'. **07**
- (b) Explain the steps/criteria for finding right associations and right attributes for preparing domain class model in brief. **07**

**OR**

- Q.4** (a) List out the steps of preparing domain class model. What are the criteria for identifying right classes? Apply the steps and find out domain classes for the following GTU's student academic record management system. **07**

GTU maintains record of all the students and affiliated colleges. Well-defined syllabus is maintained for all the branches from which predefined list of subjects are offered in each semester. The students are permitted for exam for all the regular subjects offered in a particular semester. GTU prepares result based on the grades of all the subjects (external and internal component) in which student appeared for exam. Any student having greater than four backlogs in a year is detained and cannot appear for regular subjects in next one year.

- (b) Mention the importance of analysis and design stages in software development process. Differentiate following with respect to analysis and design stages: **07**
- (i) Domain analysis vs. Application analysis
  - (ii) System design vs. Class design
- Q.5** (a) Why interaction model is more important for application analysis? Briefly explain the steps for preparing 'application interaction model'. **07**
- (b) Explain following concepts with reference to system design: **07**
- (i) Reusable components and their use
  - (ii) Methods of breaking system into subsystems
  - (iii) Management of data storage

**OR**

- Q.5** (a) Why software architecture is so important in system design? Enlist and briefly explain different architectural styles. **07**
- (b) Why class design is prepared? Explain following concepts with respect to class design: **07**
- (i) Bridging gap
  - (ii) Designing algorithms
  - (iii) Design optimization

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