Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013**

**Subject code: 1720105** **Date: 03-06-2013**

**Subject Name: Object Oriented Methodology and Design**

**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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Define following terms (Any Five)<br>i) Down-casting ii) Abstract Class iii) Reflection iv)Refactoring v) Scenario vi) Singleton vii) Serialization viii) Synergy | **05** |
| | **(b)** | Prepare an object diagram for the dining philosopherôs problem. There are 5 philosophers and 5 forks around a circular table. Each philosopher has access to 2 forks on either side. Each fork is shared by two philosophers. Each fork may be either on table or in use by one philosopher. A philosopher must have 2 forks to eat. | **07** |
| | **(c)** | Differentiate Object Model, Dynamic Model and Functional Model. | **02** |
| **Q.2** | **(a)** | A motor can be OFF or ON, while motor is ON it can be in starting or running condition or it can get hot. Draw a partially completed state diagram for motor control. | **07** |
| | **(b)** | Draw an UML Class diagram for social networking website. | **07** |
| | | **OR** | |
| | **(b)** | What is Design Pattern? Explain a design pattern for Handling Collections with the Iterator and Composite Patterns with suitable example and code. | **07** |
| **Q.3** | **(a)** | Write a short note on RTTI. | **07** |
| | **(b)** | Explain why mistakes made in the requirements analysis stage are the costliest to correct. Among the following requirements, which are functional and which are non-functional?<br>(a) Paychecks should be printed every two weeks.<br>(b) Database recovery should not take more than one hour.<br>(c) The system should be implemented using the C++ language.<br>(d) It should be possible to selectively print employee checks.<br>(e) Employee list should be displayed in lists of size 10 | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Draw a state-transition diagram for digital watch. | **07** |
| | **(b)** | Prepare a class diagram for an interactive diagram editor. A sheet is collection of lines and boxes. A line is series of line segments that connect two boxes. Each line segment is specified by two points. A point may be shared by a vertical and a horizontal line segment in the same line. A selection is a collection of lines and boxes that have been highlighted. A buffer is collection of lines and boxes that have been cut or copied from the sheet. Use generalization to express constraint by creating a super class for the class buffer, selection and sheet. Discuss its merits. | **07** |
| **Q.4** | **(a)** | What is Finite state machine? How do you model FSM? Using State design pattern, show the solution of Any State based sample example | **07** |
| | **(b)** | Which are the questions to be answered during design process? Draw separate sequence diagrams for Placing, processing and removing hold on library book. | **07** |
| | | **OR** | |

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| **Q.4** | **(a)** | What is re-factoring? State the difference between re-factoring and re-engineering. Give an example showing how re-factoring rules can be applied to Libraryôs return book and change fine with suitable code. | **07** |
| | **(b)** | A line can be specified by two points or by an equation. Consider a system where an óoriginô can be specified by a mouse click. After this is done, a line is specified by an equation of the form $ax + by + c = 0$ (the input would specify $a$, $b$ and $c$). The line specified by this equation is drawn with reference to the current location of the origin. Note that this line would span the entire drawing panel. How would you implement such an operation? | **07** |
| **Q.5** | **(a)** | What is Clone Object and what is clone () method, where they are used and How does it affect the integrity of the System? | **07** |
| | **(b)** | Show the Basic model of MVC architecture and also an alternate view of the MVC Architecture and implement the Observable and Observer pattern using MVC. | **07** |

**OR**

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|---|---|---|---|
| **Q.5** | **(a)** | Which type of designing problems can be solved using factory pattern? State the difference between factory and abstract-factory pattern. Explain factory pattern in detail with suitable example. | **07** |
| | **(b)** | Represent various states of microwave oven using Microwave Context design State Pattern object and show the segment of Microwave hierarchy using java Object and corresponding Object Model. | **07** |

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