53 (CS 511) OOAD

2013

(December)

OBJECT ORIENTED ANALYSIS AND DESIGN

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

FIRST PART

*Answer **five** questions out of **seven**.*

1. *(a)* What do you understand by a state diagram ? 2

   (b) Why are state diagram useful ? 2

   (c) Explain different types of substate diagram with example. 6

(d) A state transition in a state diagram may be labelled with an event, a guard or an action or with combinations of these three 10

(i) What is the difference between an event and a guard ?

(ii) What is the difference between an event and an action ?

2. (a) What are activation and lifeline of a sequence diagram ? 4

(b) Explain the sequence diagram by considering a Car Owner manages his/her car with a Car Lock consider different classes for each object/entity. 6

(c) Create a sequence diagram for an electric pencil sharpener. Include as object the user, the pencil, the insertion point (that is, the place where you put the pencil in to the sharpener) the motor, and the sharpening element. What messages should you include ? What are activations ? Mention all. 10

3. (a) What is an activity diagram ? 2

(b) Draw the activity diagram for calculating a number power raised to a number, *i.e.* X^Y 8

(c) Design activity diagram for printing all the primes ranging from 500 to 1000. 10

4. (a) What is an object oriented programming ? 2

(b) How you generate a corresponding object oriented code from an existing UML design ? 3

(c) Consider any class diagram and then generate the code equivalent using any Object Oriented Programming language. 5

(d) What do you mean by SDLC ? Explain *any one* SDLC model (except Waterfall Model). 10

SECOND PART

5. (a) Why use case are important ? 2

(b) What are include and extend in a Use Case ? 4

(c) Consider an electronic library system, design an use case diagram for that library system. Make assumption whenever necessary. 4

(d) Consider what happens when you go shopping for groceries and other necessities in a supermarket. Create the concept for a device that eliminates some of the annoyances associated with this experience and model the use cases for that device. In your set of use cases, use inclusion, extension and generalization whenever they are appropriate. 10

6. (a) You will find – (minus sign), + (plus sign), # (hash marks) in front of operation names and attributes in UML class diagrams. They look pretty ugly. Why are they use for? Explain 1 – 2 sentences. Also explain the different semantics of +, –, #. 6

(b) What are the key differences between sequence diagram and collaboration diagram types considering their characteristics and their application? 6

(c) Model the relationship between a car (that has an engine and a color) and its owners (having a name) in UML class diagram. A car can have several owners over time, but only one or none owner at a time. Do not forget cardinalities, role names, attributes and their types. 8

7. Model a ticket

(a) Create an activity diagram describing the process of a person (user) using the machine to buy a ticket from Kokrajhar to Guwahati. Actually, the machine only takes coins (no credit cards, debit cards). 10

(b) Create a state diagram depicting in what state the machine can be. 5

(c) Think of it : Would the activity diagram have a process end or an endless loop ? Would the state diagram have a final state ? Justify your decision. 5