C5-R3: OBJECT ORIENTED METHODOLOGY

NOTE:

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Differentiate between multiple and multilevel inheritance by giving suitable example. Java supports which of these?

b) Having a pointer as a class data member can lead to some undesirable side effects. What should you add to a class to avoid these side effects?

c) Explain the concepts: encapsulation, generalization and polymorphism. Discuss how the above concepts support reusability.

d) What is Java Database Connectivity (JDBC)? Explain how Java program can connect to a database using JDBC.

e) Activity diagram may be used for different purposes during system development process. List 4 such purposes.

f) Using suitable illustration explain the usage of "deployment" and "component" diagram in UML.

g) What is CORBA? What are the advantages of having a CORBA based application as compared to a client-server JAVA solution using sockets.

(7x4)

2.

a) What is the difference between private and protected class members?

b) What are the initialization and the assignment phases of a constructor? What is each used for?

c) Prepare an OMT object model for:
"An ice skating season consists of between one and ten competitions. A competitor may register for a competition and is assigned a number. Competitors are split into groups. A competition consists of several events. Stations are set up at each competition and each station can process several events and several judges may be assigned to a station. Routines and figures are events, raw scores are read and highest scores and lowest scores are discarded. Figures are processed. A league consists of several teams, a team consists of six competitors, a trial of a figure or routine is made by a competitors, a trial receives several scores from the judges (six judges). Scores are marked between 1 and 10."

(4+4+10)

3.

a) Object Oriented Software Development processes have two important characteristics: high level of abstraction and seamless transition. Explain both of these characteristics and briefly discuss the advantages of object-oriented development owing to each of these characteristics.

b) Explain the concept of message passing and visibility and discuss how are they related to each other.

c) A bank has a computerized customer accounting/transaction system. The system can be accessed by ATMs, which communicate with the central computer, which clears transactions. Each ATM accepts a pass card, interacts with the user, communicates with the central system for clearance purposes, dispenses cash, processes various error messages and allows access to additional services. Additional services include paying bills, printing of statement, credit transfer. Users may only use their card to the maximum value of Rs. 200.00 and not more than five times in one day.

i) Identify the main classes, their associations and attributes.

ii) Annotate the model with relevant constraints.

iii) Suggest how might generalization/specialization be introduced to your model?

(4+5+9)

4.

a) Using a few examples explain how the following types of relations among classes can be implemented in Java:
i) *association,*
ii) aggregation (is-part of)

b) Write two ways of achieving synchronization in Java. Sketch a state diagram of Java-thread. Use methods/messages available in Thread class to explain how a thread can switch a state from 'wait' to a 'run' state and vice versa.

c) What do you understand by *method overloading*? How is overloading useful? Give some examples of method overloading.

(6+6+6)

5.

a) Explain the concept of exceptions in Java. Using a small example illustrate how they are useful.

b) Explain the important differences between C++ and Java. Why is C++ not a pure object-oriented programming language while Java is a considered to be one?

c) Suppose following information about each student enrolled for some degree has to be entered in the computer: student name, roll number, courses completed, marks obtained. Write Java code to create 100 student objects and to compute the average grades of the students.

(6+6+6)

6.

a) Explain how socket programming is supported in Java. What is the difference between a server socket and a client socket? Explain how you can create a server socket.

b) What is a DNS? Explain the role of DNS in a socket-based communication.

c) What is event-driven programming? Using suitable examples explain how AWT supports event-driven programming, with special reference to event registration, listening and handling.

(6+6+6)

7.

a) Relational Database Management Systems (RDBMS) are still widely used to handle persistent objects. Using suitable examples, explain how a generalization specialization relationship may be resolved in Relational Data Modeling.

b) Why is Java considered suitable for programming on the net? Explain the important security restrictions on applets and point out why these are necessary?

c) What do you understand by *distributed object computing*? What are the advantages of distributed object computing?

(6+6+6)