B5.2-R3: OBJECT ORIENTED DATABASE MANAGEMENT SYSTEMS

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) What is the conceptual difference between an object in the object-oriented model and an entity in the entity-relationship model?
b) How would you delete an object that is created without any references to it?
c) How do IS-A and HAS-A relationships help in developing object-oriented design?
d) Discuss various measures of transaction equivalence. What is the difference between conflict equivalence and view equivalence?
e) Differentiate between Overriding and Overloading with suitable example.
f) What is object serializaton? How is the concept linked to object-persistence?
g) What is the objective of CORBA? Why is it relevant to the ODMG (Object Database Management Group) standard?

(7x4)

2.
a) What do you understand by pointer swizzling? Describe the various approaches to pointer swizzling.
b) A Vehicle Rental Company maintains a vehicle database for all vehicles in its current fleet. For all vehicles, it includes the vehicles identification number, registration number, Engine number, manufacturer model, colour of vehicle, date of purchase and the drivers of vehicles. Special data are included for certain types of vehicles:
   *   Trucks: Cargo capacity
   *   Sports Cars: Horsepower, renter age requirement
   *   Vans: Number of passengers
   *   Off road vehicles: ground clearance, drivetrain (four or two-wheel drive)
   Similarly, the details of drivers include such items as driver's name, date of birth, Licence Number, Permanent Account Number and the type of vehicles he is allowed to drive.
   Construct an object oriented database schema for this example. Use inheritance where appropriate.

(9+9)

3.
a) Explain as to how a persistent pointer is implemented. Contrast this implementation with that of pointers as they exist in general-purpose languages such as C or Pascal.
b) Differentiate between edges in DAG representing inheritance and a DAG representing object containment.
c) Why do persistent programming languages allow transient objects? Is it not simple to use only persistent objects with unneeded objects deleted at the end of an execution? Explain with justification.

(6+6+6)

4.
a) Describe the limitations of Relational Data Model that have called for object orientation.
b) Discuss as to how serailizability is used to enforce concurrency control in a database system? Why serializability is sometimes considered too restrictive as a measure of correctness of schedules?
c) Differentiate between the constrained write and the unconstrained write assumptions. Which is more realistic and why?

(6+6+6)

5.

a) Compare OODBMS with ORDBMS to find the points of similarities and dissimilarities.

b) Consider the following relations:

   Employee(name, address, salary, plant-number)
   Machine(machine-number, type, plant-number)

   Assume that
   - the employee relation is fragmented horizontally by plant-number and that each fragment is stored locally at its corresponding plant site.
   - the machine relation is stored in its entirety at the Armonk site.

   Describe a good strategy for processing each of the following queries.
   i) Find all employees at the plant that contains machine number 1130.
   ii) Find all employees at plants that contains machine whose type is "milling machine".
   iii) Find all machines at the Almaden Plant.

c) Describe the main strategies that can be used to create persistent objects?

(6+6+6)

6.

a) List the advantages and disadvantages of an OODBMS?

b) Discuss the system of propagation of privileges and the restraints imposed by horizontal and vertical propagation limits.

c) Discuss main categories of OLAP tools as suggested by Berson and Smith.

(6+6+6)

7.

a) Discuss why two-phase locking protocol is not appropriate for indices?

b) How large-objects particularly multimedia objects are stored in object-oriented database system? Explain the procedure.

c) How object hierarchies are formed? Illustrate with a suitable example.

(6+6+6)