

Seat No. : _____

DE-124

December-2013

5 Years M.Sc. (CA & IT)

Integrated (K.S.) Sem.-I F.Y. M.Sc.

Database Management Systems Concepts

Time : 3 Hours]

[Max. Marks : 100

- Instructions :**
- (1) All questions are compulsory.
 - (2) Marks are indicated against each question.
 - (3) Draw appropriate diagrams wherever necessary.

1. Answer the following : **20**
 - (a) Define DBMS. List and explain the disadvantages of traditional File system
 - (b) Explain the View Abstraction of Database Architecture.
 - (c) What do you understand by Data Model ? Explain any 1 data model with diagram.
 - (d) List and explain the types of Database Users.

2. (A) Construct an E-R Diagram for the following: **10**

An Airport database keeps track of airplanes, their owners, airport employees and pilots. Consider the following, while designing the E-R Diagram:

 - Each airplane has a registration number, is of particular plane type and is stored in a particular hanger.
 - Each plane type has a model number, capacity and weight.
 - Each hanger has a number, capacity to hold number of airplanes and location.
 - The database also keeps track of who owns which plane. Persons have name, address and phones. A person buys a plane on a particular date and with cost.
 - Pilots and employees are persons. Pilots have a license number with validity and salary. Employees have a number, rank and salary.
 - Each pilot is authorized to fly certain types of planes.
 - Employees are involved in servicing of planes.
 - Each plane undergoes service many times. Service information contains date of work, nature, hours spent, cost, etc...

- (B) Attempt the following: (Any 2): **10**
 - (a) Define attribute. Explain Single-valued and Composite attribute with appropriate example.
 - (b) Design a generalization-specialization hierarchy for a Vehicle Sales company. The company sells motorcycles, passenger cars, vans and buses. Justify your placement of attributes at each level of the hierarchy. Also list out minimum 2 attribute which will be a part of attribute inheritance. Also specify whether lower level entities will have overlapping or disjoint inheritance.

3. (A) Write Relational Algebra queries for the following : (Any 5) 5
 Product – Details (ProductNo, PName, Description, Price)
 Customer (CustId, Cname, Address, City)
 Order_Details (OrderNo, OrderDate, CustId, PNo, Qty-Jordered, Total)
 (i) Display the details of all those customers who live in city “Gandhinagar”.
 (ii) Display those orders where total amount is greater than ₹ 5000.
 (iii) List out those products which are expensive than ₹ 1000.
 (iv) Find out and display the details of those orders that have been booked by “Dinesh”.
 (v) Display the order with maximum order amount.
 (vi) List the details of those orders which are placed for the product “Wall Clock”.
 (vii) List those order’s which have been placed by “Ravi” and whose total amount is less than ₹ 3000.
- (B) Find the candidate key(s) for the following : 05
 $R = \{A, B, C, G, H, I\}$
 $F = \{ A \rightarrow B, A \rightarrow C, CG \rightarrow H, CG \rightarrow I, B \rightarrow H \}$
- (C) Attempt the following : (Any 2) 10
 (i) Define : Primary Key and Foreign Key. Also give example of each.
 (ii) What is Normalization ? Explain 1NF, 2NF, and 3NF with example.
 (iii) Explain the “Set Difference” and “Union” relational operator.
4. Answer any 4 in detail : 20
 (1) Explain the states of a transaction with state transition diagram.
 (2) What is a lock ? List and the different types of locks available for a transaction.
 (3) Explain the working of Timestamp-based protocols.
 (4) What is Serializability ? Explain conflict serializable schedules with example.
 (5) Explain the ACID properties of a transaction.
5. (A) Attempt the following : (Any 2) 10
 (1) Explain Failure. List and explain the different types of Failures.
 (2) What is a Deadlock ? Explain how you can detect a deadlock in your system with example.
 (3) Explain Log-based Deferred Database Recovery Method.
- (B) Answer any 2 of the following : 10
 (1) List the different Objects available in MS-Access. Explain any 2 objects in brief.
 (2) What is a field ? List and explain any 4 field properties.
 (3) List the data-types available in MS-Access. Explain any 3 data-types in brief with example.
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