MCA 3rd Semester Examination, 2019

DATABASE MANAGEMENT SYSTEM

PAPER – MCA-301

Full Marks : 100

Time : 3 hours

Answer **Q.No.1** and any **four** from the rest

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. Answer the following questions (any *five*) : 2×5

(*a*) Write the functions of DBA.

(*b*) What do you mean by integrity constraint ?

(*c*) Define super key.

(*d*) What is physical data independence ?

(*e*) What is functional dependency ?

(*f*) Define BCNF ?

(*g*) What is lossless decomposition ?

(*h*) What is weak entity type ?

(*i*) Define foreign key.

2. (*a*) Discuss the advantages and disadvantages of using DBMS approach as compared to using a conventional file system.

(*b*) Discuss the concept of generalization, Specialization and Aggregation.

(*c*) Describe three-schema architecture of DBMS. 5 + 5 + 5

3. (*a*) Draw an ER diagram for a club database consisting of following :

Members, Clubs, Membership, President, Activities, Activity organized, Participation fees.

(*b*) Describe entities, attributes, relationship and primary keys.

(*c*) Reduce the ER diagram into relational schema by defining all the constraints and assumptions. 6 + 4 + 5

4. (*a*) Consider the following Schemas : 3 × 4

Sailors (Sid, Sname, rating, age)

Reserves (Sid, bid, day)

Boats (bid, bname, color)

Write the following queries in SQL/ relational algebra

(*i*) Find the name of sailors who have reserved boat no. 120.

(*ii*) Find the name and age of the sailors who has minimum rating.

(*iii*) Find the name of the sailors who has reserved a "red" boat and rating above 8.

(*iv*) Find the name of sailors who have Reserved more than 5 boats.

(*b*) What is Relationship ? What is degree of a Relation ? 1 + 2

5. (*a*) Why is normalization done ? Describe the anomalies.

(*b*) Consider each order has Unique order_id for each order, following information are stored :

order_id, order_dt, customer name, customer address, salesman name, salesman address and for each requested item store item code, item name, quantity and rate.
Further assume, following functional dependencies :

Salesman name → Salesman address
Customer name → Customer address
Order_id → Order_dt, Salesman name, Customer name.
Order_id, i code → quantity
i code → i name, rate
Normalize the data structure up to 3NF, showing the steps. Indicate PK and FK also. 6 + 9

6. (*a*) What is transaction ? 2

(*b*) What is ACID property ? 3

(*c*) Explain with example serial and serializable schedule. 4

(*d*) What are the problems of concurrent execution of transaction ? Describe with examples. 6

7. Write short notes on (any *three*) : 5 × 3

(*i*) Data Dictionary

(*ii*) Transaction state diagram

(*iii*) Shared locks

(*iv*) Different database users

(*v*) Recovery of aborted transaction

(*vi*) DDL statement.

[*Internal Assessment*—30 Marks]