70423/B 030

Reg. No. | | | | | | | | |

II Semester M.Sc. 3 Examination, June/July 2017
COMPUTER SCIENCE
(Repeaters) (New Syllabus)
Database Management System

Time : 3 Hours Max. Marks : 80

***Instructions** : 1) Answer **any five** questions.*
*2) **All** questions carry **equal** marks.*

1. a) Define Database Management System (DBMS). Explain three schema architecture of the DBMS. **8**

   b) Explain the different components of DBMS. **8**

2. a) Define the following terms :
   Weak entity, derived attribute, candidate key. **6**

   b) Design an ER diagram for an IT training group database that will meet the information needs for its training program. State the assumptions, if any, clearly. The description of the environment is as follows :

   A company has 10 instructors and can handle upto 100 trainees for each training session. The company offers five advanced technology courses, each of which is taught by a team of 2 or more instructors. Each instructor is assigned to a maximum of two teaching teams or may be assigned to do research. Each trainee takes one advanced technology course per session. **10**

3. a) Discuss the characteristics of a relation (table) with suitable example. **8**

   b) Explain relationship types with examples. **8**

4. a) Explain the following relation algebra operations with examples.
   cartesian product, selection, natural join and division. **8**

   b) Consider the following relation schema :
   Employee(Fname, Initial, Lname, ENO, DOB, Address, Sex, Salary, Supereno, Dno)
   Department (Dname, Dnumber , mgreno, mgrstartdate)

P.T.O.

Dept_locations(Dnumber,Dlocation)
Project(Pname, Pnumber,plocation, dnum)
Works_on(EENO, Pno, hours)
Dependent(EENo, Dependent_Name, Sex, Bdate, Relationship)
Write the SQL statements for the following queries.

a) Retrieve the name and address of all employees who work for the 'Research department'.

b) List the names of all employees who have a dependent with the same first name as themselves.

c) Retrieve the average salary of all female employees.

d) Retrieve the names of employees who work on all the projects that 'John' works on. **8**

5. a) Explain how constraints are specified on a relation in SQL with suitable examples. **8**

b) With relevant examples discuss the following in SQL.

i) Data Manipulation Language

ii) Views. **8**

6. a) What is normalization ? Compare and contrast 3NF and BCNF. **8**

b) Define a transaction. Explain the four important properties of transaction that a DBMS must ensure to maintain database. **8**

7. a) Explain the two phase locking techniques for concurrency control. **8**

b) Explain the concept of serializability of schedules with examples. **8**

8. Write short notes on **any two** of the following : **(2×8=16)**

a) Data independence

b) Mapping cardinalities

c) Advantages and disadvantages of DBMS.

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