53 (EC 813) DBMS

2014

DBMS

Paper : EC 813

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define first, second and third normal forms. Differentiate between primary key and superkey with the help of some examples. 6+4=10

   (b) Discuss BCNF and describe how BCNF differs from and is stronger than 3*NF*. Illustrate your answer with some examples. 10

2. *(a)* Explain the desirable properties of transactions. What is a schedule (history) ? 6+2=8

(b) Explain multiprogramming and parallel processing with the help of example. 6

(c) Discuss how serializability is used to enforce concurrency control in a database system. 6

3. (a) Discuss the two-phase locking protocol. What are the ACID properties of a transaction ? 7+5=12

(b) Discuss how minimum overhead is achieved using optimistic concurrency control technique. Mention its phases. 6+2=8

4. (a) How are buffering and caching techniques used by the recovery subsystem ? 6

(b) What are the problems associated with the use of locks ? 6

(c) Explain full functional dependency and transitive dependency with the help of some examples. 4+4=8

5. *(a)* Consider the following relation schemes : 3×4=12

EMPLOYEE (emp_id, emp_name, b_date, salary, dept_no)

DEPARTMENT (d_no, d_name, mgr_id, mgr_join_date)

(i) Retrieve the total no. of distinct employees.

(ii) Retrieve the emp_id, employee name who gets maximum salary.

(iii) Retrieve the manager's name for 'Research' department.

(iv) Retrieve employee details who stay in city (address field) 'London'.

(b) Considering the relational schemas given in Q. No. 5*(a)*, write the relational algebra statements for :

(i) Get the manager's name for all departments. 2½

(ii) Get employee details for department no. 5. 2½

(iii) Consider WORKS_ON (Proj_no, emp_id1, proj_name, Proj_loc) ;

Get the employee names who work on all the projects that 'Peter Brown' works. 3

6. (a) Define the terms : Owner entity type, weak entity type, identifying relationship type and partial key. 2×4=8

(b) Draw an ER diagram for the three relational schemas given in Q. No. 5. 6

(c) Draw a binary relationship using FR-notation for 'Suppliers supply some parts to some projects'. 6

7. (a) Describe the three-schema architecture. 6

(b) Discuss various cardinality ratios with the help of example. 8

(c) Explain the different types of attributes used in a DBMS. Give example of each. 6