BCSE Examination, 2018

(3rd Year, 1st Semester supplementary (OLD))

Database Management Systems

Full marks: 100   **Time: 3 hours**

Attempt any five questions

1) a) Define relation schema and relation state in relational model.   6

   b) Consider the following relations: DEPT(DCODE, DNAME) and STUDENT(ROLL, NAME, DCODE).

   i) Write down the relational algebra and relational calculus expression to find the name of the students who study in the department named as COMPUTER SCIENCE.   3+4

   ii) Write down the relational algebra expression to display DCODE and corresponding total number of students for each department.   4

   c) Assume R and S are two relations with A as the common attribute. Implement equi-join using Cartesian product and select operation.   3

2) a) What are the advantages of using DBMS over conventional file processing system? 5

   b) Define primary key and foreign key.   3+4

   c) What are the functions of Database Manager and DML pre-compiler?   4+4

3) a) What is ER-diagram?   3

   b) Define composite attribute, multi-valued attribute and derived attribute.   6

   c) Define weak entity type and describe how will you design the table for it?   6

   d) Assume, A and B are two entity types. Two tables exist for A and B. R is many to many relation from A to B. Assume attributes of A and B as per your discretion. How will you implement R? Write the necessary SQL statement to implement R.   5

4) **Consider the tables shown in Question 1(b).**

Write down the SQL statement for the following:

   a) For each department show the name of the department and corresponding total number of students.   5

   b) Delete the records from DEPT table provided nobody is studying there.   5

c) Find the name of the students studying in the department named as COMPUTER SCIENCE.   5

d) Find the name of the students studying in the department in which student with roll 5 studies.   5

5) a) What is functional dependency?   3

b) Consider a schema R(A, B, C, D, E, F,G,H). The following are the functional dependencies that hold on it.

$A \rightarrow C, D, G$

$AB \rightarrow F, H$

$B \rightarrow E$

Find out a candidate key.   4

c) Why normalization is essential?   5

d) Consider a schema R(A, B, C, D, E, F). Each attribute is atomic and single valued. AC is the only candidate key for the schema. Further consider the following FDS:

$C \rightarrow B, D$

$E \rightarrow F$

Normalize the schema (show the steps) up to 3NF. Indicate PK and FK at each stage. 8

6) a) What are the advantages and disadvantages of ordered file?   3

b) What is the use of indexing? Primary index is sparse -- why?   4

c) What are the steps for query processing?   4

b) Describe hash join strategy.   6

c) Describe_ACID properties of transaction.   3

7) a) Why is concurrency control required?   5

b) What is the difference between the recovery strategies for deferred and immediate database update? Also specify the impact on log file for the two cases.   7

c) What is cascading rollback? Illustrate.   4

d) Discuss security feature of DBMS.   4

8) Write short notes on the following:

a) Null value and its problem   3

b) Redundancy and its problem   3

c) Utility of PL/SQL   4

d) Impact of foreign key in DML operation   5

e) Two phase locking protocol   5