Ref. No. Ex/CSE/T/312/12/2013(S)

BCSE Examination, 2013

(3rd Year, 1st Semester supplementary)

Database Management Systems

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

Attempt any five questions

1) a) Define candidate key and foreign key. 6
b) Write down the tasks of database manager, DDL interpreter and DML pre-compiler. 9
c) Differentiate schema and instance of a database, single valued and multi-valued attribute. 5

2) a) What is ER diagram? 3
b) Explain mapping cardinality and participation constraint in ER diagram. 5
c) What is weak entity type and how will you implement it in the database? 5
d) Consider two entity types COURSE(COURSE_ID, COURSE_NAME) and STUDENT(ROLL, NAME). There exists a one to many relation from COURSE to STUDENT. How will you optimally implement the relation? Write down the necessary SQL statement. 7

3) a) According to relational model, define relation scheme and relation state. 5
b) Explain the impact of foreign key on DML operation with referencing relation. 3
c) Consider the relations SUBJECT(SCODE, SNAME), STUDENT(ROLL, NAME), RESULT(ROLL, SCODE, MARKS). Answer the following:

i) Write down the relational algebra and relational calculus expression to find out the roll number of the students who have scored 80 and above in all subjects. 3.5+3.5

ii) Write down the relational algebra expression to find out the highest score in each subject. 2.5

iii) Write down the relational calculus expression to display roll and marks of all students in the subject with code S001. 2.5

4) Consider the following tables: DEPT(DCODE, DNAME), EMP(ECODE, ENAME, DCODE, BASIC, DT_JOIN) . Write down the SQL statements for the following.

a) Delete the rows from DEPT for those departments where no body works. 4

b) Increase the basic of the employees working in the department with name FINANCE by Rs.1000. 4

c) Display the name of the departments and number of employees working in it. The list will contain only those departments for which the count is more than 10 and records must appear in the descending order of the count. 5

d) Find out the name of the employees who have joined in the year of 2012. 3

e) Find out the name of the employees with basic more than the average basic of his/her department. 4

5) a) What are the possible reasons so that the length of records in a file will vary? 3

b) Compare ordered and unordered file. 3

c) Explain the utility of secondary index. 3

d) Primary index is sparse – explain. 3

e) Write down the algorithm for hash join strategy. Also mention the number of block accesses required. 8

6) a) Why is normalization done? 5

b) Define functional dependency. 2

c) What is dependency preserving decomposition? 4

d) Consider a relation that store student information as follows:
Roll, Name and for each subject in which he appears in the examination Subject code, Subject name, Full marks, Pass marks, Marks scored
Assume the following FDs:

Roll→ Name

Subject code → Subject name, Full marks, Pass marks

Roll, Subject code → Marks scored

Normalize the relation up to 3NF showing the steps. At each step indicate primary and foreign key. 9

7) a) Explain timestamp based concurrency control that is free from cascading rollback. 8

b) Explain the recovery mechanism using checkpoint for concurrent environment. 8

c) Discuss the security features of DBMS. 4

8) Write short notes on the following:

a) Non conflicting swap 5

b) Outer join 5

c) Database trigger 5

d) Query processor 5