

**BCSE Examination, 2017**(3<sup>rd</sup> Year, 1<sup>st</sup> Semester supplementary)**Database Management Systems (OLD)**

Full marks: 100

Time: 3 hours

**Attempt any five questions**

- 1) a) What is ER diagram? Define entity type and relation type. 6  
 b) Define weak entity type and how will you design the table for it? 6  
 c) What is mapping cardinality of a binary relation in ERD? How does it influence the design of tables? 8
- 2) a) Define a relation in relational model. 4  
 b) Define foreign key and how does it influence DML operations. 6  
 c) Consider the relations: DEPT (DCODE, DNAME) and EMP (EMP\_ID, EMP\_NAME, BASIC\_PAY). DEPT and EMP relations keep the list of all departments and employees respectively. Write down both, relational algebra and relational calculus expression to find the following:
- i) Name of the employees with basic pay more than 50000 and working in the department named as 'ABCD'
- ii) Name of the departments where nobody works 10
- 3) a) Draw an ER diagram for the system that stores information of all the students and courses. For each course, course id (unique), name, duration and fees are stored. For each student, roll (unique), name, phone, email-id are stored. A student must take admission in one and only one course whereas in a course number of students may take admission. Date of admission is also noted. System must be able to find out which student is in which course.
- Also, design the necessary tables optimally and write down the SQL statements to create those tables (assume the attribute types suitably). 12
- b) What are the disadvantages of NULL value? 2
- c) Differentiate simple and composite attribute, stored and derived attribute, single and multivalued attribute. 6

4) Consider the following tables:

DEPT (DCODE, DNAME)

EMP (EMP\_ID, EMP\_NAME, BASIC\_PAY, GRADE)

Write down the SQL statement for the following:

- a) For all departments display name of the department and total basic pay of the employees working in the department. 5
  - b) Delete the records from DEPT table provided no employee is in the corresponding department. 5
  - c) Increase the basic pay of grade A employees of the department named as 'XYZ' by ten percent. 5
  - d) Find the name of the employee(s) with highest basic pay. 5
- 5) a) Define functional dependency. 3
- b) Why normalization is essential? 5
- c) Consider a schema R(A, B, C, D, E, F,G,H). Assume, the scheme is in 1NF. Normalize it up to 3NF subjected to the following FDs:
- $A \rightarrow C, D, G$        $AB \rightarrow F, H$        $B \rightarrow E$        $C \rightarrow D$
- Show the steps and indicate primary key and foreign key at each step. 8
- d) What is 1NF? How will you put a relation into 1NF? 4
- 6) a) Compare i) ordered and unordered file, ii) primary and secondary index. 6
- b) Write down the hash join strategy. 7
- c) What are the acid properties of a transaction? Describe various states of a transaction. 7
- 7) a) What is a schedule? Differentiate serial and concurrent schedule. 5
- b) Why is concurrency control important? Describe two phase locking protocol. 8
- c) In immediate database update, why do we need redo and undo operations for recovery? 4
- d) What is cascading rollback? 3
- 8) Write short notes on the following:
- a) Database Manager and DDL compiler 8
  - b) Security feature in DBMS 4
  - c) Outer join 4
  - d) Database trigger 4