

**2017**

**MCA**

**3rd Semester Examination**

**DATABASE MANAGEMENT SYSTEM**

**PAPER—MCA 301**

**Subject Code—32**

*Full Marks : 100*

*Time : 3 Hours*

*The figures in the right hand margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

*Answer Q. No. 1 and any four from the rest.*

- 1. Answer the following questions (any five) :** 5×2
- (a) Why BCNF in Normal Form is more desirable than 3NF ?
  - (b) What do you mean by query optimization ?
  - (c) What is Relationship ? What is degree of a Relation ?
  - (d) What are the major functions of the database administrator ?
  - (e) Name and briefly describe the five SQL built-in functions.

*(Turn Over)*

- (f) Give a brief description on DCL command.
- (g) Write the functions of system log.
- (h) Define Data dictionary.
- (i) What is a Multivalued attribute ?
2. (a) Indicate the advantage of DBMS over conventional file system. 2
- (b) Who are the different database users ? 2
- (c) What is weak entity set ? Explain with suitable example. 3
- (d) Explain partial dependency and transitive dependency with examples. 3
- (e) View does not take any memory space. — Justify. 2
- (f) Define a foreign key. Why is this concept needed ? 3
3. (a) What is an identifier ? Write the criteria for selecting identifiers. 2+3
- (b) Define relationship instance. 2
- (c) Draw an E-R diagram for the following database system :  
 Consider the database for the management of grants. Each grant is identified by a unique grant ID, a title, the funding source of the grant, the period (starting date and ending date), and the amount of grant. Each grant might be participated by several professors and each professor might also participate in several grants. Each professor is identified by a unique SSN, name, and email

address. In addition, several graduate students might be supported by a grant. Each graduate student has exactly one professor as his/her advisor. 8

4. Write short notes on following topics (any three) : 3×5

- (a) Null Values ;
- (b) View ;
- (c) Integrity Constraint ;
- (d) Databases Recovery ;
- (e) Data inconsistency ;
- (f) Weak entity type.

5. The given database schema is 5×3

Flights (flno, from, to, distance, departs)

Aircraft (aid, aname, range)

Certified (eid, aid)

Employees (eid, ename, salary)

(Pilots are those employees who are certified on at least one aircraft. An aircraft can be used for any flight provided it has sufficient range. Pilots can pilot any flight provided they are certified on an aircraft with sufficient range).

Where the underlined column names are primary keys.

Write the queries in relational algebra with the above schema.

- (a) Find names of pilots who are certified on Boeing.
- (b) Find aid's of aircraft that can fly non-stop from LA to NY.
- (c) Find eid of employee(s) with the second highest salary.

- (d) Find names of pilots who can operate planes with a range greater than 3,000 miles.
- (e) Find eid's of employees certified on exactly three aircraft.
6. (a) Write the drawbacks of normalization process. 2
- (b) What is Update anomaly ? Explain with examples. 4
- (c) Define Functional Dependency. 2
- (d) Describe 4 NF with suitable examples. 3
- (e) Consider the relation : 4  
 Assignment (worker\_id, building\_id, startdate, name, skill type) and FDs are {worker\_id → name, (worker\_id, building\_id) → startdate}.  
 Is the relation in 2NF ? If not, then make it in 2NF.
7. (a) What is schedule ? 2
- (b) Describe two-phase locking protocol. 2
- (c) Write ACID properties of a transaction. 3
- (d) Why does the recovery process necessary in transaction ? 2
- (e) Describe any of the concurrent transaction control policies. 3
- (f) Describe the state diagram of transaction management system. 3

*[ Internal Assessment : 30 Marks ]*