

# DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours Min. Passing Marks : 24 Maximum Marks : 80

### Instruction to Candidates :

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

#### <Unit-I>

- 1. (a) Compare the file system and DBMS on the basis of following :
  - (i) Integrity
  - (ii) Difficulty in accessing data
  - (iii) Concurrent access anomalies. [2×3 = 6]
- (b) Describe various functions of Database Administrator. [2]
- (c) Explain the database design process. [3]
- (d) Using neat diagram and examples show that database system hides details of data stored and maintained. [5]

#### OR

- 1. (a) Consider following transaction that transfer \$50 from account A to account B
 

```
Ti : read (A);      reading A from database
      A = A - 50;
      write (A);     updating A in database
      read (B);
      B = B + 50;
      write (B);
```

 using the above example describe the following problems in file system;
  - (i) Atomicity
  - (ii) Inconsistency. [4+4 = 8]
- (b) Why query processor component of database system is important? Briefly discuss about all components of query processor. [2+2 = 4]
- (c) Differential between DDL & DML using syntax for them. [4]

#### <Unit-II>

- 2. (a) Describe the following terms with examples :
  - (i) owner entity sets
  - (ii) identifying relationship
  - (iii) discriminator [6]
- (b) Design an E-R to show that participation of weak entity set as owner entity set in identifying relationship with another weak entity sets and find primary key of all entity sets. [4]
- (c) Differentiate between following :
  - (i) Candidate keys and super key
  - (ii) Partial and total participation
  - (iii) Entity and entity sets. [6]

#### OR

- 2. A university Registrar office maintain data about course, course offering, student, instructor, enrolment and grade. Construct an E-R diagram for office and convert E-R diagram into tables. [8+8 = 16]

#### <Unit-III>

- 3. (a) Explain Relationship algebra joints. [8]

- (b) Explain following terms for Domain Relational Calculus :
  - (i) Formal definitions [4]
  - (ii) Safety of expressions. [4]

#### OR

- 3. (a) Compare the tuple relational calculus and domain relational calculus on the basis of following : [8]
  - (i) Formal definition
  - (ii) Safety of expressions
  - (iii) Expressive power of languages.
- (b) Consider following schemas :
 

```
Project (Pid, Pname, dept-no)
Work-on (emp-id, pid, hours)
Employee (emp_id, ename, address, salary)
Department (dept_no, dname)
```

 Write relational algebra syntax for following :
  - (i) For each employee working on a project with Pname of '231 Project', retrieve the name of the employee and his/her salary.
  - (ii) Retrieve the name of each employee who works on all project controlled by department number 5.
  - (iii) For each project on which more than two employee work, retrieve the project number, the project name and the number of employee who work on the project. [2+2+4 = 8]

#### <Unit-IV>

- 4. (a) Consider the schemas of Q.3(ii) in unit-III and write the SQL syntax for mention statements a, b, and c. [3+3+4=10]
- (b) What is embedded SQL? Why we need to access a database using General Purpose Programming Language? [2+4=6]
- 4. (a) What is JDBC? Explain establishing a connection to the database, create statement, execute query and iterate result set in JDBC. [8]
- (b) What is Triggers? How do we create triggers on a database? Show some syntax. [2+2+4=8]

#### <Unit-V>

- 5. (a) What is Red database? Explain with examples insert, update and delete anomalies in database. [8]
- (b) Consider the schema R=(A,B,C;D,E) with a set F of functional dependencies {ED→D, A→BC, E→A, E→B, B→C}. Find canonical cover fo. F. [8]

#### OR

- 5. We are given a schema = S{A,B,C,D,E}. The F of functional dependencies is {A→B, BC→E, ED→A}.
  - (a) is S in BCNF? Why
  - (b) is S in 3NF? Why?
  - (c) Find canonical cover F<sub>c</sub> of F
  - (d) List all candidate keys for S. [3+3+5+5 = 16]