

**SRK/KW/14/7088**

**Faculty of Engineering & Technology**  
**Fifth Semester B.E. (Computer Technology) (C.B.S.)**  
**Examination**

**DATABASE MANAGEMENT SYSTEM**

**Time : Three Hours]**

**[Maximum Marks : 80**

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.**
- (2) Solve SIX questions as follows :**

**Question No. 1 OR Question No. 2,**

**Question No. 3 OR Question No. 4,**

**Question No. 5 OR Question No. 6,**

**Question No. 7 OR Question No. 8.**

1. (A) Consider the employee table with appropriate fields and write SQL statements for the following queries :

(i) Display dept numbers and total no. of employees within each group.

(ii) Display the various jobs along with total salary for each of the jobs where total salary is greater than 50,000/-

(iii) Display the name of the employee who earns the highest salary.

(iv) Display dept. number and maximum salary of each department. 8

(B) Explain Network and Hierarchical data model. 5

OR

~~2.~~ (A) What are the drawbacks of conventional file processing system ? Explain. 5

(B) What is Data Dependence ? Why is it needed ? 3

(C) Draw and explain three level architecture of DBMS. 5

3. (A) Solve the following queries using relational algebra. Consider the following relations :

student (ssn, name, address)

course (code, title)

Registered (ssn, code)

- (i) List the codes of courses in which at least one student is registered.
  - (ii) List the titles of registered courses.
  - (iii) Titles of courses for which no student is registered.
  - (iv) Names of students and titles of courses they are registered to. 8
- (B) Distinguish between Domain relational calculus and Tuple relation calculus.
- (C) What do you mean by Integrity constraints ? 2

**OR**

4. (A) What is Normalization ? Why is it needed ? Take any unnormalized relation and convert it into 1NF, 2NF and 3NF. 8
- (B) What is MVD ? Compare 4NF and 5NF. 5
5. (A) Difference between the following :
- (i) B tree and B<sup>+</sup> tree
  - (ii) Dense and Sparse Indexing. 8
- (B) Explain Trigger and Assertions. 5

**OR**

(Contd.)

6. (A) What is bitmap index ? When and why is it needed ? 5
- (B) What is Static Hashing and Dynamic Hashing ? Explain. 4
- (C) Explain the basic structure of PL/SQL. 4
7. (A) Explain the techniques of query optimization. 5
- (B) What are the steps involved in processing a query ? 5
- (C) What is materialization ? Explain. 3

**OR**

8. (A) State the advantages of pipelining ? Explain when the pipelining cannot be used. 5
- (B) What are the different equivalence rules available in transformation of relational algebra. 8
- ~~9.~~ (A) What is serializability ? What are its different types ? Explain. 6
- (B) What is Deadlock ? How is it detected and prevented in DBMS ? 8

**OR**

10. (A) What is Transaction ? Explain the different properties of Transaction. 5

- (B) What is two phase locking protocol ? Explain various versions of 2PL. 5
- (C) Explain ACID properties. 4
11. (A) Explain the various failure classifications. 6
- (B) Explain the various aspects of Data Security. 4
- (C) What is checkpoint ? What happens at the time of checkpointing ? 4

**OR**

- ~~12.~~ Write a short notes on (any **THREE**) :— 14
- (i) Log Based Recovery
- (ii) Buffer Management
- (iii) SQL Databases
- (iv) Recovery and Atomicity.