2021

COMPUTER SCIENCE — HONOURS

Paper : CC-11

(Database Management System)

Full Marks : 50

The figures in the margin indicate full marks.

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

Section - I

1. Answer *any five* questions. 2×5

   (a) What do you mean by functional dependency?

   (b) Define loss less decomposition.

   (c) What do you mean by data redundancy?

   (d) What is the requirement of specialization in the ER data model?

   (e) Explain the functionality of transitivity rule of functional dependency.

   (f) Explain the concept "Dependency preservation".

   (g) Define BCNF.

   (h) Distinguish between Generalization and Aggregation.

Section - II

Answer *any four* questions.

2. (a) For the relations given below, check whether the given functional dependencies hold or not. Give proper justifications.

J :	X	X	Y	Y	Z	P
K :	1	1	1	1	2	4
L :	2	3	4	3	5	7

   (i) J → K

   (ii) J, K → L

   (b) Verify the statement, "Any relation in BCNF is in 3NF but converse is not true". Give suitable example. 5+5

Please Turn Over

3. (a) Explain the term data replication and data fragmentation with suitable example.

   (b) What are integrity constraints? Explain the various types of integrity constraints with suitable examples.   5+5

4. (a) Describe the 3-Level architecture of DBMS.

   (b) Distinguish between strong and weak entity set. Draw an ER diagram to illustrate weak entity set.   5+5

5. (a) How do B-Tree indexes differ from Binary Search Tree Indexes?

   (b) Differentiate between the concepts of Logical data independence and Physical data independence in DBMS.   5+5

6. What do you understand by the term closure of a relation (R) with functional dependency set (F)? Compute the closure for the relation R (l, m, n, o, p) with functional dependency set F :

   $F \{l \rightarrow mn$; $no \rightarrow p$; $m \rightarrow o$; $p \rightarrow l\}$ Identify the candidate keys for the relation (R).   10

7. (a) Explain referential integrity with an example.

   (b) Consider the relation schema : Employee (Empid, Ename, deptid); Project (Projectid, Pname, deptid) Department (deptid, dname, dlocation)

      (i) Retrieve the name of all employees who work for the 'Computer Science' department.
      (ii) List the name of the Employees who works in "IOT" projects.
      (iii) List the projects of "Computer Science" running at "Kolkata".   4+6

8. (a) Consider the relational table given below and answer the following SQL queries.

      Employee (SSN-No. Name Department, Salary)

      (i) List all the employees whose name starts with the letter 'L'.
      (ii) Find the maximum salary given to employees in each department.
      (iii) Find the number of employees working in 'accounts' department.
      (iv) Find the second maximum salary from the table.
      (v) Find the employee who is getting the minimum salary.

   (b) Explain various types of Functional dependency. List and discuss the six inference rules for functional dependencies.   5+(2+3)