2024

M.Sc. 2nd Semester Examination

Computer Science

PAPER : COS–201

(Advanced DBMS and Green Computing)

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks.

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

Illustrate the answers wherever necessary.

Answer from **both** the Sections.

SECTION—A

(Advanced DBMS)

(M1/*Marks* : 20)

GROUP—A

Answer *any* **two** questions : 2×2=4

1. Explain the difference between Data Definition Language (DDL) and Data Manipulation Language (DML).

2. What is referential integrity constraint?

3. What problem does third normal form (3NF) address in database design?

4. Differentiate between exclusive and shared locks.

GROUP—B

Answer *any* **two** questions : 4×2=8

5. Who are the primary users of a database system? Explain the roles and responsibilities of a database administrator (DBA).

6. What is the three schema architecture of a DBMS and how does it function?

7. Explain the concepts of functional dependency and multivalued dependency.

8. What are deductive databases and how do they differ from traditional relational databases?

GROUP—B

Answer *any* **two** questions : 4×2=8

5. What are the enterprise strategies for green IT? Explain any one of them. 1+3=4

6. Discuss EPEAT and RoHS. 2+2=4

7. What is sustainable software? How can software impact the environment? 2+2=4

8. Briefly explain the 3Rs of green IT. 4

GROUP—C

Answer *any* **one** question : 8

9. What is green IT? Explain OCED green IT framework. 2+6=8

10. Explain the different energy-saving software techniques. 8

[Internal Assessment : 10]

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(c) Calculate the average grade of male students.

(d) List the names of students along with the titles of all courses they are enrolled, in ordered alphabetically by student name and then by course title.

SECTION—B

(Green Computing)

(M2/*Marks* : 20)

GROUP—A

Answer *any* **two** questions : 2×2=4

1. What do you mean by the term 'sustainability'?

2. What are the key subsystems of IT that could be made greener?

3. What is meant by 'green washing'?

4. Name some ICT strategy for green storage.

GROUP—C

Answer *any* **one** question : 8

9. Why is normalization important in database design? How does BCNF differ from third normal form (3NF)? What is fourth normal form (4NF) and when is it necessary to use?

Consider the relation schema R(A, B, C, D, E, F) and the functional dependencies :

A->B, C->DF, AC->E, D->F

Find the primary key of this relation R.

2+2+3+1=8

10. Consider the following database schema :

Students (StudentID, Name, Age, Department)

Courses (CourseID, Title, Credits, Department)

Enrollments (EnrollmentID, StudentID, CourseID, Grade, StudentID, CourseID)

Write the SQL/relational algebra expression for the following queries : 2×4=8

(a) Fetch the titles of all courses in the 'Computer Science' department.

(b) Display the names of students who are enrolled in a course titled 'Database Management'.