PG/IIS/COS/201/25

M. Sc. 2nd Semester Examination, 2025

COMPUTER SCIENCE

(*Advanced DBMS and Green Computing*)

PAPER – COS-201

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

GROUP–A

Answer any **four** questions : 2×4

1. What is a data model ? Name any two commonly used data models.

2. What is meant by green IT ?

3. Differentiate between schema and instance in the context of a database

4. What is meant by 'Green Washing' ?

5. What is the role of a Database Administrator (DBA) ?

6. Why there is growing demand and need, for greening data centers ?

GROUP–B

Answer any four questions : 4 × 4

7. Explain the Three Schema Architecture of DBMS.

8. Write a short note on EPEAT and RoHS. 2 + 2

9. What is a foreign key ? Explain with an example. What is it used for ?

10. Explain any two strategies incorporated by the enterprises for Green IT.

11. Describe the ACID properties of a transaction.

12. Briefly explain the 3Rs of Green It.

GROUP–C

Answer any **two** questions : 8×2

13. What environmentally sensitive materials are typically used in the manufacturing of a product (e.g. a notebook computer or a smart mobile phone) and what are their impacts on humans ? $2 + 6$

14. What is normalization ? How does Boyce-Codd Normal Form (BCNF) differ from 3NF ? Define Fourth Normal Form (4NF) and provide an example. Given the relation schema R(A, B, C, D) and functional dependencies :
$A \rightarrow B$, $B \rightarrow C$, $A \rightarrow D$
Find the candidate key(s) of R. $2 + 2 + 2 + 2$

15. What are the attributes relevant to assessing the sustainability of a software ? Explain each of them. 2 + 6

16. Consider the following database schema :
Students (StudentID, Name, Age, Department)
Courses(CourseID, Title, Credits, Department)
Enrollments (EnrollmentID, StudentID, CourseID, Grade)

Write the SQL queries for : 2 × 4

(*a*) Display the names of students enrolled in any course from the 'IT' department.

(*b*) Fetch the names of students who have obtained 'A' grade in any cource.

(*c*) List the course titles with credits more than 3.

(*d*) Retrieve the names of all students along with the total number of courses they are enrolled in.

[Internal Assessment — 10 Marks]