

**Indian Institute of Engineering Science and Technology, Shibpur**  
**B. Tech. 5<sup>th</sup> Semester Mid-Term Examination, September 2022**  
**Subject: Database Management System (CS 3102)**

**Full marks: 30**

**Time: 2 hours**

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1. Answer the following questions in brief:

- a) What do you mean by data inconsistency?
- b) What is weak entity?
- c) Differentiate between database schema and database instance.
- d) Define multi-valued and composite attributes with examples.
- e) What do you mean by data dictionary?

[2×5]

2. a) How DBMS differs from traditional file processing system?  
b) Briefly explain the three-schema architecture of DBMS.  
c) Compare between physical and logical data independence.  
d) What are the main tasks of database administrator (DBA)?

[3+3+2+2]

3. a) Distinguish between a super-key and a candidate-key of a relation with an example.  
b) Compare and contrast hierarchical and network data models.  
c) Consider the following relational schemas:

EMPLOYEE(NAME, SSN, SUPERSSN, SEX, ADDRESS, DNO)  
DEPENDENT(ESSN, DEPENDENT-NAME, SEX, BDATE, RELATIONSHIP)

Here, ESSN, the social security number of the employees, is the foreign key in the DEPENDENT table and refers to the primary key of the EMPLOYEE table.

Now, write a SQL query to retrieve the names of all employees who have two or more dependents.

[2+4+4]