This question paper contains **8** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **2395**

Unique Paper Code : **32345201** **GC-4**

Name of the Paper : **Introduction to Database Systems**

Name of the Course : **GE : Computer Science for Honours**

Semester : **II**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt any *four* of question Nos. **2** to **7**.

Parts of a question must be answered together.

Marks are indicated against each question.

1. (*a*) Differentiate between tuples and attributes of a relation. Illustrate by giving an example. 4

(*b*) For the binary relationships given below, suggest the cardinality ratio based on the common sense meaning of entity types.

	Entity1	**Cardinality Ratio**	**Entity2**
(*i*)	STUDENT	.....	TEACHER (Enrolled in a Course)
(*ii*)	CLASSROOM	.....	BLACKBOARD
(*iii*)	COUNTRY	.....	CURRENT_PRESIDENT
(*iv*)	EMPLOYEE	.....	DEPARTMENT

4

(*c*) Justify the following statements : 2×3=6

(*i*) Primary key cannot be null.

(*ii*) Weak entities do not have their own key attributes.

(*d*) Define foreign key. Why is it used ? 2

(e) What is a relational data model ? Explain in the context of a relation 'STUDENT'. 1+2=3

(f) Consider the following database schema.

STUDENT

Name	Student_id	Class	Major	Marks
Smith	17	1	CS	85
Browny	8	1	CS	76
Jane	14	1	CS	65
Bob	5	1	CS	90

Write SQL statements to perform the following operations on the above database.

(*i*) Insert a new student, <'Johnson', 25, 1, 'MATH'>, in the database.

(*ii*) Change the class of 'Smith' to 2.

(*iii*) Delete the record for the student whose name is 'Smith' and whose 'Student_id' is 17. 3×2=6

P.T.O.

(*g*) Differentiate between DROP and DELETE command with the help of one example each. 4

(*h*) Consider the relation given in Q.1. (*f*). Write SQL queries for the following tasks :

(*i*) Display the name and marks of the student who scored highest marks.

(*ii*) Display total number of students.

(*iii*) Display average marks of the class. 3×2=6

2. (*a*) Define the following terms :

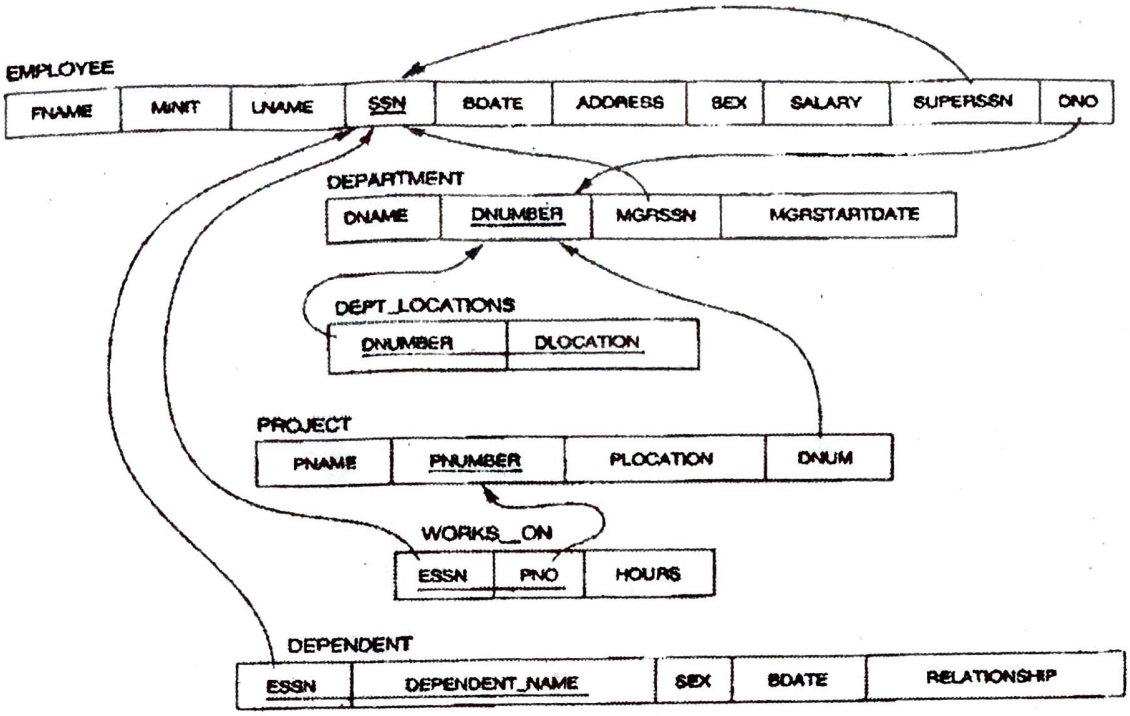
(*i*) Meta data

(*ii*) Candidate key. 2×1=2

(*b*) What are the four types of database users ? Discuss the role of each. 4

(*c*) Differentiate between HAVING and WHERE clause. Illustrate the same by giving *one* example. 4

3. Consider the following COMPANY database schema :



(*i*) Specify six primary and six foreign keys for this database schema. 6

(*ii*) Write CREATE TABLE command for the relation DEPARTMENT specifying primary and foreign key constraints. 4

4. Consider the following set of requirements for a UNIVERSITY database that is used to keep track of students' transcripts.

(*a*) The University keeps track of each student's name, student number, social security number, current address, birthdate and sex.

(*b*) Each department is described by a name, department code, office number, office phone, major department, minor department and degree program (B.A., B.Sc. etc.)

(*c*) Each section has an instructor, semester, year, course and section number.

Design an ER diagram for the above problem. Specify key attributes of each entity. 10

5. (*a*) Consider the following tables:

WORKS (Pname, Cname, Salary)

LIVES (Pname, Street, City)

LOCATED_IN (Cname, City)

MANAGER (Pname, Mgrname)

Where Pname=Person name, Cname=Company name and Mgrname=Manager Name

Write SQL queries for the following :

(*i*) List the names of the people who work for the company Wipro along with the cities they live in.

(*ii*) Find the people who work for the company 'Infosys' with a salary more than Rs. 50,000. List the names of the people, along with the street and city addresses.

(*iii*) Find the names of the persons who do not work for the company 'HCL'. 3×2=6

(*b*) What do you understand by Normalization in database design ? Explain Third Normal Form (3NF) by taking suitable example(s). 4

6. (*a*) What is a relationship set ? 2

(*b*) Give short answers for the following :

(*i*) Properties that describe an entity's characteristics.

(*ii*) Language used to define data in a database.

(*iii*) SQL clause used for sorting the tuples.

(*iv*) SQL clause used for pattern matching in a string. 4×1=4

(*c*) Suggest appropriate data types for the following attributes :

(*i*) Date of birth

(*ii*) Marks of a student

(*iii*) Employee id

(*iv*) Name of a school. 4×1=4

7. (*a*) What is a binary relationship ? Illustrate the same with the help of an example. 4

(*b*) Describe the three level architecture of database approach for a DBMS with the help of a block diagram. What is the difference between logical and physical data independence. 4+2=6