END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] JULY-2023

Paper Code: AIDS/AIML/IOT-204	Subject: Database Management Systems
Time : 3 Hours	Maximum Marks :75

Note:. Attempt five questions in all including question no.1 which is compulsory. Select one question from each unit. Scientific calculators are allowed.

Q1　Answer the following questions:　　　　　　　　　**(2.5x6=15)**
- (a) Distributed vs Object-oriented databases
- (b) Explain ACID property in brief
- (c) Discuss three tier architecture of DBMS with example
- (d) Explain the concept of referential integrity giving example
- (e) Write short note on key features of MongoDB
- (f) Tuple vs Domain Relational Calculus

UNIT-I

Q2　(a) A database is being built up by an e-commerce corporation "ABC" to track vendors and their products. This necessitates writing down the details such as name, mailing address, contact no. and email for each seller, the name, price, and quantity of each product, information like which seller's merchandise it is, a number that is specific to each product. Choose additional attributes for the schema that seems appropriate. Create an entity-relationship (ER) diagram to visualise this data. Be sure to note the restrictions on the relevant relationships, and give the entities the proper primary keys.　　**(10)**

(b) Explain the concept of weak and strong entity set with the help of an example. Draw the ER diagram to represent these entities.　　**(5)**

OR

Q3　(a) Write short note on the following with example:　　　　**(7)**
- i.　Multivalued and Derived attributes
- ii.　Specialization vs Generalization

(b) Explain how the hierarchical, network, and relational DBMS models differ from one another. Any real-time application of each should be given.　　**(8)**

UNIT-II

Q4　(a) Explain various steps of query processing with the help of diagram.**(7)**

(b) Explain the concept of join operation in DBMS relations. Differentiate between outer and inner join operations with examples.　　**(8)**

P.T.O.

P-1/2

OR (7)

Q5 (a) Write short note on the following with example:
  i. Query optimization techniques
  ii. Types of Cursors in PL/SQL

(b) Explain the concept Nested queries in SQL. Write syntax of given clausesin SQLsuch as: **GROUP BY, DISTINCT, AVG(), LIKE, AND, CONCAT()**, with the help of examples. (2+6)

UNIT-III

Q6 (a) What is concurrency? Discuss various concurrency problems associated with it. Explain Time-stamp based protocol for concurrency control. (8)

(b) Let there are three concurrent transactions T1,T2 and T3. Determine the following schedule 'S' is conflict serializable or not? For a serializable schedule, find equivalent serial schedule.
  S: R3(A), R2(A), W3(A), R1(A), W1(A) (7)

OR

Q7 (a) Define BCNF. Compare 3NF and BCNF. Which normal form is stronger between these two? Give an example of a relation in 3NF that is not in BCNF. (8)

(b) Write short note **any two** from the following with example: (7)
  i. Functional dependency
  ii. Two phase locking protocol
  iii. View Serializability

UNIT-IV

Q8 (a) Explain the architectures of distributed databases. How data is fragmented in distributed databases? Also, discuss how transparency is achieved in such databases. (8)

(b) Discuss the need of data security in DBMS. Explain various security measures to protect database against various security threats. (7)

OR

9 (a) Design a data model for an e-commerce website that stores information on users, products, and orders. Evaluate the strengths and weaknesses of an RDBMS versus a NoSQL database for this application. (8)

(b) Write short note on the following with example: (7)
  i. Applications of Data mining
  ii. CAP theorem

. . . .

Mid-Term Examination – May 2023

ramme: B.Tech (AIML, AIDS, IIOT)

er Code: AIML/AIDS/IIOT 204

ne: 1½Hrs.

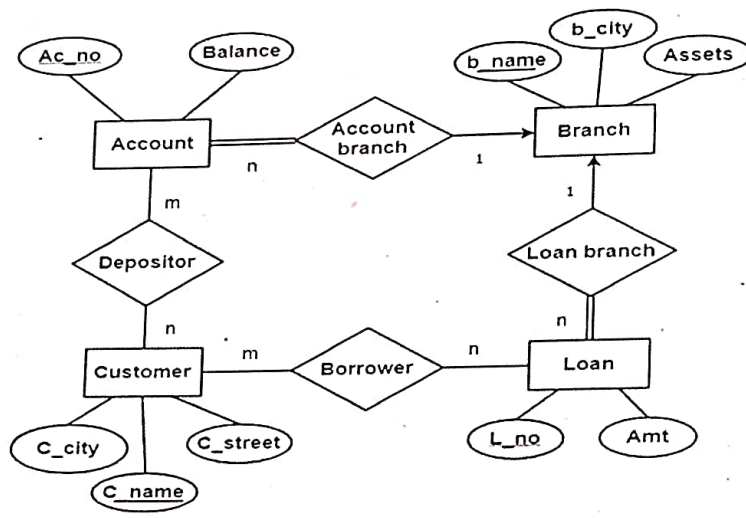Semester: Fourth (Jan 2023 - Aug 2023)

Paper Name: Database Management Systems

Maximum Marks: 30

Note:
- Question No. 1 is compulsory.
- Attempt any two questions from the remaining questions.
- Some questions have internal choice also.
- All questions carry equal marks.

Question 1		Marks
1(a)	Compare and contrast the features of DBMS with traditional file system.	[3]
1(b)	Frame an instance to explain Referential Integrity.	[3]
1(c)	Compare the 2-tier and 3-tier architecture of DBMS.	[2]
1(d)	Outline the concept of Query Processing and Optimization with the help of a neat diagram.	[2]

Question 2		
2(a)	Do you agree with the statement "Are specialization and generalization simple inversions of each other". Defend your answer with the help of examples.	[4]
2(b)	Design an ER Diagram for an IT Organization having following details: • Organization is organized into DEPARTMENTS. Each department has a **unique name** and a particular employee who manages the department. The date when one becomes a manager is also recorded. Department may have **several** locations. The department has a budget also. A department controls several PROJECTS having a unique name, number, and a single location. • Organization's EMPLOYEE name (first, middle and last name), ssno., address, salary, sex, birth date, mobile numbers (multiple) and age (derived from birth date) are recorded. An employee is assigned to one department but may work for several projects (not necessarily controlled by his/her dept). Number of hours/weeks an employee works on each project is recorded. Also, there is an immediate supervisor for the employee. Employees can be categorized as salaried or hourly paid. • Employee's DEPENDENT records (dependent name, age, relationship to employee) are also maintained for insurance purposes.	[6]

Question 3		
3(a)	Consider the following relations. Student(Rollno, Name, Address, Phone, Age, Department_no) Course(Courseid, Course_name) StdCourse(Courseid, Rollno) #Courseid and Rollno act as foreign key Solve the following queries using SQL: 1. Find the student details whose names (start with 'a' and end with 'h') or (have at least one 'p'). 2. Find the student details in decreasing order of age followed by increasing order of rollno. 3. Update the department no. of students to 20 who are enrolled in course 'AIML'. 4. Find the names and address of students enrolled in courses with courseid=3.	[4]

3(b)	Solve the following queries in **SQL as well as Relational Algebra**: 1. Retrieve the names, age, course id and course name of students enrolled in different courses. 2. Find the names of students enrolled in Course 'CSE'. (Use nested queries for SQL). 3. Find the department no. wise average age of students having average age greater than 25.		[6]

Question 4

4(a)	For the ER Diagram given below, derive the relational schema (Tables along with keys) 		[5]
4(b)	Categorize the different types of cursors in PL/SQL with examples. OR Illustrate the key advantages and disadvantages of PostgreSQL?		[5]

--XXX--