Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENECES
END SEMESTER THEORY EXAMINATIONS NOVEMBER/DECEMBER 2023
III SEMESTER B.Sc.(APPLIED SCIENCES) IN ENGG.
Database Management Systems [ICS 231]

Marks: 50   **Duration: 180 mins.**

Answer all the questions.
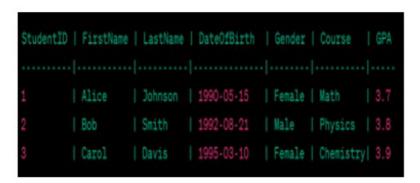
Missing data may be suitably assumed.

1)
   A) Explain with neat diagram file system and DBMS interface? (5)

   B) Explain Advantages of DBMS (5)

2)
   A) Explain the following term with an example? (5)
   i) Super Key
   ii) Candidate Key
   iii) Weak Entity
   iv) Project Operation
   v) Total Participation

   B) Write ER diagram for Library Management System database keep track of (5)
   readers with the following considerations.

   - The system keeps track of the staff with a single point authentication system comprising login Id and password.
   - Staff maintains the book catalog with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details.
   - A publisher has publisher Id, Year when the book was published, and name of the book.
   - Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. The staff keeps track of readers.
   - Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too.
   - Staff also generate reports that has readers id, registration no of

report, book no and return/issue info.

3) Refer below STUDENT table and write sql query.? (5)

A) Student Table

```
StudentID | FirstName | LastName | DateOfBirth  | Gender | Course   | GPA
..........|...........|..........|..............|........|..........|.....
1         | Alice     | Johnson  | 1990-05-15   | Female | Math     | 3.7
2         | Bob       | Smith    | 1992-08-21   | Male   | Physics  | 3.8
3         | Carol     | Davis    | 1995-03-10   | Female | Chemistry| 3.9
```

i) List the female students with a GPA greater than 3.7
ii) Count the number of male students.
iii) Find the oldest student in the database.
iv) Sort students by GPA in descending order.
v) Display the constraint name and constraint type.

B) Refer below Employee Table and write sql query.? (5)

Employee Table

```
+------------+-----------+----------+-------------+----------+
| EmployeeID | FirstName | LastName | Department  | Salary   |
+------------+-----------+----------+-------------+----------+
| 1          | John      | Doe      | HR          | 50000.00 |
| 2          | Jane      | Smith    | Finance     | 60000.00 |
| 3          | Alice     | Johnson  | Marketing   | 55000.00 |
| 4          | Bob       | Wilson   | Engineering | 65000.00 |
| 5          | Charlie   | Brown    | HR          | 52000.00 |
+------------+-----------+----------+-------------+----------+
```

i) Select all employees whose first name starts with 'J'
ii) Add a unique constraint to the Employee ID column to ensure its uniqueness.
iii) Find departments with a total salary exceeding 150,000.
iv) Select all employees with salaries greater than the average salary of all employees.
v) What alternative methods can be used to clear all records from a table without using the DELETE command

4) Explain different types of anomalies in normalization with an example? (5)

A)

B) Convert the below table into second normal form? Explain second normal form? (5)

Table: BorrowedBooks

BorrowerID	BorrowerName	BookID	BookTitle	Author
1	Alice	101	Book A	Author X
2	Bob	102	Book B	Author Y
1	Alice	103	Book C	Author Z
3	Carol	104	Book D	Author X

5)

A) Explain various possible consistency problems with transactions with an example? (5)

B) Explain ACID properties of DBMS with an example? (5)

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