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UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Program Name : MCA
Course Name : Database Management Systems
Course Code : CSEG7011
No. of Page(s) : 3
Instructions : Attempt all sections.

Semester : II
Time : 3 hours
Max. Marks : 100

SECTION-A

| S. No. | Questions | Marks | CO |
|---|---|---|---|
| Q.1 | State the difference between 'Database Schema' and 'Database Instance' with an example. | 4 | CO1 |
| Q.2 | Elaborate various symbols used in ER Diagram. Write use of these symbols. | 4 | CO2 |
| Q.3 | Convert the following SQL query into relational algebraic expression:<br>`SELECT Ename, Salary FROM Employee WHERE city = "Dehradun" AND department = "CSE";` | 4 | CO3 |
| Q.4 | Explain what is transitive dependency and how to remove it using appropriate example. | 4 | CO4 |
| Q.5 | List the conditions for view serializability. | 4 | CO5 |

SECTION-B

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| Q.6 | Classify various types of DBMS users. Discuss various responsibilities of these users with example. | 10 | CO1 |
| Q.7 | Attempt the following- | 10 | CO2 |
| A) | Explain total and partial participation of entities in a relation with one example of each. | (6) | |
| B) | Explain generalization and specialization of entities with an example. | (4) | |
| Q.8 | Attempt the following- | 10 | CO3 |
| A) | Elaborate any 2 operators of relational algebra with syntax and example. | (4) | |
| B) | Explain different types of inner joins with one example each. | (6) | |

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| C) | Print Ward ID and Name of all wards that belong to the "Cardiology" department. | (2) | |
| D) | Print Doctor ID and Patient ID for all the visits on "01-04-2023". | (2) | |
| E) | Print the maximum experience of doctors in each city. | (3) | |
| F) | Print the total amount of fees paid by the patients having issue "Cough and Cold". | (3) | |
| G) | Print the names and Ages of patients treated by a doctor named "ABC". | (4) | |
| H) | Print the date on which a patient named "XYZ" visited a doctor named "ABC" for "Viral Fever". | (4) | |
| | OR | | |
| | Consider the following tables and write SQL queries to find answers to given questions.<br>Table 1: Students(S_ID, S_Name, Marks, Address)<br>Table 2: Course(S_ID, C_ID, C_Name) | 20 | CO3 |
| A) | Print all the details of all students. | (1) | |
| B) | Print all the distinct course ids and corresponding names. | (1) | |
| C) | Print average marks of students from "Dehradun". | (2) | |
| D) | Print Student ID and Name of all students from the following cities-"Chandigarh", "Dehradun". | (2) | |
| E) | Print Student ID and Name of all students enrolled in "Python" course. | (3) | |
| F) | Write the output of cartesian product on these tables. | (3) | |
| G) | Print all pairs of students from same city. | (4) | |
| H) | Write the result of left, right and full outer join on these tables. | (4) | |

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| Q.9 | Explain how one relational database can be normalized in 3NF. If $\alpha \rightarrow \beta$ functional dependency exist, then how 3NF rules are checked in context of super key and prime, non-prime attributes. Explain with relevant example.<br><br>OR<br><br>Consider the following table and identify the type of dependency that exists in this table. Decompose and normalize this table to remove this dependency. | 10 | CO4 |

| Course | Faculty | Textbook |
|---|---|---|
| Java | F01 | Book1 |
| | F02 | Book2 |
| | F03 | Book3 |
| | F04 | |
| Python | F05 | Book4 |
| | F06 | Book5 |
| | F07 | |
| DBMS | F08 | Book6 |
| | | Book7 |

SECTION-C

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| Q.10 | Attempt the following- | 20 | CO5 |
| A) | Explain types of locks and their compatibility with each other. | (6) | |
| B) | Explain Read timestamp, Write timestamp and Transaction timestamp. | (6) | |
| C) | Explain the following deadlock prevention scheme- Wait-Die, Wait-wound. | (8) | |
| Q.11 | Consider the following tables and write SQL queries to find answers to given questions.<br>Table 1: Doctors(D_ID, D_Name, City, Experience)<br>Table 2: Patients(P_ID, P_Name, Profession, Age)<br>Table 3: Wards(W_ID, W_Name, Department, No_of_Beds)<br>Table 4: Visits(D_ID, P_ID, Visit_Date, Issue, Fees) | 20 | CO3 |
| A) | Print all the details of all doctors. | (1) | |
| B) | Print Patient ID and Name of all the patients. | (1) | |