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



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **End - Term Examinations – JANUARY 2025** |
| **Date:** 04- 01- 2025 **Time:** 1:00 pm – 04:00 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOIS | **Program:** BCA (General/DS/AIML) | |
| **Course Code :** CSA2003 | **Course Name :** Relational Database Management Systems | |
| **Semester**: III | **Max Marks**: 100 | **Weightage**: 50% |

|  |  |  |  |
| --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** |
| **Marks** | **26** | **26** | **48** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define Strong Entity and Weak Entity. | **2 Marks** | **L1** | **CO1** |
| **2** | Define Cardinality Ratio, Participation Constraint | **2 Marks** | **L1** | **CO1** |
| **3** | Define the purpose of the CHECK constraint in a database with an example. | **2 Marks** | **L1** | **CO1** |
| **4** | What is the necessity of ORDER BY clause in SQL. | **2 Marks** | **L2** | **CO2** |
| **5** | Write a SQL query to create a trigger that executes after insert operation (event) occurs. | **2 Marks** | **L1** | **CO2** |
| **6** | What is the purpose of view in SQL? Give an example. | **2 Marks** | **L1** | **CO2** |
| **7** | Specify the difference between trivial and non-trivial functional dependency. | **2 Marks** | **L1** | **CO3** |
| **8** | Define Functional Dependency. When do you say a given functional dependency is valid or not? | **2 Marks** | **L1** | **CO3** |
| **9** | Given R(A,B,C,D,E) FD: {A->B, B->C ,C->D, D->E}  Find the closure of C, D, AC, AB. | **2 Marks** | **L2** | **CO3** |
| **10** | Define two modes of Concurrency. | **2 Marks** | **L1** | **CO3** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | **a.** | Construct an ER diagram for Student database with following constraints.   1. A faculty works for a department. 2. Every department is headed by a HOD. 3. A faculty handles on one or more courses. 4. One of the entities has dependent. 5. A student enrolls for one or more courses. 6. Faculty teaches one or more Students.   Identify the entities, their attributes, and the relationships between them. Also mention the Cadinality Ratio and Participations constraints. | **10 Marks** | **L2** | **CO1** |
| **b.** | Explain three-schema architecture with a neat diagram. | **10 Marks** | **L2** | **CO1** |
| **Or** | | | | | |
| **12.** | **a.** | Create an ER model for a Airline Reservation Management system.  In the above ER diagram, identify entities, their attributes, and the relationships between them. Also mention the Cadinality Ratio and Participation constraints. | **10 Marks** | **L2** | **CO1** |
| **b.** | Explain the following relational algebra operations with an example.  i. Select ii. Project iii. Intersection iv. Equi join v. Left Outer join | **10 Marks** | **L2** | **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.** | Consider the above ER diagram representing a Company database:   * + 1. Identify all the strong and weak entities.     2. List the attributes associated with each entity.     3. Determine the type of attribute for all the entities (e.g., simple, composite, derived, primary, multi-valued etc).     4. Describe participation constraint between the entities.     5. Identify the type of relationship between entities. | **10 Marks** | **L3** | **CO2** |
| **b.** | Consider the following relations for a database that keeps track of student enrollment in courses and the books adopted for each course:  STUDENT(SSN, Name, Major, Bdate)  COURSE(Course#, Cname, Dept)  ENROLL(SSN, Course#, Quarter, Grade) BOOK\_ADOPTION(Course#, Quarter, Book\_ISBN)  TEXT(Book ISBN, BooLTitle, Publisher, Author)  Specify the following queries in **SQL** on the database schema given.  i. List the number of courses taken by all students named 'John Smith' in Winter 1999 (i.e., Quarter = 'W99').  ii. Produce a list of textbooks {include Courses, BookISBN, Book, Title} for courses offered by the 'CS' department that have used more than two books.  iii. List any department that has all its adopted books published by 'AWL Publishing' .  iv.List the course which has more than three textbooks.  v.List the names of the students who has enrolled in more than one courses. | **10 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **14.** | **a.** | Consider the above ER diagram representing a University database:  Identify all the strong and weak entities.  List the attributes associated with each entity.  Determine the type of attribute for all the entities (e.g., simple, composite, derived, primary, multi-valued etc).  Describe participation constraint between the entities.  Identify the type of relationship between entities. | **10 Marks** | **L3** | **CO2** |
| **b.** | Consider the Sailors-Boats-Reserves database described  **Sailor (sid, sname, rating, age)**  **Boat(bid, bname, color)**  **Reserves (sid, bid, date)**  Write each of the following queries in SQL.   1. Find the colors of boats reserved by Alber. 2. Find all sailor ids of sailors who have a rating of at least 8 or reserved boat 103. 3. Find the names of sailors who have not reserved a boat whose name contains the string “storm”. Order the names in ascending order. 4. Find the sailor ids of sailors with age over 20 who have not reserved a boat whose name includes the string “thunder”. 5. Find the sailors name where the reserved date is 15-11-2024. | **10 Marks** | **L3** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15.** | **a.** | Consider a relation scheme S = (A, B, C, D, E, F, G, H) on which the following functional dependency hold:  {A–>BC, E–>A, B–>CFH, CH–>G, F–>EG }.  i. Find **candidate** keys.  **ii. Identify prime and non-prime attributes.**  ii. Find the total number of **super keys** of relation R. | **10 Marks** | **L3** | **CO3** |
| **b.** | Which Normal forms are based on the concept of Partial Dependency and Transitive Dependency? Explain with an example. | **10 Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.** | Consider the table and functional dependency given below:    FunctionalDependency:  **{Emp\_id->Pno,**  **Pno->Pname,**  **(Emp\_id,Pno->P\_Hrs)}**  Normalize the given table into 1NF, 2NF, 3NF and BCNF along with justifying the reason to decompose the table. | **10 Marks** | **L3** | **CO3** |
| **b.** | Discuss the informal design guidelines for a relational schema with suitable examples. | **10 Marks** | **L3** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **17.** | **a.** | Illustrate Insertion Anomalies, Deletion Anomalies and Updation Anomalies with the help of examples. | **10 Marks** | **L2** | **CO3** |
| **b.** | Explain different types of functional dependency in detail. | **10 Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **18.** | **a.** | Construct the states through which a transaction passes during execution and explicate the desirable properties of any transaction with example | **10 Marks** | **L2** | **CO3** |
| **b.** | Explain the causes of transaction failure or why do we need recovery in transaction. | **10 Marks** | **L2** | **CO3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***