



**SCHOOL OF COMPUTER SCIENCE AND ENGINEERING**  
**CONTINUOUS ASSESSMENT TEST - II**  
**WINTER SEMESTER 2024-2025**

SLOT: B2

**Programme Name & Branch** : B. Tech ( CSE and Business Systems)  
**Course Code and Course Name** : CBS1007 and Database Systems  
**Faculty Name(s)** : Prof. K. Govinda & Prof. M. Anbarasi  
**Class Number(s)** : VL2024250505148 & VL2024250505151  
**Date of Examination** : 17.3.2025  
**Exam Duration** : 90 minutes  
**Maximum Marks: 50**

**General instruction(s):**

- Answer All Questions
- Course Outcomes
  - CO 4: Use the concepts of data normalization to analyse, measure and evaluate the performance of a database application
  - CO 6: Construct efficient SQL queries to retrieve and manipulate data as required

| Q. No | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | M  | CO | BL |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
| 1.    | Suppose we are given a database with a table T with attributes (M, N, P, Q, R) and a set of functional dependencies<br>$F = \{MQ \rightarrow NR, MR \rightarrow P, RP \rightarrow NQ, P \rightarrow Q\}$ .<br>a) Is T in 3NF? If the answer is no, briefly explain why? Provide a lossless join and dependency preserving decomposition of T into 3NF. Show the steps you followed for the solution.                                                                                                                                                                                                                                                                         | 5  | 4  | 5  |
|       | b) Provide a lossless join decomposition of T into BCNF. Show the steps you followed for the solution. Justify whether the decomposition obtained is dependency preserving.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5  |    |    |
| 2.    | Let the relation R be R (M, N, O, P, Q) and the given set of FDs be<br>$F = \{M \rightarrow P, NO \rightarrow MP, O \rightarrow N, Q \rightarrow M, Q \rightarrow P\}$ . Find the minimal cover of F.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 5  | 4  | 4  |
|       | Considering F1 and F2 be two sets of functional dependencies,<br>Let $F1 = \{A \rightarrow B, C \rightarrow DE, B \rightarrow EC\}$ $F2 = \{A \rightarrow B, A \rightarrow C, B \rightarrow D, C \rightarrow E\}$<br>Check whether the functional dependencies are equivalent.                                                                                                                                                                                                                                                                                                                                                                                               | 5  |    |    |
| 3.    | Consider a relational database about the International Sled Dog (Husky) Racing Association (ISDRA). The database consisting of the following tables.<br>Dogs ( <u>did</u> , dname, dob, weight)<br>Mushers ( <u>mid</u> , mname)<br>Races ( <u>mid</u> , <u>did</u> , racenumber)<br>Write the relational algebra expression for the following:<br>a. Find the number of times that each dog has participated in races. (2.5)<br>b. Find the names of mushers who have used both "max" and "chaco" in races before. (2.5)<br>c. Find the names of dogs whose age is between 5 to 9 (2.5)<br>d. Find the names of mushers who have raced with all the dogs in the past. (2.5) | 10 | 6  | 3  |



**VIT**  
Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

**SCHOOL OF COMPUTER SCIENCE AND ENGINEERING**  
**CONTINUOUS ASSESSMENT TEST - II**  
**WINTER SEMESTER 2024-2025**

SLOT: B2

|    |                                                                                                                                                                                                                                                                          |    |   |   |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---|
| 4. | Consider the same database which is given in the question 3. Write the SQL query and draw the query tree for the following.<br>Find the names of dogs that have never participated in any races and age of the dogs is more than 5 years.                                | 10 | 4 | 6 |
| 5. | Consider the following schedules<br>S1 = r1(A) r2(A) w1(A) w2(A)<br>S2 = r1(A) r2(B) w3(A) r2(A) r1(B)<br>S3 = r1(A) w2(A) w1(A) r3(A)<br>Check whether the schedules are conflict serializable? For each serializable schedule determine the equivalent serial schedule | 10 | 6 | 3 |

\*\*\*\*\*