**United College of Engineering and Research, Prayagraj**

**Department of Computer Science and Engineering**

**B.Tech.**

**IIIrd Sessional Examination (2020-21)**

**Semester: Vth Branch: CSE/IT**

**Subject Name: Database Management System Subject Code: KCS-501**

**Time: 2:00 Hours Max Marks: 30**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Section-A** | | | | | | | | |
| **Question**  **No.** | **Question** | | **Max. Marks** | | **CO** | | **BL** | |
| 1 | **Attempt all** | | | | | | | |
| a | Define the candidate key, primary key, super key. | | 1 | | CO1 | | L1 | |
| b | Describe the role of Database Administrator (DBA) in Database Management System. | | 1 | | CO1 | | L1 | |
| c | Define partial key with example. | | 1 | | CO1 | | L1 | |
| d | Consider the join of relation R with a relation S. If R has m tuples and S has n tuples, then the maximum and minimum size of the join respectively are  **(A)** m+n and 0 **(B)** m+n and |m-n|  **(C)** mn and 0 **(D)** mn and m+n | | 1 | | CO2 | | L2 | |
| e | Discuss the entity integrity and referential integrity constraints. Why is each considered important? | | 1 | | CO2 | | L2 | |
| f | Explain division operator in relational algebra using example. | | 1 | | CO2 | | L2 | |
| g | Define deadlock in DBMS. | | 1 | | CO5 | | L1 | |
| h | What is Thomas’s Write rule? | | 1 | | CO5 | | L1 | |
| i | Two phase locking protocol ensures which of the following:-  (i) Freedom from cascading rollback  (ii) Freedom from deadlock  (iii) Conflict serializable.   1. (i) & (ii) (B) (ii) & (iii) (C) (iii) only (D) (ii) only | | 1 | | CO5 | | L2 | |
| **Section-B** | | | | | | | | |
| 2 | **Attempt all** | | | | | | | |
| a | 1. Consider the following relation schema R(A,B,C,D,E) and FD’s A🡪BC, C🡪A,D🡪E, F🡪A, E🡪D   Is the decomposition of R into R1(A, C, D), R2(B,C, D) AND R3(E,F,D) lossless?  OR   1. Suppose you are given a relation *R* with four attributes *ABCD*. For each of the following sets of FDs, assuming those are the only dependencies that hold for *R*, do the following: (a) Identify the candidate key(s) for *R*. (b) Identify the best normal form that *R* satisfies (1NF, 2NF, 3NF, or BCNF). (c) If *R* is not in BCNF, decompose it into a set of BCNF relations that preserve the dependencies. 2. F={ *A → B, BC → D, A → C }* 3. F={ *AB → C, AB → D, C → A, D → B}* | | 3 | | CO3 | | L3 | |
| b | 1. What do you understand by ACID properties of transaction ? Explain in details.   OR   1. Which of the following schedules is conflict serializable? For each serializable schedule, find its equivalent schedule.   S1: r1(x), r3(x), w3(x), w1(x) ,r2(x)  S1: r1(x), r2(x), r3(y), w1(x), r2(z) ,r2(y), w2(y) | | 3 | | CO4 | | L2 | |
| c | 1. What is Two phase Locking (2PL)? Describe with the help of example.   OR   1. Explain the phantom phenomena. Discuss a Time Stamp Protocol that avoids the phantom phenomena. | | 5 | | CO5 | | L2 | |
| **Section-C** | | | | | | | | |
| 3. | | **Attempt any one** | | | | | | |
| a | | Describe Time Stamp based locking protocol and also explain its working by taking an example. | | 10 | | CO5 | | L4 |
| b | | What is deadlock? What are necessary conditions for it? How it can be detected and recovered? | | 10 | | CO5 | | L4 |