

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: M.Tech.
BRANCH: CSE**

**SEMESTER : II
SESSION : SP/2023**

**SUBJECT: CS511 ADVANCED DATABASE MANAGEMENT SYSTEM
TIME: 3 Hours**

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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| Q.1(a) Discuss the atomicity, durability, isolation, and consistency preservation properties of a database transaction. | [5] CO1 | BL1 |
| Q.1(b) Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below.
Draw the serializability (precedence) graphs for S1 and S2, and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s).
T1: r1 (X); r1 (Z); w1 (X);
T2: r2 (Z); r2 (Y); w2 (Z); w2 (Y);
T3: r3 (X); r3 (Y); w3 (Y);
S1: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y);
S2: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X); w2 (Z); w3 (Y); w2 (Y); | [5] CO1 | BL3 |
| Q.2(a) Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems. | [5] CO2 | BL1 |
| Q.2(b) Discuss the timestamp ordering protocol for concurrency control. How does strict timestamp ordering differ from basic timestamp ordering? | [5] CO2 | BL1 |
| Q.3(a) Discuss the different types of transaction failures. What is meant by catastrophic failure | [5] CO3 | BL1 |
| Q.3(b) Discuss the deferred update technique of recovery. | [5] CO3 | BL1 |
| Q.4(a) What is a fragment of a relation? What are the main types of fragments?
Why is fragmentation a useful concept in distributed database design? | [5] CO4 | BL1 |
| Q.4(b) Discuss the factors that affect query decomposition. How are guard conditions and attribute lists of fragments used during the query decomposition process? | [5] CO4 | BL1 |
| Q.5(a) What is a data warehouse? Describe the characteristics of a data warehouse. | [5] CO5 | BL1 |
| Q.5(b) Describe the steps of building a warehouse | [5] CO5 | BL1 |

:25/04/2023:E