

**MCA**4<sup>th</sup> Semester Examination – 2021*Paper: Database Implementation*

Full Marks : 70

Time: 02 Hours

*(Answer all questions within 300 words)*

1. (a) 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). [14]

T 1: r 1 (X); r 1 (Z); w 1 (X);

T 2: r 2 (Z); r 2 (Y); w 2 (Z); w 2 (Y);

T 3: r 3 (X); r 3 (Y); w 3 (Y);

S 1: r 1 (X); r 2 (Z); r 1 (Z); r 3 (X); r 3 (Y); w 1 (X); w 3 (Y); r 2 (Y); w 2 (Z); w 2 (Y);

S 2: r 1 (X); r 2 (Z); r 3 (X); r 1 (Z); r 2 (Y); r 3 (Y); w 1 (X); w 2 (Z); w 3 (Y); w 2 (Y);

**OR**

- (b) What are some variations of the two-phase locking protocol? Why is strict or rigorous two-phase locking often preferred? [9]
- (c) What is a timestamp? How does the system generate timestamps? [5]
2. (a) Discuss the various type constructors. How are they used to create complex object structures? [8]
- (b) What is the difference between persistent and transient objects? How is persistence handled in typical OO database systems? [6]
- OR**
- (c) List the basic operations of the following built-in interfaces of the ODMG object model: Object, Collection, Iterator, Set, List, Bag, Array, and Dictionary. [14]
3. (a) List the different types of transaction failures. What is meant by catastrophic failure? [4]
- (b) Describe the write-ahead logging protocol. [10]
- OR**
- (c) Describe the three phases of the ARIES recovery method. [12]
- (d) What are log sequence numbers in ARIES? [2]
4. (a) What are the differences between the use of tags in XML versus HTML? [4]
- (b) Explain the three types of XML documents. Create a complex XML element <Projects>, that contains other simple elements. [10]

**OR**

- (c) What is the difference between data-centric and document-centric XML documents? [8]
- (d) Write a PHP program to display a welcome message by asking user to enter his name. [6]
5. (a) State the Market-Basket Model and explain the Apriori algorithm to solve the Market Basket Problem. [14]
- OR**
- (b) What are classification rules and how are decision trees related to them? [8]
- (c) How does clustering differ from classification? [6]

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