

**Question 1: Timestamp Ordering ..... [110 points]**

- (i) **[10 points] Timestamp Ordering:**  
Distinguish between: (1) pessimistic and (2) optimistic approach.
- (ii) **[10 points] Timestamp Ordering:**  
What is the purpose of a timestamp?
- (iii) **[10 points] Timestamp Ordering:**  
How are timestamps generated?
- (iv) **[10 points] Timestamp Ordering:**  
When should the DBMS abort a txn with basic timestamp ordering?
- (v) **[10 points] Timestamp Ordering:**  
Explain the purpose of the Thomas Write Rule.
- (vi) **[10 points] Timestamp Ordering:**  
Are deadlocks possible with this protocol? Is starvation possible with this protocol?
- (vii) **[10 points] Timestamp Ordering:**  
Define a recoverable schedule.
- (viii) **[10 points] Timestamp Ordering:**  
List the limitations of timestamp ordering.
- (ix) **[10 points] Timestamp Ordering:**  
Does the TO protocol use latches?
- (x) **[10 points] Partition-based Timestamp Ordering:**  
Distinguish between: (1) basic and (2) partition-based TO.
- (xi) **[10 points] Partition-based Timestamp Ordering:**  
Explain how reconnaissance mode is used in partition-based TO.