



- (b) Describe how a non-recoverable situation could arise if write locks are released after the last operation of a transaction but before its commitment. What are the advantages and drawbacks of multiversion timestamp ordering in comparison with the ordering timestamp ordering?
- (c) Describe the architecture for locking scheduler.
3. Attempt any **two** parts from the following : **(10×2=20)**
- (a) What do you mean by Fragmentation ? Explain horizontal and vertical fragmentation with examples.
- (b) Explain allocation problem. Describe any algorithm for allocation.
- (c) What is Replica ? Explain Replication Techniques.
4. Attempt any **two** parts from the following : **(10×2=20)**
- (a) Discuss Issues of recovery and atomicity in distributed database.
- (b) What is Recovery Line ? Describe an algorithm to determine the recovery line.
- (c) What is checkpointing ? Discuss a checkpointing based method for recovery in distributed database.

5. Attempt any **two** parts from the following : (10×2=20)

- (a) Explain Deadlock Management in brief. Differentiate communication deadlock and resource deadlock.
- (b) Explain semi join-based algorithms and distributed query optimization algorithms. Explain distributed cost model with an example.
- (c) Write short note on Eager and Lazy Replication Techniques.