

(2 ½ Hours.)

[Total Marks: 60]

- N. B.:** (1) All questions are compulsory.
 (2) Numbers to the right indicate marks.
 (3) Make suitable assumptions wherever necessary and state the assumptions made.
 (4) Answers to the same question must be written together.
 (5) Mixing of Sub-Questions is not allowed.
 (6) Draw neat labelled diagrams wherever necessary.

1. Attempt any two of the following:

12

- Explain different Levels of Distributed Transparent System.
- Discuss the various factors for DDBMS Architecture.
- State the significance of replication in distributed databases.
- Write a brief note on Query Optimization.

2. Attempt any two of the following:

12

- Explain the Three-Phase Commit Protocol and its advantages over the Two-Phase Commit Protocol.
- Differentiate between intra-query parallelism and inter-query parallelism.
- Define deadlock in distributed transaction management. State its prevention.
- Demonstrate how timestamp ordering ensures serializability in distributed systems.

3. Attempt any two of the following:

12

- Explain the concept of constructors and inheritance in object-oriented databases.
- Write a detailed note on the structure and granularity of time domains in temporal databases.
- State the differences between raster and vector models in spatial databases.
- Write a brief note on R-trees for storing spatial data.

4. Attempt any two of the following:

12

- Define recursive queries and explain their use in deductive databases.
- Discuss active databases and compare with traditional database triggers.
- Explain safe Datalog programs and their significance.
- What is content-based retrieval in multimedia databases? Explain the two main approaches used for identifying the contents of multimedia sources.

5. Attempt any two of the following:

12

- Compare horizontal and vertical fragmentation techniques.
- Explain the clustering methods used in spatial databases.
- Discuss the challenges of implementing multimedia databases.
- What is the role of external schemas in DDBMS architecture?