

Advance Database Management (315324)

MSBTE Diploma · K-Scheme · Model Question Paper — Set B

Time: 3 Hours**Max. Marks: 70****Instructions:**

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) What is a lock? Draw the lock-compatibility matrix for shared and exclusive locks.
- b) Define throughput and response time of a parallel database system.
- c) Define XPath. Write any two XPath expressions and state their meaning.
- d) State any four benefits of NoSQL databases.
- e) Write the syntax of the find() function of MongoDB and explain its parameters.
- f) Expand ETL. State the purpose of each step.
- g) Define distributed database. List its two types.

Q.2 Attempt any THREE of the following:**12**

- a) Explain the Two-Phase Locking protocol. Also state the need of strict and rigorous two-phase locking.
- b) Compare parallel database and distributed database. (Any four points)
- c) Explain structured types and type inheritance in SQL with an example.
- d) Explain structured, semi-structured and unstructured data with examples.

Q.3 Attempt any THREE of the following:**12**

- a) Differentiate between transaction server and data server. (Any four points)
- b) Draw and explain the architecture of a distributed database system.
- c) Write MongoDB queries to insert multiple records into a collection *employees* (name, dept, salary) and display the employees having salary more than 40000 using find().
- d) Explain the data lakehouse and its components.

Q.4 Attempt any THREE of the following:**12**

- Explain the clauses of a FLWOR expression with an example on suitable XML data.
- Explain any four data types supported by MongoDB with examples.
- Explain support and confidence of an association rule. For the transactions T1 {bread, milk}, T2 {bread, butter, milk}, T3 {bread, butter}, T4 {milk, tea}, T5 {bread, butter, milk, tea}, find the support and confidence of the rule bread $\rightarrow$ butter.
- Explain shared-nothing and hierarchical architectures of parallel databases with neat diagrams.
- Differentiate between object-oriented and object-relational databases. (Any four points)

Q.5 Attempt any TWO of the following:

12

- Explain lock-based protocols with respect to modes of locks, lock-compatibility and granting of locks, with an example.
- Write SQL statements to: i) create a structured type *address_t* (street, city, pin) ii) create table *employee* (eid, ename, address of type *address_t*, phones as an array, skills as a multiset) iii) insert two rows iv) display names of employees living in 'Pune' v) display the first phone number of each employee vi) display employees having the skill 'Python'.
- Write the output of the following commands executed in the MongoDB shell and explain each:
i) `new Date("2026/1/26")` ii) `"Advance Database".toUpperCase()` iii) `"MongoDB".length` iv) `[5, 10, 15].concat([20])` v) `Math.max(12, 45, 7)` vi) `"MSBTE-K-Scheme".split("-")`

Q.6 Attempt any TWO of the following:

12

- Explain the three-tier architecture of a data warehouse with a neat diagram.
- Explain XML document schema. Write a DTD and an XML Schema for a *student* document with suitable example.
- Explain transaction processing in a distributed database system. Describe the two-phase commit protocol.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in