

TE sem IV 'C' scheme Summer 2025

Time:3hrs

Max. Marks:80

**N.B.: 1. Question no. 1 is compulsory.**

2. Attempt **any Three** from out of remaining **Five** questions.
3. Assume suitable data wherever necessary.
4. Figures at right indicates full marks.

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(13/03/25)

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| Q 1 | a Discuss Query Optimization in brief.   | 5  |
|     | b Explain CAP Theorem in NoSQL.  | 5  |
|     | c Differentiate between Data mart and Data Ware house.   | 5  |
|     | d Discuss various characteristics of Big Data  | 5  |
| Q 2 | a Explain Discretionary Access Control (DAC) and the Grant Option in DAC.<br>Illustrate with a suitable example how the grant option works.  | 10 |
|     | b What is a Federated Data Warehouse? Discuss its architecture.  | 10 |
| Q 3 | a Differentiate between Star Schema and Snowflake Schema in data warehousing. Also, design a Star Schema for an E-commerce System and briefly explain its components.                        | 10 |
|     | b Explain in detail the Key-Value Store and Document Store data architectural patterns in NoSQL databases. Discuss their characteristics and provide suitable real-world use cases for each. | 10 |
| Q 4 | a Explain the ETL (Extract, Transform, Load) process in detail. Describe each phase with its purpose, tools commonly used, and its importance in data warehousing and business intelligence. | 10 |
|     | b What are Business Intelligence (BI) tools? Explain the commonly used BI tools and their key features.  | 10 |
| Q5  | a Explain MOLAP, ROLAP, and HOLAP in detail. Discuss their differences, advantages, and typical use cases.   | 10 |
|     | b Explain the External Merge Sort algorithm with a suitable example. Also, calculate the required number of block transfers and seek costs involved in the process.                          | 10 |
| Q6  | a Write a short note on OLTP (Online Transaction Processing).  | 5  |
|     | b Write a short note on Distributed Database and its usefulness.   | 5  |
|     | c Write a short note on Spatial Databases, highlighting their key features and uses.   | 5  |
|     | d Write a short note on Mobile Databases, highlighting their key features and uses.  | 5  |

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