

**CMR ENGINEERING COLLEGE: : HYDERABAD****UGC AUTONOMOUS****III–B.TECH–II–Semester End Examinations (Regular) - June- 2025****DATA ENGINEERING****(CSD)****[Time: 3 Hours]****[Max. Marks: 60]****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A****(10 Marks)**

1. a) List the different types of database schemas used in Data Warehousing. [1M]
- b) What is the role of a Data Engineer? [1M]
- c) What is the significance of ETL staging in data pipelines? [1M]
- d) List 3 AWS tools used in ETL operations. [1M]
- e) What are Kubernetes pods? [1M]
- f) State two uses of REST APIs in data pipelines. [1M]
- g) Define NoSQL databases. Give one use case. [1M]
- h) What is a Time Series Database? Give one example. [1M]
- i) What is data storytelling in analytics dashboards? [1M]
- j) Define Active Directory and its role in device/data management. [1M]

**PART-B****(50 Marks)**

2. Explain the differences between RDBMS and NoSQL. Create an example database in MySQL and define its schema. [10M]

**OR**

3. Design a denormalized schema from 3NF for a sales analytics dashboard. [10M]

- 4.a) Draw and explain Data Warehouse Architecture. [5M]
- b) Compare columnar vs row-based storage. [5M]

**OR**

5. Design an OLAP cube from a STAR schema and explain slicing and dicing operations. [10M]

6. Explain the Hadoop ecosystem. Implement a real-world example using HDFS and MapReduce. [10M]

**OR**

- 7.a) Describe Docker container lifecycle. [5M]
- b) How does Docker help in microservice scalability? [5M]

8. Compare Spark RDD and DataFrames with code examples in Scala. [10M]

**OR**

9. List and explain the types of NoSQL databases with examples. [10M]

- 10.a) Compare Tableau and PowerBI features. [5M]
- b) Explain the importance of Business Intelligence in mobile-first architectures. [5M]

**OR**

11. Explain Lambda and Kappa architecture with neat diagrams. [10M]

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