

CMR ENGINEERING COLLEGE: : HYDERABAD**UGC AUTONOMOUS****III–B.TECH–II–Semester End Examinations (Supply) - December- 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) Differentiate between OLTP and OLAP databases. [1M]
- b) What is the role of a Data Engineer? [1M]
- c) Define the 4Vs of Big Data. [1M]
- d) List any three AWS tools used in the ETL process. [1M]
- e) What is the role of Kubernetes in container orchestration? [1M]
- f) State any two components of the Hadoop ecosystem. [1M]
- g) Mention the key difference between Hive and Impala. [1M]
- h) What is the role of MapReduce in Spark architecture? [1M]
- i) What is the purpose of Business Intelligence (BI) tools like Power BI in real-time analytics? [1M]
- j) List any two BI tools and their purpose. [1M]

PART-B**(50 Marks)**

- 2.a) Design a normalized table for an e-commerce app with customer, product, and order details. [5M]
- b) Explain with an example how a Star schema is implemented from a normalized table. [5M]

OR

3. Analyze OLTP and OLAP architectures with business use case examples and performance metrics. [10M]
- 4.a) Illustrate the architecture of a data warehouse. [5M]
- b) Write about Data Lakes in detail. [5M]

OR

5. Explain the ETL process with an example. [10M]
- 6.a) Discuss the role of Docker in microservices-based data architecture. [5M]
- b) Explain REST API design with examples. [5M]

OR

7. Compare Hadoop and Docker-based architectures in large-scale data systems. [10M]
- 8.a) Write a Spark program in Python using the DataFrame API to filter customers with >500 orders. [5M]
- b) Explain Spark SQL and its advantages. [5M]

OR

9. Differentiate between NoSQL Document Store and Key-Value Stores with examples. [10M]
- 10.a) Explain Lambda vs Kappa Architecture. [5M]
- b) Write about mobile APIs. [5M]

OR

11. Write in detail about Tableau and Power BI. [10M]
