(3 Hours)   Total Marks 80

N B
1) Question **number 1** is compulsory
2) Attempt **any three** out of the remaining **five questions**.
3) Assume suitable data if **necessary** and justify the assumptions.
4) The figures to the **right** indicate full marks

Q1

A	Explain in brief the taxonomy of time series forecasting	5
B	Explain in brief the objectives of Data Exploration	5
C	State the reasons for the outliers occurring in the dataset	5
D	What is anomaly detection? Explain the process of anomaly detection	5

Q2	A	Discuss the working of the ARIMA model in detail	10
	B	Explain the DBSCAN algorithm to detect outliers. Give the advantages and disadvantages of the algorithm	10

Q3	A	Explain SMOTE in detail	10
	B	Explain the Data Science Process	10

Q4	A	Find Bowley's coefficient of skewness for the following series.	10

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22

	B	State the importance of Data Visualization. State the purpose of scatter plots, quartile plots, bubble charts, density chart	10
Q5	A	Find the coefficient of skewness from the data given below	10

Size	3	4	5	6	7	8	9	10
Frequency	7	10	14	35	102	136	43	8

	B	Describe how the time-series approach is useful for forecasting the demand for a product	10
Q6	A	Describe how the predictive modelling can be applied to the House price prediction recommendation	10
	B	Explain the significance of Volume, Dimension and Complexity to Data Science Techniques	10

(Time: 3 Hours)   Total Marks: 80

N.B: 1) Question **number 1** is compulsory.
     2) Attempt **any THREE** out of the remaining.
     3) Assume suitable data if **necessary** and justify the assumptions.
     4) Figures to the **right** indicate full marks.

Q 1

    A Explain key Features of Global Scheduling algorithm. [05]

    B What are the services offered by middleware? [05]

    C Differentiate between RMI and RPC. [05]

    D Explain synchronization in DFS with its challenges. [05]

Q 2

    A Justify how load balancing is useful in distributed system. [10]

    B What is fault tolerance? Explain failure models. [10]

Q 3

    A Explain group communication. [10]

    B Explain Raymond's tree based algorithm for mutual exclusion. [10]

Q 4

    A Explain Ricart-Agrawala's algorithm and how it optimizes the message [10]
       overhead in achieving mutual exclusion.

    B Discuss Google file system (GFS) as a scalable distributed file system. [10]

Q 5

    A Explain bully election algorithm. [10]

    B Discuss code migration in distributed system. [10]

Q 6

    A Explain any five data centric consistency models. [10]

    B Discuss design issues in distributed systems. [10]

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Time: 3 hours   Max. Marks: 80

Instructions:
1) Only **Four question** need to be solved.
2) All question carries equal marks.
3) Illustrate your answers with neat sketches wherever necessary.
4) Figures to the right indicate full marks.
5) Assume suitable additional data, if necessary and clearly state it.
6) All sub-questions of the same question should be grouped together.

Q.1	(a)	Explain data carving.	05
	(b)	What is Domain Key Identified Mail (DKIM).	05
	(c)	Write short note on web Forensic.	05
	(d)	What is SIM cards Forensic? Explain the SIM architecture and file structure?	05
Q.2	(a)	What is digital Forensic? What are the goals of digital forensics? Explain the phase after detection of incident?	10
	(b)	Explain volatile data collection for windows system?	10
Q.3	(a)	What is malware analysis? What is the importance of Malware analysis? List and explain any four malware analysis tools and techniques	10
	(b)	Explain data analysis in mobile forensics? Also explain what type of evidence will be obtain from any social networking application (e.g Facebook, whtasapp, webchat)	10
Q.4	(a)	What is digital forensic? Explain the incident response methodology.	10
	(b)	What are the challenges of obtaining RAM memory? List tools to capture RAM.	10
Q.5	(a)	Explain the steps in the router investigation.	10
	(b)	Describe GPS evidentiary data. What are its challenges and limitations? How to extract waypoints and track points from GPX files for displaying the tracks on a Map?	10
Q.6		Write short note **(any 2)**	20
	1	Event log Analysis	
	2	Hidden hard drive partition analysis	
	3	Guidelines for incident report writing	
	4	Steps involved in Unix system investigation	

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