Total No. of Questions : 8]

SEAT No. :

PD-4855

[Total No. of Pages : 2

[6404]-386

B.E. (Artificial Intelligence & Data Science)

DISTRIBUTED COMPUTING

(2019 Pattern) (Semester - VIII) (417531)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidate:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***

Q1) a) Explain the key differences between Centralized and Distributed Load Balancing Techniques. **[6]**

b) Describe what Consensus algorithms are and explain how one specific algorithm works. **[6]**

c) Compare and contrast how Weighted Round Robin and Least Connection load balancing algorithms would perform in a system with varying server capacities and network loads. **[6]**

OR

Q2) a) Describe one variant of Paxos and explain how it differs from the original Paxos algorithm. **[6]**

b) Describe how Genetic Algorithms can be used for task scheduling and explain their benefits in this context. **[6]**

c) Apply load balancing and resource allocation strategies to optimize performance in a cloud computing environment. How would you implement these strategies to handle varying workloads? **[6]**

P.T.O.

Q3) a) Explain Elastic Averaging SGD. **[9]**

b) Explain Systems and Architectures for Distributed Machine Learning. **[8]**

OR

Q4) a) What is Apache Spark? Explain the working of Apache Spark. **[9]**

b) Explain i) Federated Learning.

ii) Elastic Averaging SGD. **[8]**

Q5) a) How would you apply Secure Multi-Party Computation (SMPC) to protect sensitive data in a collaborative machine learning task? **[6]**

b) What are the key differences between SIMD and MIMD? **[6]**

c) Describe the concepts of Threat Hunting and Visualization and explain how they are used in cybersecurity. **[6]**

OR

Q6) a) Summarise the AI-based Intrusion Detection and Threat Mitigation Techniques. **[6]**

b) Explain Anomaly as well as Behavior AI-based Intrusion Detection & Threat Mitigation Techniques **[6]**

c) Discuss about various types of real-time analytics used in distributed computing systems. **[6]**

Q7) a) Explain how reinforcement learning can be applied to load balancing in distributed systems, highlighting its potential advantages. **[9]**

b) Apply different Big Data processing frameworks in a distributed computing environment to solve a specific data analysis problem. How would you choose and implement the appropriate framework? **[8]**

OR

Q8) a) Describe the different types of data ingestion and explain how each type is used in data processing workflows. **[9]**

b) Describe Al-based intrusion detection and threat mitigation techniques and explain how they help enhance network security. **[8]**