

Duration: 3 Hours

[Max. Marks: 80]

12

- N.B.: (1) Question No 1 is Compulsory.
 (2) Attempt any **THREE** questions out of the remaining **FIVE**.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

Q1 Attempt any **FOUR** [20]

- A Explain Training error and Generalization error.
- B Differentiate between Supervised and unsupervised Learning
- C Differentiate between Linear regression and Logistic regression.
- D Explain issues in Machine learning.
- E Explain performance evaluation metrics for the classification.

Q2 A Demonstrate MST algorithm along with example. [10]
 B Explain Logistics regression and performance evaluation metrics. [10]

Q3 A Demonstrate steps to design a Machine Learning application. [10]
 B What is over fitting, under fitting and Bias variance trade-off with reference to Machine learning? [10]

Q4 A Demonstrate Ensemble learning based Random Forest algorithm in detail. [10]
 B Suppose we want Gini index to decide whether the car will be stolen or not. The target classification is "car is stolen?" which can be Yes or No, create a decision tree for the given data below. [10]

Car no	Colour	Type	Origin	Stolen ?
1	Red	Sports	Domestic	Yes
2	Red	Sports	Domestic	No
3	Red	Sports	Domestic	Yes
4	Yellow	Sports	Domestic	No
5	Yellow	Sports	Imported	Yes

Car no	Colour	Type	Origin	Stolen ?
6	Yellow	SUV	Imported	No
7	Yellow	SUV	Imported	Yes
8	Yellow	SUV	Domestic	No
9	Red	SUV	Imported	No
10	Red	Sports	Imported	Yes

Q5 A Give steps to design PCA dimensional reduction technique along with an example. [10]
 B Demonstrate DBSCAN algorithm along with example. [10]

Q6 Write detailed note on following. (Any TWO) [20]
 A Write a short note on XGBoost ensemble method.
 B Explain support vector machine as constraint optimization problem.
 C SVM Kernel trick



BE sem VII Computer R-19 C scheme

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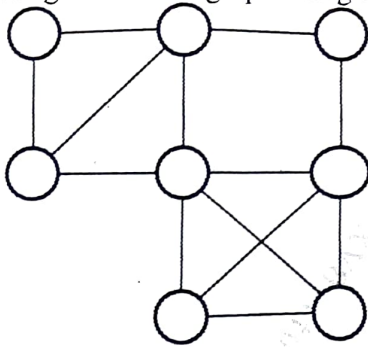
Total Marks: 80

- Note: 1. Question 1 is compulsory
 2. Answer any three out of the remaining five questions.
 3. Assume any suitable data wherever required and justify the same.

- Q.1 a) Explain CAP. How is CAP different from ACID property in databases? [05]
 b) Secondary Name node is a backup of Name node. Is this statement True or False? Justify your answer. [05]
 c) List and explain the core business drivers behind the NoSQL movement. [05]
 d) List down any five constraints that must be satisfied for representing a stream by buckets using DGIM algorithm with examples. [05]
- Q.2 a) List the architectural patterns in NoSQL databases. Discuss the Key-Value and Document-Oriented patterns, focusing on their characteristics, use cases, and examples. [10]
 b) Write a map reduce pseudo code for word count problem. Apply map reduce working on the following document: [10]
 "This is NoSQL. NoSQL handles complex data."
- Q.3 a) Explain Map Reduce execution pipeline with suitable example. [10]
 b) Create a Bloom filter with the following parameters: [10]
 Size of the bit array $m=8$
 Hash functions:
 $h_1(x)=x \bmod m$
 $h_2(x)=(2x+1) \bmod m$
 $h_3(x)=(3x+2) \bmod m$
 (i) Insert the following elements into the Bloom filter: 12, 25, 30, 5
 (ii) Check if the following elements are present in the Bloom filter: 6, 55
 (iii) Discuss the results of your checks, identifying which elements is true positive and which is true negative.
- Q.4 a) For the stream of integers: 9, 8, 7, 6, 5, 4, 3, 2. Use the hash function, $h(x)=(2x+1) \bmod 32$ and treat the result as a 5-bit binary integer. Show the steps of the Flajolet-Martin algorithm to estimate the number of distinct elements in this stream. [10]
 b) Draw a diagram of the typical Hadoop Ecosystem and explain any two components of it. [10]



Q.5 a) Write an algorithm for the Clique Percolation Method and discover the communities in the given below graph using Clique Percolation Method with clique $k=3$. [10]



- b) i. List and explain the functions provided by R to combine different sets of data. [10]
- ii. Write the script to sort the values contained in the following vector in ascending order and descending order: (46, 23, 15, 38, 98, 56, 28, 78). Demonstrate the output.

Q.6 a) The project manager at ABC Corp, Mr. Thomas, needs to track information about ongoing projects in the organization. He has the following details about current projects in a table format: [10]

ProjectId	ProjectName	Budget
1	Website Redesign	150000
2	Mobile App Launch	100000
3	Data Migration	80000
4	AI Development	200000
5	Cybersecurity Audit	50000

- i) Create a Data frame in R for the above project data and display the output.
 - ii) Show the structure and summary statistics of the Data Frame created.
- b) Justify the use of a Content-Based Recommendation System with a specific case study. [10]

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N.B.: 1) Question No.1 is compulsory.

2) Attempt any THREE questions out of remaining FIVE questions.

3) Figures to the right indicates full marks.

4) Assume suitable data if necessary.

- | | | |
|-----|---|----|
| Q1 | | 20 |
| a | What is Cybercrime? Who are Cybercriminals? Explain. | |
| b | How Cybercrimes differs from most terrestrial crimes? | |
| c | What are different Security Risks for Organizations? | |
| d | Outline the challenges for securing data in business perspective. | |
| Q.2 | | |
| a | What are illegal activities observed in Cyber Cafe? What are safety and security measures while using the computer in Cyber Cafe? | 10 |
| b | What is digital evidence? Where one can find it. | 10 |
| Q.3 | | |
| a | Explain different types of Cybercrimes. | 10 |
| b | What are basic security precautions to be taken to safeguard Laptops and Wireless devices? Explain. | 10 |
| Q.4 | | |
| a | Explain Steps for SQL Injection attack. How to prevent SQL Injection attacks? | 10 |
| b | Discuss steps involved in planning of cyberattacks by criminal. | 10 |
| Q.5 | | |
| a | What is vishing attack? How it works? How to protect from vishing attack? | 10 |
| b | What is e-commerce? Discuss types of e-commerce. | 10 |
| Q.6 | Write short notes on any FOUR | 20 |
| a | Cyberstalking and harassment | |
| b | HIPAA | |
| c | Buffer overflow attack | |
| d | Botnets | |
| e | DOS attack | |
| f | Mobile/Cell Phone attacks | |



BE Sem VII Computer R-19 C scheme

(3 Hours)

(Total Marks: 80)

14/12/24

- N.B.:**
1. Question No. 1 is compulsory.
 2. Answer any three out of the remaining questions.
 3. Assume suitable data if necessary.
 4. Figures to the right indicate full marks.

Q1. Attempt the following (any 4):

(20)

- a. What is a Merkle tree? Explain the structure of a Merkle tree.
- b. Compare Bitcoin and Ethereum
- c. Differentiate between PoW and PoS.
- d. What is a Smart Contract? What are the different types of smart contracts?
- e. Explain five challenges of Blockchain Implementation.

Q2. Attempt the following:

a. Explain the components of Blockchain.

(10)

b. What is RAFT consensus algorithm? Explain in detail.

(10)

Q3. Attempt the following:

a. What is cryptocurrency? Explain different types of Cryptocurrencies.

(10)

b. Explain state machine replication.

(10)

Q4. Attempt the following:

a. Explain the following terms with respect to Ethereum: Miner and Mining Node, Gas, Accounts, Ether, Transactions.

(10)

b. Write a program in solidity to implement multi-level inheritance.

(10)

Q5. Attempt the following:

a. What is double spending problem? Which algorithm helps in solving it and how? (10)

b. Explain view and pure functions in solidity with suitable examples.

(10)

Q6. Write short notes on (any 2):

(20)

a. Quorum

b. Hyperledger Fabric v1 Architecture

c. PAXOS consensus algorithm

d. Corda

