

(3 Hours)

Total Marks : 80

INSTRUCTIONS

- (1) Question No. 1 is compulsory.
- (2) Attempt any (3) from remaining (5) questions.
- (3) Assume suitable data if required.
- (4) Figures to the right indicate full marks.

**Q1** Attempt any four (4) questions.

- a) Explain different types of Blockchain. Give example of each. [5]
- b) What is Smart Contract? Explain different types of Smart Contracts. [5]
- c) Explain the concept of Ethereum Virtual Machine with suitable diagram? [5]
- d) With suitable diagram explain how transaction flow occurs in Hyperledger fabric? [5]
- e) What are different types of test-networks used in Ethereum? [5]

- Q2** a) Explain the phases of development in ETH 2.0 with suitable diagram. [10]  
b) What are different steps involved in the implementation of Blockchain? [10]

- Q3** a) Explain Bitcoin UTXO with suitable example. [10]  
b) Explain the RAFT consensus mechanism with suitable diagram. [10]

- Q4** a) Explain Ethereum Accounts in detail. [10]  
b) How does Blockchain Supports Crowd Funding? [10]

- Q5** a) What is Hyperledger Fabric? What are different components of Hyperledger Fabric? [10]  
b) What is Quorum Blockchain? Explain the structure of Quorum Node with suitable diagram. [10]

- Q6** Write a short note on : [20]  
a) MetaMask  
b) Mist Wallet  
c) Ripple Blockchain.  
d) Byzantine Fault Tolerant

**Duration: 3hrs**

**[Max Marks:80]**

- 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.

- 1 Attempt **any FOUR** [20]
- a Describe services and mechanisms.
  - b ECB and CBC block cipher.
  - c Why digital signature and digital certificates are required?
  - d What is keyed and keyless transposition ciphers?
  - e Explain clickjacking and session hijacking.
- 2 a Explain DES algorithm with reference to following points: [10]
- 1. Block size and key size
  - 2. Need of expansion permutation
  - 3. Role of S-box
  - 4. Possible attacks on DES
- b Use the playfair cipher with the keyword “example” to encipher “The algorithm name is playfair cipher” [10]
- 3 a What are properties of hash function? Compare MD-5 and SHA hash algorithm. [10]
- b Explain Diffie hellman key exchange algorithm. [10]
- 4 a What do you understand by digital signatures and digital certificates? Explain digital signature scheme RSA. [10]
- b Explain memory and address protection in detail. Write a note on file protection. [10]
- 5 a Enlist various functions of protocols of SSL. Explain the phases of handshake protocol. [10]
- b Briefly explain database security. What do you understand by multilevel database security. [10]
- 6 Write short notes on **any four**: [20]
- a Web browser attacks
  - b X.509
  - c Cross site request forgery
  - d DNS attack
  - e Email attacks.

**Duration: 3 Hrs**

**[Max Marks: 80]**

- Notes: (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.  
 (5) Figures to the right indicate full marks.

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|----|--|-----------|
| Q1 | a) What is an analytic sandbox, and why is it important?   | <b>5</b>  |
|    | b) Why use autocorrelation instead of autocovariance when examining stationary time series?  | <b>5</b>  |
|    | c) Difference between Pandas and NumPy.  | <b>5</b>  |
|    | d) What is regression? What is simple linear regression?   | <b>5</b>  |
| Q2 | a) Explain in detail how dirty data can be detected in the data exploration phase with visualizations.   | <b>10</b> |
|    | b) List and explain methods that can be used for sentiment analysis.   | <b>10</b> |
| Q3 | a) List and explain the main phases of the Data Analytics Lifecycle.   | <b>10</b> |
|    | b) Describe how logistic regression can be used as a classifier.   | <b>10</b> |
| Q4 | a) Suppose everyone who visits a retail website gets one promotional offer or no promotion at all. We want to see if making a promotional offer makes a difference. What statistical method would you recommend for this analysis? | <b>10</b> |
|    | b) List and explain the steps in the Text Analysis.  | <b>10</b> |
| Q5 | a) How does the ARMA model differ from the ARIMA model? In what situation is the ARMA model appropriate?   | <b>10</b> |
|    | b) Explain with suitable example how the Term Frequency and Inverse Document Frequency are used in information retrieval.  | <b>10</b> |
| Q6 | <b>Write short notes on:</b>   |           |
|    | a) Evaluating the Residuals in Linear regression.  | <b>5</b>  |
|    | b) Box-Jenkins Methodology   | <b>5</b>  |
|    | c) Seaborn Library.  | <b>5</b>  |
|    | d) Data import and Export in R   | <b>5</b>  |

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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) What are various issues in distributed system? **05**  
Explain minimum 5 issues. Each issue carries 1 mark
- (b) Justify how Ricart-Agrawala's algorithm optimized the Message overhead in achieving mutual exclusion **05**
- (c) What are desirable features of global scheduling algorithm. **05**
- (d) Compare process and thread. **05**
- Q.2** (a) Explain the message communication model transient synchronous, transient asynchronous, persistent synchronous and persistent asynchronous in detail. **10**
- (b) What is RPC? Explain the working of RPC in detail with the help of diagram. **10**
- Q.3** (a) Explain Suzuki-Kasami Broadcast Algorithm of mutual exclusion. **10**
- (b) Explain the process of synchronization w.r.t. physical and logical clocks. **10**
- Q.4** (a) Compare Load sharing to Task Assignment and Load balancing strategies for scheduling processes in a distributed system. **10**
- (b) Explain Bully Election algorithm with the help of an example. **10**
- Q.5** (a) Explain in detail different Data centric consistency models. **10**
- (b) Explain Maekawa's algorithm in detail and also specify properties of Quorum Set. **10**
- Q.6** (a) Write a note on code migration. **10**
- (b) What are the features of DFS and explain and draw and explain Model file service architecture. **10**

(3 Hours)

(Maximum Marks: 80)

- NB.** 1. **Question number One** is compulsory  
2. Attempt **any three out of remaining five** questions  
3. Assume suitable data  
4. Figures to the right indicate the maximum marks

- Q1 Attempt any FOUR: (20)**
- a) Define and classify Cybercrime
  - b) Comment on Windows OS Artifacts
  - c) Explain Principles of Digital Forensic.
  - d) Which are the Goals of Incident Response
  - e) How to Acquire Image over a Network
- Q2 a) Explain Digital Forensics and its lifecycle. (10)**  
**b) Explain in detail Incidence Response Methodology (10)**
- Q3 a) Describe Steps to prevent cybercrime and explain Hackers, Crackers and Phreakers (10)**  
**b) Explain Forensic Investigation Report Writing in terms of Standards, Content, Style, Formatting and Organization. (10)**
- Q4 a) Describe Digital Investigation Staircase Model (10)**  
**b) How to Acquire an Image with dd Tools and with Forensic Formats (10)**
- Q5 a) Describe in details OS File Systems. (10)**  
**b) Explain Network-Based Evidence acquisition and its analyzing. (10)**
- Q6 a) Explain Need and types of Computer Forensic Tools in detail. (10)**  
**b) In Mobile Forensics explain Challenges, Evidence Extraction Process, Types of Investigation, and Procedure for Handling an Android Device. (10)**

Time: 3 Hours

Max. Marks: 80

Note: 1. Q.1 is Compulsory.

2. Attempt any 3 from remaining

3. Assume suitable data if necessary

Q.1 Solve any Four

- A. What is Machine Learning? What are the steps in developing a machine learning application? [05]
- B. Differentiate between supervised and unsupervised learning. [05]
- C. Draw and explain biological neural networks and compare them with artificial neural networks. [05]
- D. Explain in detail the MP neuron model. [05]
- E. Explain the overfitting and underfitting with example [05]

Q.2

- A. Draw a block diagram of the Error Back Propagation Algorithm and explain with the flow chart the Error Back Propagation Concept. [10]
- B. The values of independent variable X and the dependent variable Y are given below

X	Y
0	2
1	3
2	5
3	4
4	6

Find the least square regression line  $Y=aX+b$ . Estimate the Y when the value of X equals 10. [10]

Q.3

A. Diagonalize the matrix A

$$\begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$$

[05]

B. List out and explain the applications of SVD

[05]

C. Write short note on maximum expectation algorithm

[05]

D. What are Activation functions? Explain the Binary, Bipolar, Continuous, and Ramp activation functions.

[05]

4.

A. Write a short note on (a) Multivariate Regression and (b) Regularized Regression.

[10]

B. What is the curse of Dimensionality? Explain the PCA dimensionality reduction technique in detail

[10]

Q. 5

A. Design a Hebb net to implement OR function (consider bipolar inputs and targets)

[10]

B. Draw Delta Learning Rule (LMS-Widrow Hoff) model and explain it with a training process flowchart.

[10]

Q. 6. Write short note on any FOUR

A. Least Square Regression for classification

[05]

B. Differentiate between Ridge and Lasso Regression

[05]

C. Artificial Neural Network

[05]

D. Feature selection methods for dimensionality reduction

[05]

E. Perceptron Neural Network

[05]

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