

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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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**

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? | 5 |
| | b) | Why use autocorrelation instead of autocovariance when examining stationary time series? | 5 |
| | c) | Difference between Pandas and NumPy. | 5 |
| | d) | What is regression? What is simple linear regression? | 5 |
| Q2 | a) | Explain in detail how dirty data can be detected in the data exploration phase with visualizations. | 10 |
| | b) | List and explain methods that can be used for sentiment analysis. | 10 |
| Q3 | a) | List and explain the main phases of the Data Analytics Lifecycle. | 10 |
| | b) | Describe how logistic regression can be used as a classifier. | 10 |
| 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? | 10 |
| | b) | List and explain the steps in the Text Analysis. | 10 |
| Q5 | a) | How does the ARMA model differ from the ARIMA model? In what situation is the ARMA model appropriate? | 10 |
| | b) | Explain with suitable example how the Term Frequency and Inverse Document Frequency are used in information retrieval. | 10 |
| Q6 | | Write short notes on: | |
| | a) | Evaluating the Residuals in Linear regression. | 5 |
| | b) | Box-Jenkins Methodology | 5 |
| | c) | Seaborn Library. | 5 |
| | d) | Data import and Export in R | 5 |

(3 Hours)

Max. Marks: 80

- Note: 1. Q.1 Compulsory
2. Solve Any 3 question form remaining questions

- Q1. a) Define software engineering and explain umbrella activities **5**
b) Difference between white box and black box testing **5**
c) Explain functional and non-functional requirements **5**
d) Explain the golden rules for interface design **5**
- Q2 a) Elaborate COCOMO model for Cost estimation
b) Illustrate the SCM process
- Q3. a) Describe the waterfall model and evolutionary process model **10**
b) What is Risk management? Discuss Common sources of risk in IT projects? **10**
- Q4.A) What are the different phases in project life cycle with suitable example **10**
b) What are the Agile Methodologies? Explain any of them **10**
- Q5. a) Develop the SRS of University Management system **10**
b) Describe the details of FTR and Walkthrough **10**
- Q6. a) Explain project scheduling and describe CPM and PERT **10**
b) Explain software reverse engineering in details **10**
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