Time: 3 Hours **Max. Marks: 80**

Instructions:

1) **Question no 1 is Compulsory**
2) Only **Three question** need to be solved.
4) Illustrate your answers with neat sketches wherever necessary.
5) Figures to the right indicate full marks.
6) Assume suitable additional data, if necessary and clearly state it.

Q.1	**(a)**	What is distributed computing? Explain any four issues of distributed computing.	**05**
	(b)	What is group communication? Explain 1:M and M: 1 group communication.	**05**
	(c)	Justify how Ricart-Agrawala's algorithm optimized the Message overhead in achieving mutual exclusion.	**05**
	(d)	Explain code migration and its techniques.	**05**
Q.2	**(a)**	What are the features of DFS and explain and draw and explain Model file service architecture.	**10**
	(b)	What is RPC? Explain the working of RPC in detail with the help of diagram.	**10**
Q.3	**(a)**	What is mutual exclusion? Explain Suzuki-Kasami Broadcast Algorithm of mutual exclusion	**10**
	(b)	What are the goals of a distributed system? Explain various system models of distributed computing?	**10**
Q.4	**(a)**	What is the difference between Data centric consistency models and client centric consistency models? Explain one model of each..	**10**
	(b)	Explain Maekawa's algorithm in detail and also specify properties of Quorum Set.	**10**
Q.5	**(a)**	Discuss the need of the coordinator. Also explain any one algorithm for coordinator selection.	**10**
	(b)	Compare Load sharing to Task Assignment and Load balancing strategies for scheduling processes in a distributed system.	**10**
Q.6	**(a)**	Explain Andrew File System (AFS) in detail.	**10**
	(b)	What is fault tolerance? Explain various types of failure models.	**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 steganography with example.

b Write properties of hash functions.

c What is Digital Signature? Why digital signatures are required?

d List and explain various vulnerabilities in operating system.

e Explain penetration testing.

2 a Explain DES algorithm. What do you mean by double DES and triple DES [10]

b Explain RSA with example. [10]

3 a Write a note on user authentication and session management. [10]

b Explain AES algorithm in detail. [10]

4 a Explain Needham Schroeder Authentication protocol. [10]

b Explain Hill cipher with suitable example. [10]

5 a What are database security requirements? What do you understand by Inference attacks? Explain about multilevel database security. [10]

b Differentiate between MD5 and SHA256. [10]

6 a Write a note on Digital Certificate: X.509 and Public Key Infrastructure. [10]

b Explain web security in detail. [10]

Time: 3 Hours **(Total Marks: 80)**

Note:-1. Question No. one is compulsory.
2. Answer any three out of the remaining questions.
3. Assume suitable data if required.

Q1 **Attempt the following: (Any 4)** **[20]**

[A] What are the common tools used for data preparation phase and model planning phase of data analytics life cycle. **[05]**

[B] Differentiate Linear Regression and Logistic Regression. **[05]**

[C] Explain different data types in R with examples. **[05]**

[D] Explain in brief steps of text analysis. **[05]**

[E] What is time series analysis? Explain its components. **[05]**

[F] What is Pandas? Explain features of Pandas. **[05]**

Q2 **Attempt the following:** **[20]**

[A] List and explain different phases in data analytics lifecycle. **[10]**

[B] Explain Autoregressive (AR), Moving Average (MA), Autoregressive Moving Average (ARMA) and Autoregressive Integrated Moving Average (ARIMA) Models in detail. **[10]**

Q3 **Attempt the following:** **[20]**

[A] Calculating the regression equation of x on y and y on x from the following data and estimate x when y = 20. Also determine the value of correlation coefficient. **[10]**

x	10	12	13	17	18
y	5	6	7	9	13

[B] Explain seven practice areas of text analytics. **[10]**

Q4 **Attempt the following:** **[20]**

[A] Explain with justification that which analysis model is used to predict / forecast monthly average temperature in a specific region over the next year considering historical climate data. **[10]**

[B] Explain following data visualization libraries in Python: Box plot, Violin plot, Pie chart, Histogram, Bar chart **[10]**

Q5 **Attempt the following:** **[20]**

[A] What is a text summarizer? How does it work? Explain the difference between extractive summarization and abstractive summarization. **[10]**

[B] How is data exploration different from presentation? Explain with suitable examples? **[10]**

Q6 **Write a short note on:** **[20]**

[A] Box-Jenkins Methodology **[05]**

[B] Key roles in data analytics life cycle **[05]**

[C] Stepwise regression **[05]**

[D] Generalized Linear model **[05]**

Time: 3 Hours **Max. Marks: 80**

Q.1 Solve any Four

A. What is Machine Learning? Explain in brief various steps in developing a machine learning application? [05]

B. Differentiate between supervised and unsupervised learning. [05]

C. Draw and explain Biological neuron [05]

D. Explain in detail the MP neuron model. [05]

E. List various applications of machine learning. And describe the SPAM/ Non-SPAM email filtering application in detail [05]

Q.2 Solve the following

A. Draw a block diagram of the Error Back Propagation Algorithm and explain with the flow chart the Error Back Propagation Concept. [10]

B. Find a linear regression equation for the following two sets of data: [10]

Time X in (Second)	Mass Y (Grams)
5	40
7	120
12	180
16	210
20	240

Q.3 Solve the following

A. Diagonalize the matrix A [05]

$$\begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$$

B. Write short note on Hebbian Learning rule [05]

C. What is the curse of dimensionality? Explain PCA dimensionality reduction technique in detail. [10]

4. Solve the following

A. Write a short note on (a) Multivariate regression and (b) Regularized Regression. [10]

B. What are activation functions? Explain Binary, Bipolar, Continuous, and Ramp activation functions [10]

Q. 5 Solve the following

A. Find SVD of matrix A which is shown below [10]

$$\begin{bmatrix} 1 & 1 \\ 7 & 7 \end{bmatrix}$$

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. Ridge and Lasso Regression [05]

C. Artificial Neural Networks. [05]

D. Feature selection methods for dimensionality reduction [05]

E. Perceptron Neural Network [05]

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Time: 3 hour **Max. Marks: 80**

Note: Question 1 is compulsory. Attempt any 3 out of remaining 5 questions.

Q1 **(20)**

A. Define software engineering and explain different umbrella activities

B. Explain formal technical review.

C. What is cost estimation? Assume that a system for simple students registration in a course is planned to be developed and its estimated size is approximately 10,000 lines of ode .The organization is proposed to pay Rs 25000/month to software engineers. Compute the development effort , development time ?.

D Differentiate White box and black box testing

Q2

A. Discuss different categories of risk and You are the project manager for a major software company. You have been asked to lead a team that's developing "next generation" word processing software. Create a risk table for the project.. **(10)**

B. Explain project scheduling and dscribe CPM and PERT. **(10)**

Q3.

A. Develop SRS for hospital management system **(10)**

B. Discuss Software configuration management. **(10)**

Q4

A. Discuss project management techniques. **(10)**

B. Explain software quality management with QA and QC **(10)**

Q5

A. Elaborate COCOMO Method of cost estimation. **(10)**

B. Explain software maintenance and different types of maintenance **(10)**

Q6 Write short note on any 2. **(20)**

A. Reverse engineering process

B. Unit testing and integration testing.

C. Software design patterns

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