TE Sem VI CSE AIML R-19 C scheme

Max. Marks: 80

Time: 3 hours

N.B.: (1) Question No.1 is compulsory
(2) Attempt any three questions from remaining five questions.

Q1. Attempt any four of the following: (5 marks each) — 20

(a) Define distributed systems. Discuss their goals and challenges. — 5

(b) Explain the client-server model in distributed systems. — 5

(c) What is middleware? Discuss the services offered by middleware. — 5

(d) Differentiate between physical clocks and logical clocks. — 5

(e) What is process migration? Explain its significance in distributed systems. — 5

Q2. (a) Explain the working of Remote Procedure Call (RPC) with a diagram. — 10

(b) Discuss the role of group communication in distributed systems. — 10

Q3. (a) Explain Lamport's logical clock algorithm with an example. — 10

(b) Describe the Ricart-Agrawala algorithm for distributed mutual exclusion. — 10

Q4. (a) Discuss the task assignment approach in global scheduling algorithms. — 10

(b) Explain the concept of load balancing and load sharing in distributed systems. — 10

Q5. (a) What is replication? Discuss data-centric consistency models. — 10

(b) Explain the concept of fault tolerance and process resilience in distributed systems. — 10

Q6. (a) Discuss the architecture and features of the Hadoop Distributed File System (HDFS). — 10

(b) Explain the file-caching schemes used in distributed file systems. — 10

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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.

			20
Q.1		Write short notes on	
	A	Arithmetic Coding	
	B	FFT	
	C	Digital video Formats	
	D	Representation of Digital Image	

Q.2 A What do you mean by Neighbourhood Processing? Explain with an example. 10

B Explain in detail Hadamard Transform 10

Q.3 A Explain Histogram Equalization. Equalize the following histogram. Show the 10
table for Histogram equalization. Plot the Input histogram and output histogram
for the 3bpp image given below:

7	3	2	1	2
7	3	4	4	6
7	3	4	4	3
4	1	4	5	4
5	5	4	5	4
2	5	5	5	2
7	2	4	5	6
7	2	4	6	5
7	5	4	6	2
2	3	4	2	3

B What do you understand by Image Compression? Can Vector Quantization 10
technique be used for Compressing images if Yes How? If No Why?

Q.4 A Explain segmentation based on Discontinuities 10

B Explain DFT and IDFT in detail 10

Q.5 A Explain in detail Contrast Stretching and Dynamic Range Compression 10
Technique

B Explain with an example Run Length Coding 10

Q.6 Write short notes on 20

A Sampling and Quantization

B Unitary Transforms

C Split and Merge

D Smoothing and Sharpening Filters

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X403Y16BC44X403Y16BC44X403Y16BC44X403Y16BC44
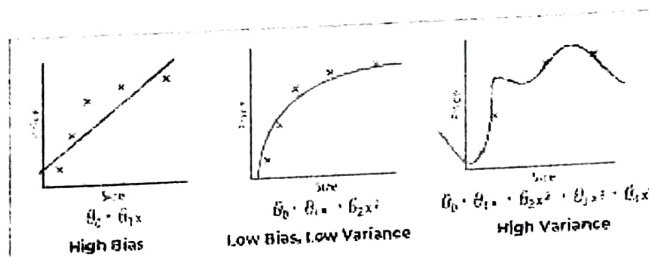
TE sem VI CSE-AIML R-19 Cscheme

[Max Marks: 80]

Duration: 3hrs

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.

[20]

1   Attempt any FOUR

a   With reference to below figure 1,2,3 explain under-fitting and over-fitting. Identify best   [5]
   fit and overfitted line.

$\theta_0 \cdot \theta_1 x$	$\theta_0 \cdot \theta_1 \cdot \theta_2 x^2$	$\theta_0 \cdot \theta_1 \cdot \theta_2 x^2 \cdot \theta_3 x^3 \cdot \theta_4 x^4$
High Bias	**Low Bias, Low Variance**	**High Variance**

b   200 emails that were actually spam were correctly predicted as spam. 50 emails that   [5]
   were actually spam were incorrectly predicted as not spam. 60 emails that were actually
   not spam were incorrectly predicted as spam. And 330 emails that were actually not
   spam were correctly predicted as not spam. For the given data build the confusion
   matrix and find accuracy, precision, recall and f1 score.

c   In a SVM explain the kernel trick.   [5]

d   Draw and explain a biological neuron. Compare ANN with BNN.   [5]

e   What is curse of dimensionality?   [5]

2   a   Find the eigenvalues of the 2 x 2 matrix   [10]

$$A = \begin{bmatrix} 0 & -2 \\ 3 & 4 \end{bmatrix}$$

   Also find eigen vectors

   b   Diagonalize the matrix   [10]

$$\begin{matrix} 2 & 0 & 2 \\ -1 & 2 & 1 \\ 0 & 1 & 4 \end{matrix}$$

[10]

3 a Find the values of a and b to estimate the **linear regression equation** (y= a+bx) for the following two sets of data:

x	2	4	6	8
y	3	7	5	10

    b Explain the need for regularization. Compare Lasso and Ridge Regression techniques   [10] for regularization.

4 a State the **algorithm** for Hebb learning rule. Design Hebb network for **AND gate**. State   [10] weights and bias assumptions clearly. Assume bipolar inputs and targets.

    b Explain the Expectation Maximization algorithm with neat flowchart.   [10]

5 a Explain various activation functions with appropriate diagrams, equations, ranges and   [10] their applications in real world.

    b Explain back error propagation with neat diagram and weight Updation equation.   [10]

6 a Implement OR function using single layer perceptron upto 2 epochs. Assume initial   [10] values of weights and learning rate as follows w1=w2=b=0 threshold (Θ) =0.2 and learning rate (α) = 1.

    b Use Principal component analysis to arrive at the transformed matrix for the given data   [10]

2	1	0	-1
4	3	1	0.5

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Max. Marks: 80

Time: 3 hours
N.B. (1) Question one is Compulsory.
        (2) Attempt any 3 questions out of the remaining.
        (3) Assume suitable data if required.

Q. 1 Answer any 4   05
    a) What is cohesion and coupling   05
    (b) Compare Agile and waterfall models   05
    (c) Compare FTR and walkthroughs.   05
    (d) What is the golden rule for User interface Design   05
    (e) What are different umbrella activities

                                                                          10
Q.2 a) Explain Design concepts and elaborate Architectural Design styles .
    b) 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

                                                                          10
Q. 3 a) Elaborate COCOMO Method of cost estimation.
    b) Write Test cases for input box accepting numbers between 1 and 1000 using
        Equivalence Partitioning and using Boundary Value Analysis.   10

Q.4 a) What is the importance of requirement analysis? Explain different Requirement
        engineering tasks.   10
    b) Explain Software Change management with example.   10

                                                                          10
Q. 5 a) Explain with diagram CMM model
    b) Draw AON diagram and find the critical path. Find the total float time for each
        path and list down the critical and non-critical activities. Find the total duration
        of the project?   10

Activity	Predecessor activity	Duration(days)
A	None	2
B	A	4
C	A	3
D	B	2
E	C	3
F	D	6
G	D	5
H	F,G,E	4

                                                                          20
Q.6 Write Short notes on .
    i.   Software Quality and quality factors
    ii.   PMBOK Knowledge Areas
    iii. Kanban model and extreme programming
    iv.   Reverse engineering and reengineering

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Time: 3 Hours   **Marks: 80**

Note:

1. Question 1 is compulsory.
2. Attempt any 3 questions out of the remaining questions.

Q1. Attempt any Four.

a.	Explain different types of phishing techniques	05
b.	Explain different mechanisms to achieve security.	05
c.	Differentiate MD5 and SHA-1 algorithms.	05
d.	Explain the different modes of block ciphers.	05
e.	List and explain security requirements of database.	05

Q2.

a.	Explain RSA algorithm with example.	10
b.	List the functions of the different protocols of SSL. Explain the handshake protocol.	10

Q3.

a.	List different poly-alphabetic substitution ciphers. Encrypt "The key is hidden under the door" using playfair cipher with keyword "domestic".	10
b.	Explain memory and address protection in detail. Write a note on file protection.	10

Q4.

a.	Define digital signature. Explain any digital signature algorithm in detail.	10
b.	Explain session hijacking and management	10

Q5.

a.	Give the format of X.509 digital certificate and explain the use of a digital signature in it.	10
b.	What is need of Diffie-Hellman algorithm? Explain the algorithm with example.	10

Q6. Attempt any TWO.

a.	List and explain characteristics needed in secure hash function. Compare various hash in detail.	10
b.	Explain Triple DES in detail.	10.
c.	Explain Hill cipher with example.	10

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TE Sem VI CSE (AIML) R-19 Cscheme

Max. Marks: 80

Time: 3 hours

N.B. (1) Question one is Compulsory.
    (2) Attempt any 3 questions out of the remaining.
    (3) Assume suitable data if required.

Q1. Attempt the following (any 4):   [20]
  a. What are the application and use cases for text mining?
  b. What is Seaborn Library? State and explain key features of seaborn.
  c. Explain TFIDF with an example.
  d. Explain Logistic Response Function.
  e. List and explain the various key roles for a successful analytics.

Q2. Attempt the following   [20]
  a. Calculate the linear regression using least square method for the given dataset.

Independent Variable (X)	Dependent Variable (Y)
1	2
2	4
3	5
4	4
5	5

  b. List and explain the different type of data visualization used in R.

Q3. Attempt the following: [20]
  a. Explain the data analytics life cycle.
  b. Explain AR and MA model in detail.

Q4. Answer the following   [20]
  a) Fit a regression equation to estimate β_0, β_1 and β_2 to the following data of a transport company on the weights of 6 shipments, the distances they were moved and the damage of the goods that was incurred.

Weight X_1 (1000 kg)	4.0	3.0	1.6	1.2	3.4	4.8
Distance X_2 (100 km)	1.5	2.2	1.0	2.0	0.8	1.6
Damage(y)	160	112	69	90	123	186

    Estimate the damage when a shipment of 3700 kg is moved to a distance of 260 km.
  b) Describe in detail about building and evaluating an ARIMA Model.

[20]

Q5. Attempt the following
   a) List and explain the steps in text analysis.
   b) Describe in detail about removing the dirty data using R.

[20]

Q.6 Write short notes on:
a) Box Plot
b) Data types in R
c) Box-Jenkins Methodology
d) Fitted value and residuals in Linear Regression.

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