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]

****

X692Y521EC2X692Y521EC2X692Y521EC2X692Y521EC2