Reg. No.																

Question Paper Code	13958

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Fifth Semester

Artificial Intelligence and Data Sciences

20AIPC502 - DEEP LEARNING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which activation function is commonly used in the output layer of binary classification problems? (a) Sigmoid (b) ReLU (Rectified Linear Unit) (c) Tanh (Hyperbolic Tangent) (d) Softmax	1	K1	CO1
2.	What is the purpose of dropout in deep neural networks? (a) Reducing the number of neurons in the network (b) Removing outliers from the training data (c) Preventing over fitting by randomly deactivating neurons during training (d) Simplifying the architecture of the network	1	K1	CO1
3.	Restricted Boltzmann Machines (RBMs) are primarily used for_____. (a) Unsupervised feature learning (b) Image edge detection (c) Text tokenization (d) Speech signal plotting	1	K1	CO2
4.	Auto encoders are neural networks used to _____. (a) Learn compressed representations of data (b) Classify images only (c) Generate random noise (d) Detect facial landmarks	1	K1	CO2
5.	In CNNs, 'pooling' refers to _____. (a) Reduce spatial dimensions and computational complexity (b) Increase the size of feature maps (c) Perform back propagation (d) Tokenize text data	1	K1	CO3
6.	A key motivation for using CNNs is _____. (a) Their ability to automatically learn hierarchical feature representations (b) Reducing audio signal noise (c) Performing linear regression (d) Generating random numbers	1	K1	CO3
7.	Bidirectional RNNs differ from standard RNNs because the_____. (a) Process the sequence in both forward and backward directions (b) Only use input at the last time step (c) Ignore sequence dependencies (d) Perform convolution operations	1	K1	CO4
8.	In sequence-to-sequence models, the encoder is responsible for _____. (a) Encoding the input sequence into a fixed-size context vector (b) Predicting the next word in isolation (c) Performing PCA (d) Detecting edges in images	1	K1	CO4
9.	Deep fake technology leverages _____. (a) Generative models to create realistic fake images or videos (b) PCA for facial recognition (c) Bag-of-Words for text processing (d) Fourier Transform for audio	1	K1	CO5

10.	Case studies of deep learning applications in security help to _____. (a) Detect fake fingerprints, fake images, and videos (b) Perform Fourier analysis (c) Tokenize text for NLP (d) Reduce dimensionality only	*1*	*K1*	*CO6*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define Deep Learning.	*2*	*K1*	*CO1*
12.	Summarize the methods used for efficient hyper parameter tuning.	*2*	*K2*	*CO1*
13.	Compare ReLU, Leaky ReLU, and ELU activation functions with their advantages.	*2*	*K2*	*CO2*
14.	Why an Auto encoder for noise reduction in images?	*2*	*K1*	*CO2*
15.	List any two applications of CNNs.	*2*	*K1*	*CO3*
16.	What are the roles of convolution and pooling layers in feature extraction?	*2*	*K1*	*CO3*
17.	What is meant by unfolding a computational graph in RNNs?	*2*	*K2*	*CO4*
18.	Explain an Encoder-Decoder model for language translation.	*2*	*K2*	*CO4*
19.	Define Generative Neural Network.	*2*	*K1*	*CO5*
20.	What is the purpose of Deep Associative Memory Networks?	*2*	*K1*	*CO5*
21.	Summarize the process of identifying fake fingerprints using deep learning.	*2*	*K2*	*CO6*
22.	Outline the DBN model to recognize handwritten digits from the MNIST dataset.	*2*	*K2*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Discuss in detail the working of a perceptron and the role of activation functions.	*11*	*K2*	*CO1*
		OR			
	b)	Explain with examples about the contribution of model regularization techniques and hyper parameter tuning in preventing over fitting and enhancing the performance of deep learning models.	*11*	*K2*	*CO1*
24.	a)	Implement a ReLU-based deep network to classify image data and analyze its performance.	*11*	*K3*	*CO2*
		OR			
	b)	Develop a deep neural network for object detection in real-time applications.	*11*	*K3*	*CO2*
25.	a) (i)	Examine the role of parameter sharing and weight regularization in improving CNN efficiency.	*6*	*K4*	*CO3*
	(ii)	Compare and analyze the strengths and limitations of CNNs in image and text classification tasks.	*5*	*K4*	*CO3*
		OR`			
	b)	Analyze and compare the architectures of ResNet and AlexNet, focusing on depth, connectivity, and performance.	*11*	*K4*	*CO3*
26.	a)	Examine the impact of deep recurrent layers on feature extraction and temporal learning.	*11*	*K4*	*CO4*
		OR			
	b)	Analyze the role of unfolding and back propagation through time (BPTT) in optimizing RNN models.	*11*	*K4*	*CO4*
27.	a)	Explain the working of generative neural networks with suitable examples.	*11*	*K2*	*CO5*
		OR			
	b)	Explain in detail about the construction of DBNs using stacked restricted boltzmann machines.	*11*	*K2*	*CO5*
28.	a)	Construct a generative neural network to synthesize realistic facial images.	*11*	*K3*	*CO6*

OR

b)	Apply deep learning techniques to detect 'Deepfake detection' in generated images and videos.	*11*	*K3*	*CO6*