Reg. No.																

Question Paper Code	13899

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

Seventh Semester

Electronics and Communication Engineering

20ECEL710 – DEEP LEARNING PRINCIPLES AND PRACTICES

Regulation - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following activation functions introduces non-linearity in neural networks? (a) ReLU (b) Softmax (c) Sigmoid (d) All of the above	1	K1	CO1
2.	Back propagation is primarily used to _____. (a) Initialize weights (b) Update weights (c) Generate features (d) Normalize input	1	K1	CO1
3.	Which architecture is widely used for image classification tasks? (a) CNN (b) RNN (c) LSTM (d) GAN	1	K2	CO2
4.	Pooling layer in CNN helps to _____. (a) Increase feature map size (b) Reduce dimensionality (c) Add non-linearity (d) Normalize weights	1	K2	CO2
5.	The vanishing gradient problem is often observed in _____. (a) CNN (b) RNN (c) Autoencoders (d) Transformers	1	K2	CO3
6.	Which of the following is a type of generative deep model? (a) LSTM (b) CNN (c) Restricted Boltzmann Machine (d) Perceptron	1	K1	CO3
7.	LSTM networks are primarily used for _____. (a) Static images (b) Time-series or sequential data (c) Clustering (d) Noise removal	1	K2	CO4
8.	Gradient clipping is used in RNNs to overcome _____. (a) Exploding gradients (b) Vanishing gradients (c) Overfitting (d) Underfitting	1	K2	CO4
9.	Sentiment analysis using neural networks is an example of _____. (a) Classification (b) Regression (c) Clustering (d) Generation	1	K2	CO5
10.	In deep learning applications, TensorFlow is mainly used for _____. (a) Visualization (b) Model training (c) Data storage (d) Database indexing	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define deep learning and mention its advantages over traditional ML.	2	K1	CO1
12.	What is meant by perceptron learning algorithm.	2	K1	CO1
13.	What is the role of convolution operation in CNNs?	2	K1	CO2
14.	Differentiate between pooling and convolution layers.	2	K2	CO2
15.	List any two deep generative models and their applications.	2	K1	CO3
16.	Write short notes on Boltzmann Machines.	2	K1	CO3
17.	State the importance of LSTM over vanilla RNN.	2	K1	CO4
18.	Define Backpropagation Through Time (BPTT).	2	K1	CO4
19.	Mention any two deep learning applications in image processing.	2	K1	CO5
20.	What is the role of embeddings in NLP applications?	2	K1	CO5
21.	List any two popular deep learning frameworks.	2	K1	CO6
22.	Differentiate between TensorFlow and PyTorch.	2	K2	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a) (i)	Explain the architecture of a multilayer perceptron with neat diagram.	*6*	*K1*	*CO1*
	(ii)	Describe the steps involved in the backpropagation algorithm.	*5*	*K1*	*CO1*
		OR			
	b) (i)	Describe the gradient descent optimization algorithm and its variants.	*6*	*K1*	*CO1*
	(ii)	Illustrate the difference between shallow and deep networks.	*5*	*K1*	*CO1*
24.	a)	Explain the architecture and working principle of LeNet-5 and discuss the role of convolution and pooling operations in feature extraction.	*11*	*K2*	*CO2*
		OR			
	b)	Describe transfer learning in CNNs and explain how data augmentation improves model performance.	*11*	*K2*	*CO2*
25.	a)	Explain the architecture and working of Restricted Boltzmann Machines and compare them with Deep Belief Networks.	*11*	*K4*	*CO3*
		OR			
	b)	Describe Autoencoders and Variational Autoencoders with neat diagrams.	*11*	*K4*	*CO3*
26.	a)	Explain the structure and working of Long Short-Term Memory (LSTM) networks.	*11*	*K3*	*CO4*
		OR			
	b)	Differentiate between RNN, LSTM, and GRU architectures with examples.	*11*	*K2*	*CO4*
27.	a)	Describe deep learning applications in medical image analysis and speech recognition.	*11*	*K2*	*CO5*
		OR			
	b)	Explain sentiment analysis using LSTM and describe the steps in building an end-to-end deep learning pipeline.	*11*	*K2*	*CO5*
28.	a)	Describe the key features of TensorFlow and Keras for model implementation and explain how GPU acceleration enhances performance.	*11*	*K2*	*CO6*
		OR			
	b)	Write the procedure to implement a CNN model using PyTorch and discuss evaluation metrics such as accuracy, precision, recall, and F1-score.	*11*	*K2*	*CO6*