Semester:VII	Department of ISE and CSE(AI)	AY: 2026-27
Course Code: **BCS714A**	Course Name: **Deep Learning**	

Question Bank

Q.	Module-01	M	L	C
1	Explain biological vision and describe the hierarchical organization of visual processing in the human brain with a neat diagram.	8	L2	CO1
2	Explain the experiments of Hubel and Wiesel and describe the role of simple cells and complex cells in visual perception.	10	L2	CO1
3	Explain machine vision and differentiate between traditional machine learning–based vision and deep learning–based vision approaches	8	L3	CO1
4	Explain the Neocognitron model and describe the functions of S-cells and C-cells with a neat diagram	8	L2	CO1
5	. Explain the LeNet-5 architecture with a neat diagram and discuss its significance in handwritten digit recognition	10	L2	CO1
6	Explain the ImageNet dataset and the ILSVRC challenge and discuss how they led to the breakthrough of deep learning models such as AlexNet.	10	L2	CO1
7	Explain the AlexNet architecture with a neat diagram and discuss the factors responsible for its breakthrough performance.	10	L2	CO1
8	Explain how deep learning networks learn representations automatically and discuss representation learning with reference to vision and language tasks.	10	L2	CO1
9	Define Natural Language Processing (NLP) and explain the objectives, applications, and brief history of deep learning for NLP	8	L2	CO1
10	Explain computational representations of language and describe one-hot representations, word vectors, word-vector arithmetic, and localist vs distributed representations with suitable examples	10	L3	CO1
	Module-02			
11	Explain the need for regularization in deep learning and discuss the problem of overfitting with suitable examples.	8	L2	CO2
12	Explain parameter norm penalties and describe L2 regularization (weight decay) with mathematical formulation.	8	L3	CO2
13	Explain L1 regularization and compare L1 and L2 regularization highlighting their effects on sparsity and feature selection	10	L2	CO2
14	Explain norm penalties as constrained optimization and describe the role of Lagrange multipliers in regularization.	10	L3	CO2
15	Explain dataset augmentation and discuss how it improves generalization in deep learning models with suitable examples	10	L2	CO2
16	Explain dataset augmentation and discuss how it improves generalization in deep learning models with suitable examples.	10	L2	CO2
17	Explain noise robustness in deep learning and describe dropout as a regularization technique.	8	L2	CO2
18	Explain semi-supervised learning and multi-task learning and discuss how they act as regularizers.	8	L2	CO2

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19	Explain early stopping as a regularization technique and describe the algorithm for early stopping with validation error tracking.	10	L2	CO2
20	Explain how learning in deep models differs from pure optimization and describe empirical risk minimization.	10	L2	CO2
	Module-03			
21	Explain convolutional neural networks (CNNs) and discuss the motivation behind convolution with respect to sparse interactions, parameter sharing, and equivariant representations.	10	L2	CO3
22	Explain the convolution operation and describe discrete convolution for 1-D and 2-D inputs with a neat diagram.	8	L3	CO3
23	Explain the architecture of a convolutional neural network and describe convolution layer, detector stage, pooling layer, and fully connected layer with a neat diagram.	10	L2	CO3
24	Explain pooling in convolutional neural networks and discuss max pooling and average pooling. Explain how pooling provides translation invariance.	10	L2	CO3
25	Explain convolution and pooling as an infinitely strong prior and discuss the assumptions made by CNNs about image data.	10	L3	CO3
26	Explain variants of the basic convolution function and describe valid, same, full, unshared, and tiled convolution.	10	L2	CO3
27	Explain structured outputs in convolutional networks and discuss pixel-wise labeling and strategies to handle size reduction.	10	L2	CO3
28	Explain different data types handled by convolutional networks and describe convolution on 1-D, 2-D, and 3-D data with examples.	10	L2	CO3
29	Explain efficient convolution algorithms and discuss FFT-based convolution and separable convolution.	10	L2	CO3
30	Explain spatially separable convolution and depthwise separable convolution and compare them with standard convolution.	10	L2	CO3

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