

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Nov – Dec 2025

B. Tech Program /Electronics and Telecommunication Engineering - Scheme IIB

Regular Examination LY Semester VII

Course Code: **EXDLC7041** Course Name: **Neural Network and Deep Learning**

Date of Exam: **27/11/2025**

Duration: **02.5 Hours**

Max. Marks: **60**

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Describe a single-layer feed-forward with a diagram.	5	1	U
b)	Explain the concept of a perceptron with a cell diagram.	5	2	U
c)	Explain the Saddle point problem in Neural Network.	5	3	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Describe back propagation with an appropriate diagram.	5	4	U
b)	What are hyperparameters, and discuss their categories.	5	5	U
c)	What is a kernel	5	6	U
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Using linear separability, find the response of the OR function and plot it.	10	1	U
b)	Describe the basic structure of a Neural network and the mathematical model of the working of the back propagation algorithm.	10	3	U, A

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c)	Explain the convolution operation with the necessary diagrammatic representations.	10	5	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Consider a single neuron in a neural network with 5 inputs, each with a corresponding weight, and a single bias. The goal is to predict an output y_{pred} and compare it to a true output y_{true} . Given Data: Inputs (x): $[x_1, x_2, x_3, x_4, x_5] = [2.0, 1.5, 3.0, 0.5, 4.0]$ Weights (w): $[w_1, w_2, w_3, w_4, w_5] = [0.1, 0.2, 0.3, 0.4, 0.5]$ Bias (b): 0.6 True Output (y_{true}): 5.0	10	2	U
b)	What are the vanishing gradient problem and the exploding gradient problem? How to address these issues.	10	4	U
c)	Explain RNN and its types in detail with an appropriate diagram.	10	6	U, A
