

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

May-June 2026

(B. Tech) Program: Computer Engineering Scheme: III

Regular Examination: TY Semester: VI

Course Code:CEC602 and Course Name: Deep Learning

Date of Exam:20/05/2026

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)	A CNN architecture consists of: • Input image: 224×224×3 Conv layer: 32 filters of size 3×3, stride = 1, padding = 1 Max Pooling: 2×2, stride = 2 Conv layer: 64 filters of size 5×5 , stride = 1, padding = 2 Calculate the output dimensions after each layer.,		CO4	Ap																	
b)	Explain the vanishing and exploding gradient problems in deep neural networks		CO3	U																	
c)	Draw the architecture of Bidirectional RNN and explain its working with suitable example.		CO5	U																	
Q 2	Solve any two questions out of three: (05 marks each)	10																			
a)	Explain Error Backpropagation algorithm for multilayer feedforward neural network with suitable mathematical derivation.		CO2	U																	
b)	Explain Denoising Autoencoder, Sparse Autoencoder with respect to objective function, latent representation, and applications.		CO6	U																	
c)	Explain Linearly separable and linearly non-separable classes with suitable example.		CO1	U																	
Q.3	Solve any two questions out of three. (10 marks each)	20																			
a)	i) Consider the input given in the following table and compute the output values. (5 mk) <table><tr><td>Activation Function</td><td>Input</td><td>Compute Output?</td></tr><tr><td>ReLU</td><td>X= 4</td><td>?</td></tr><tr><td>Leaky ReLU</td><td>X= -5</td><td>?</td></tr><tr><td>Sigmoid</td><td>X=2</td><td>?</td></tr><tr><td>Binary Step Function</td><td>X=0.5</td><td>?</td></tr><tr><td>tanh</td><td>X=1</td><td>?</td></tr></table>		Activation Function	Input	Compute Output?	ReLU	X= 4	?	Leaky ReLU	X= -5	?	Sigmoid	X=2	?	Binary Step Function	X=0.5	?	tanh	X=1	?	CO2
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	ii) Explain the role of Loss Functions in Neural Networks.			
b)	Explain Diffusion Models (DDPM) and Stable Diffusion in detail.		CO6	U
c)	Draw and explain AlexNet architecture in detail.		CO4	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Explain Long Short Term Memory networks(LSTM) and Gated RNN (GRU) architecture in detail.		CO5	U
b)	Explain following optimization algorithms in detail 1.Gradient Descent 2.Stochastic Gradient Descent 3.Momentum Based Gradient Descent		CO3	U
c)	Explain the evolution of Deep Learning and discuss major challenges faced in Deep Neural Networks.		CO1	U
