BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.Tech **SEMESTER : II**
BRANCH: CSE **SESSION : SP/2025**

SUBJECT: CS631 DEEP LEARNING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain the purpose of an activation function in a neural network? How do weights and biases affect the output of a neural network?	[5]	1	1,2
Q.1(b)	Explain the role of hyperparameters in training neural networks and briefly describe any three variants of Gradient Descent, Mini-Batch gradient descent, Momentum and ADAM.	[5]	1	2
Q.2(a)	Define data attributes nominal, ordinal, interval, and ratio. Explain each with one example.	[5]	2	1,2
Q.2(b)	Why normalization is important in machine learning? Compare Min-Max normalization and Z-score standardization with formulas and use-cases.	[5]	2	2,4
Q.3(a)	Explain how the components of a Convolutional Neural Network (CNN) work together to perform image classification.	[5]	3	2
Q.3(b)	Explain the purpose of pooling in CNNs. Compare max pooling and average pooling, and discuss their impact on feature maps.	[5]	3	2,4
Q.4(a)	How does an RNN process sequential data step by step? Apply an example sentence to explain the working with the help of diagram.	[5]	4	3,4
Q.4(b)	Discuss the exploding gradient problem in RNNs? What is one common method used to address the exploding gradient problem in RNNs?	[5]	4	2
Q.5(a)	What are the three main gates in an LSTM and their functions? How does the forget gate in an LSTM work?	[5]	5	2
Q.5(b)	Explain the key components of a GRU? How does GRU handle the vanishing gradient problem?	[5]	5	2,4

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