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

CLASS: BTECH   SEMESTER :VII
BRANCH: COMPUTER SCIENCE (CSE)   SESSION : MO/2024

SUBJECT: CS437 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)	Find the intercept and slope of the following using linear regression model using matrix form	[5]	1	3

X	Y
1	5
2	7
3	9
4	11
5	13
6	15

You have given the following

$$\text{inverse}(X'*X) = \begin{bmatrix} 0.8667 & -0.200 \\ -0.200 & 0.0571 \end{bmatrix}$$

			CO	BL
Q.1(b)	Describe the concept of Overfitting and underfitting with the help of diagram	[5]	1	2
Q.2(a)	Demonstrate the operation of AND and OR logics using McCulloch-Pitts neuron.	[5]	2	2
Q.2(b)	A single input, single output neuron has a weight of 3 and a bias of −2.	[5]	2	3

What is the net input to the transfer function if it is given an input of 2?
What will be the output if the transfer function is bipolar sigmoid given slope s = 0.7?
You have given the following
Identity function $f(sum_k) = sum_k$ $for\ all\ sum_k$
Bipolar sigmoid function = $f(sum_k) = \frac{1}{1+\exp(-s*sum_k)}$

$\exp(-0.7*sum_k)$ is 0.06

			CO	BL
Q.3(a)	What are the drawbacks of using the gradient descent algorithm ?. Explain gradient descent with momentum algorithm using a diagram.	[5]	3	2
Q.3(b)	Explain the role of autoencoder also explain the sparse and denoising autoencoder in detail.	[5]	3	2

Q.4(a)	Why do we need dropout layers? Find out how many neurons will be off and on If you have 10 nodes in a layer and dropout rate is 0.2. Describe about the batch normalization concept.	[5]	4	3
Q.4(b)	Describe about the early stopping concept with the of example.	[5]	4	2
Q.5(a)	Describe the Recurrent Neural Network architecture with functions. What do you mean by vanishing and exploding gradients problem?. Explain.	[5]	5	2
Q.5(b)	Explain briefly about AlexNet architecture with the help of diagram.	[5]	5	2

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