BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: BTECH — **SEMESTER : V**
BRANCH: AIML — **SESSION : MO/2024**

SUBJECT: AI301 SUPERVISED LEARNING

TIME: 02 Hours — **FULL MARKS: 25**

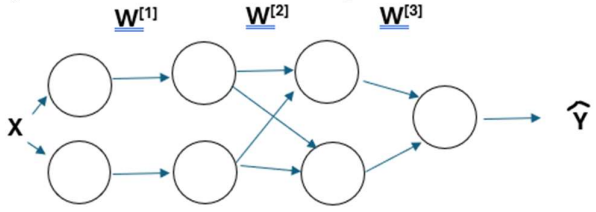
INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	What is a data matrix? Illustrate with an example.	[2]	1	2
Q.1(b)	Apply the technique of linear regression (closed form solution) on the following data:	[3]	1	3

x	1	2	3	4	5
y	12	18	22	28	35

Compute the value of y for x = 8.

Q.2(a)	Why is cost function required in linear regression? Give mathematical expression of cost function.	[2]	1	2
Q.2(b)	Explain the Naïve bayes classifier technique.	[3]	1	2
Q.3(a)	When should the training by gradient descent be stopped?	[2]	2	2
Q.3(b)	Design a perceptron with three inputs, and two output neurons. The weight matrix is $W = \begin{bmatrix} 0.5 & -0.5 \\ 0.1 & 0 \\ 0.4 & -0.2 \\ -0.1 & -0.1 \end{bmatrix}$. Calculate the outputs of both the output neurons for input vector [2, 1, 3]. Assume the bias input as +1. Use Step function as activation function.	[3]	2	3
Q.4(a)	How can regularization reduce overfitting?	[2]	2	2
Q.4(b)	Elaborate upon the perceptron learning algorithm.	[3]	2	2
Q.5(a)	What is the importance of "learning rate"?	[2]	2	3
Q.5(b)	What would happen if all the neurons in a network had a linear activation function? Explain with reference to the figure.	[3]	2	4



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