Exam.Code:1005
Sub. Code: 35085

2125

M. E. (Information Technology)

First Semester

MEIT-1205: AI and Machine Learning

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.***

x-x-x

1	(a) Derive the equation for gradient descent algorithm. (b) What is likelihood and logliklihood? (c) When K means clustering algorithm fails? (d) What will be the value of sigmoid function if score is one? (e) What is the difference between shallow and deep neural networks?	(10)
	Part A	
2	(a) Solve this 8 puzzle problem using heuristic method. Select path with lowest cost. Assume cost of each step as 1 unit. Initial State: 7 2 4 / 5 * 6 / 8 3 1 — Final State: * 1 2 / 3 4 5 / 6 7 8 (b) What is alpha-beta pruning technique? Explain with the help of an example.	(5) (5)
3.	Design a binary classifier for spam detection. Take two features for model, Policy & CASH (as spam feature) and MEETING & OFFICE (as no spam features). What will be the score and probability, if weightage for spam feature is -3, for no spam feature is 2? Bias value is 2. Consider following data	(10)
4.	Develop a maximum margin classifier using following data	(10)
	Part B	
5.	What is the linear discriminant analysis? How is it different from PCA? What is the role of covariance in PCA?	(10)
6.	Find prediction for two input neural network with weights and bias as: W1 = 4, W2 = 4, b= -8. Assume discrete inputs. Derive equations for feedforward and backpropagation algorithm for neural networks (2 inputs, 1 hidden layer with 2 nodes, 1 output node).	(10)
7	Explain following, each using a numerical example (a) Natural language processing (b) Deep learning	 (5) (5)

Policy	1	0	1	0
CASH	1	1	0	0
MEETING	0	1	0	1
OFFICE	0	0	1	1
CLASS	SPAM	SPAM	NO SPAM	NO SPAM

Class	+	-	-	+
Data (X1)	0	1	2	3

x-x-x