

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Sixth Semester

Electronics and Communication Engineering

CS3491 - Artificial Intelligence and Machine Learning

(Common to Fourth Semester Computer Science and Engineering & Information Technology)

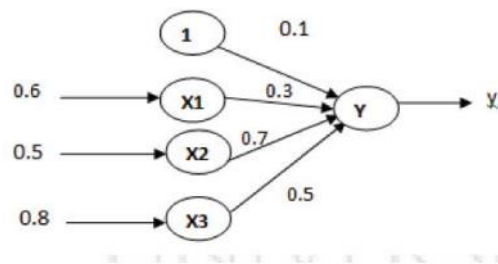
Regulations - 2021

Duration : 3 Hrs

Maximum : 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BLT	CO	Marks
1.	List the steps involved in problem solving agent.	L2	1	2
2.	Discover the need for heuristic search algorithm and mention its benefits.	L4	1	2
3.	Define uncertainty and list any two causes of uncertainty.	L1	2	2
4.	Given that $P(A)=0.3$, $P(A B)=0.4$ and $P(B)=0.5$, Compute $P(B A)$.	L3	2	2
5.	Differentiate machine learning and data mining based on their characteristics.	L4	3	2
6.	List the types of classification models.	L1	3	2
7.	Identify the types of classifiers used in weighted voting method.	L2	4	2
8.	State the principle of maximum likelihood.	L1	4	2
9.	Calculate the output of the following neuron Y using the input vectors and weight and bias.	L3	5	2



10.	Assess the need for regularization in neural network architecture and specify whether applying regularization will upgrade/downgrade the performance of the network.	L4	5	2
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PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a i What is uniformed search strategy? Explain the Depth First search with an example.	L2	1	10
	ii Outline the applications of AI in real world.	L2	1	6

Or

	b i	Explain the approaches for solving tree structured constraints satisfaction problem with suitable examples.	L2	1	10
	ii	Illustrate the properties of Greedy search.	L2	1	6
12.	a i	A doctor is aware that disease meningitis causes a patient to have a stiff neck, and it occurs 80% of the time. He is also aware of some more facts, which are given as follows: - The Known probability that a patient has meningitis disease is 1/30,000. - The Known probability that a patient has a stiff neck is 2%. Apply Bayes' rule for calculating the probability that a patient has diseases meningitis with a stiff neck.	L3	2	8
	ii	Consider two events: A (it will rain tomorrow) and B (the sun will shine tomorrow). Use Bayes' theorem to compute the posterior probability of each event occurring, given the resulting weather conditions for today: $P(A sunny) = P(sunny A) * P(A) / P(sunny)$ $P(B sunny) = P(sunny B) * P(B) / P(sunny)$ where sunny is our evidence Or	L3	2	8
	b	Consider the following set of propositions Patient has spots Patient has measles Patient has high fever Patient has Rocky mountain spotted fever. Patient has previously been inoculated against measles. Patient was recently bitten by a tick Patient has an allergy. a) Create a network that defines the casual connections among these nodes. b) Make it a Bayesian network by constructing the necessary conditional probability matrix.	L3	2	16
13.	a i	Explain the various learning models used in machine learning.	L2	3	8
	ii	Compare least square regression and multiple regressions based on their functionality and applicability. Or	L2	3	8
	b i	Examine the Support Vector Machine with suitable example.	L4	3	8
	ii	You've built a random forest model with 10000 trees. You got delighted after getting training error as 0.00. But, the validation error is 34.23. Analyze the performance of the model whether it is trained well or not.	L4	3	8
14.	a	Elaborate in detail about the types of Ensemble learning techniques with suitable examples. Or	L2	4	16
	b	Explain in detail about Gaussian mixture models and expectation maximization.	L2	4	16
15.	a	Construct the architecture of a Multilayer perceptron (MLP) and explain its operation. Or	L3	5	16
	b	Develop a Back propagation algorithm for Multilayer Feed forward neural network consisting of one input layer, one hidden layer and output layer from first principles.	L3	5	16