

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

**B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY
2025**

Fourth/Sixth Semester

Biomedical Engineering

CS3491 - Artificial Intelligence and Machine Learning

**(Common to Sixth Semester Electronics and Communication Engineering &
Fourth Semester Information Technology and Computer Science and
Engineering)
Regulations-2021**

Duration : 3 Hrs

Maximum: 100 Marks

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

Q.No	Questions	BLT	CO	Marks
1.	Define Artificial Intelligence.	L1	1	2
2.	State the problem formulation for 8-puzzle problem.	L1	1	2
3.	List the 2 types of memory bounded heuristic algorithms.	L1	2	2
4.	Can you provide examples of Constraint Satisfaction Problems?	L2	2	2
5.	Differentiate supervised and unsupervised machine learning.	L2	3	2
6.	What are the role does linear algebra play in machine learning?	L4	3	2
7.	What is the perceptron learning rule, and how does it update weights?	L2	4	2
8.	Mention some of the instance-based learning algorithms.	L2	4	2
9.	What are Kohonen Self-Organizing Feature Maps (SOFMs) used for?	L2	5	2
10.	Why do we need Back propagation and how will you reduce the error?	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a Explain the following search strategies. (i) depth limited search (ii) Uniform search.	L2	1	16
	Or			
	b Describe the constraint satisfaction problem. Outline local search for constraint satisfaction problem with example.	L2	1	16
12.	a i Demonstrate the use of Baye's rule with an example in a doctor finding the probability P(disease / symptoms) before and after the decease becomes epidemic.	L3	2	8
	ii Demonstrate the methods of approximate inference in Bayesian Networks. Compare their trade-offs with exact inference.	L3	2	8

Or

- b i Demonstrate how the sustainability of enumeration algorithm can be improved. L3 2 8
- ii Demonstrate probabilistic reasoning using Bayesian networks and causal reasoning using causal networks. L3 2 8

13. a Estimate the time series data given below: L6 3 16

X_i	8	3	2	10	11	3	6	5	6	8
Y_i	4	12	1	12	9	4	9	6	1	14

Use the least square method to determine the equation of line of best fit for the data.

Or

- b Construct the decision tree by using the ID3 algorithm for the following data: L6 3 16

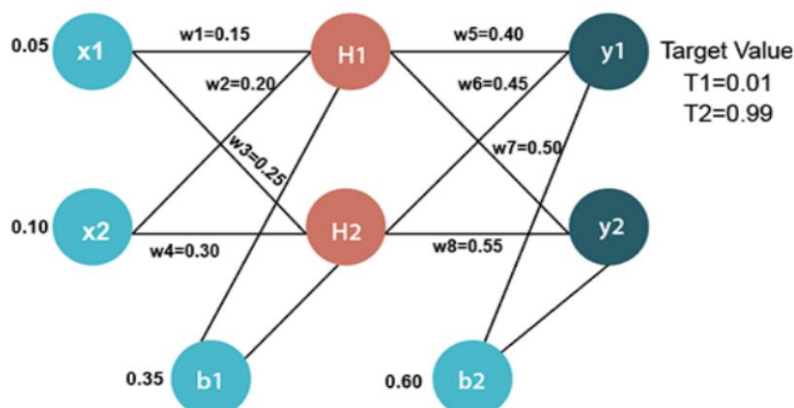
Instance	a1	a2	a3	Classification
1	True	Hot	High	No
2	True	Hot	High	No
3	False	Hot	High	Yes
4	False	Cool	Normal	Yes
5	False	Cool	Normal	Yes
6	True	Cool	High	No
7	True	Hot	High	No
8	True	Hot	Normal	Yes
9	False	Cool	Normal	Yes
10	False	Cool	High	Yes

14. a i Assume an image has pixel size 240 x 180. Elaborate how K means clustering can be used to achieve lossy data compression of that image. L3 4 8
- ii Demonstrate the steps in the AdaBoost algorithm with an example. L3 4 8

Or

- b Construct a training dataset. By using it, demonstrate the AdaBoost algorithm that makes an ensemble classifier. L3 4 16

15. a Explain how error function is used in Backpropagation and how Backpropagation works for the following example. L2 5 16



Or

- b Explain the concept and impact of dropout in training deep neural networks. Compare it with other regularization techniques. L2 5 16