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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			
		M	L
Q.1	a.	10	L2
	b.	10	L2

OR

		M	L	C
Q.2	a.	10	L2	CO1
	b.	10	L2	CO1

Module – 2

		M	L	C
Q.3	a.	10	L3	CO2
	b.	10	L3	CO2

Table : 1

CGPA	Interaction	Knowledge	Skill	Thinking	Interest	Job Offer
≥9	Yes	Excellent	Good	Fast	Yes	Yes
≥9	Yes	Good	Good	Fast	Yes	Yes
≥8	No	Good	Good	Fast	No	No
≥9	Yes	Good	Good	Slow	No	Yes

OR

		M	L	C
Q.4	a.	10	L3	CO2
	b.	10	L2	CO2

Module - 3

Q.5	a.	Consider the student performance training dataset of 8 instances shown in Table – 2 which describes the performance of individual students in a course and their CGPA obtained in the previous semester. Independent attributes are – CGPA, Assessment and Project, Target variable is 'Result' that takes two values 'pass' or Fail. Based on the performance of a student, classify whether a student (6.1, 40, 5) will pass or Fail. Assign K = 3	Table : 2	10	L3	CO3

SL.NO.	CGPA	Assessment	Project	Result
1	9.2	85	8	Pass
2	8	80	7	Pass
3	8.5	81	8	Pass
4	6	45	5	Fail
5	6.5	50	4	Fail
6	8.2	72	7	Pass
7	5.8	38	5	Fail
8	8.9	91	9	Pass

b. List and explain various types of regression methods. What are the limitation of regression methods?

OR

Q.6	a.	Consider the same training data set given in Table -2. Use weighted K-NN and determine the class of Test Instance (7.6, 60,8), Assign k = 3.	10	L3	CO3
		b. How does the structure of a decision tree help in classifying a data instance? Discuss the advantages and disadvantages of decision tree.			

Module – 4

Q.7	a.	Compare biological neuron and artificial neuron. Illustrate Mc Culloch and Pitts mathematical model of an artificial neuron.	10	L2	CO3
		b. What is meant by Probabilistic based learning? Explain Maximum A Posteriori (MAP) h_{MAP} and Maximum likelihood (ML), h_{ML} .			

OR

Q.8	a.	Define activation function. List some of the linear and non linear activation function and explain any two.	10	L2	CO4
		b. Illustrate Artificial Neural Network structure. List and explain types of Artificial Neural Networks.			

Module – 5

Q.9	a.	Define and distinguish between classification and clustering. List out the application and challenges of clustering Algorithms.	10	L2	CO5
		b. Consider the following set of data given in Table – 3. Cluster it using K – means algorithm with the initial value of object 2 and 5 with the coordinate values (4,6) and (12,4) as initial seeds.			

Objects	X-Coordinate	Y- Coordinate
1	2	4
2	4	6
3	6	8
4	10	4
5	12	4

Table - 3

OR

Q.10	a.	How is reinforced Learning different from supervised and unsupervised Learning methods? What are the components of reinforced Learning? Explain.	10	L2	CO5
		b. Elucidate Q-Learning algorithm. How Q- Learning is different for SARSA Learning? Explain.			

*** 2 of 2 ***