Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN											Course Code	2	1	C	S	6	3

Sixth Semester B.E. Degree Examinations, September/October 2024
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
(Computer Science & Engineering)

Duration: 3 hrs **Max. Marks: 100**

*Note: 1. Answer any **FIVE** full questions choosing ONE full Question from each Module.*
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		Module-1		
1.	**a.**	Explain the any two types of task environments.	**06**	(2:1:1.3.1)
	b.	Summarize the working principle of simplex reflex agent and utility based agent.	**08**	(2:1:1.3.1)
	c.	Summarize the concept of rationality for vacuum cleaner.	**06**	(3:1:1.3.1)
		(OR)		
2.	**a.**	Explain the working principle of steepest ascent hill climbing.	**06**	(2:1:1.3.1)
	b.	Outline the steps involved in reaching goal state using simulated annealing algorithm.	**06**	(2:1:1.3.1)
	c.	Summarize the working principle of A* algorithm.	**08**	(2 :1:1.3.1)
		Module-2		
3.	**a.**	Apply candidate elimination algorithm, to find the consistent hypothesis for the following training data set:	**10**	(3:4:1.3.1)

RID	Domain	Platform	Browser	Day	Screen	Country	Click
1	Edu	Mac	Net-3	Mon	XVGA	America	Yes
2	Com	Mac	Net com	Tue	XVGA	America	Yes
3	Com	PC	IE	Sat	VGA	Europe	No
4	Org	Unix	Net-2	Wed	XVGA	America	Yes
5	Com	Unix	Net-2	Wed	XVGA	Europe	Yes

	b.	Explain the context involved in designing a 'learning system' for checkers program.	**10**	(2 :2:1.3.1)
		(OR)		
4.	**a.**	Apply Find-S algorithm for the following training data set and find the most specific hypothesis. Also find the number of distinct, semantically distinct and syntactically distinct hypothesis:	**10**	(3:4:1.3.1)

RID	Origin	Manufacturer	Colour	Decade	Type	Example Type
1	Japan	Honda	Blue	1980	Economy	Positive
2	Japan	Toyota	Green	1970	Sports	Negative
3	Japan	Toyota	Blue	1990	Economy	Positive
4	USA	Chrysler	Red	1980	Economy	Negative
5	Japan	Honda	White	1980	Economy	Positive

	b.	Explain Inductive bias in Candidate elimination algorithm.	**10**	(2 :2:1.3.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)

Module-3

5. **a.** Construct the decision tree for the following training data set using the concept of ID3 algorithm.   **12**   (3:4:1.3.1)

ID	Age	Competition	Type	Profit
1	Old	Yes	Software	Down
2	Old	No	Software	Down
3	Old	No	Hardware	Down
4	Mid	Yes	Software	Down
5	Mid	Yes	Hardware	Down
6	Mid	No	Hardware	Up
7	Mid	No	Software	Up
8	New	Yes	Software	Up
9	New	No	Hardware	Up
10	New	No	Software	Up

b. Outline the steps involved in ID3 algorithm.   **08**   (2 :2:1.3.1)

(OR)

6. **a.** Outline the steps involved in training a linear unit using gradient descent algorithm.   **10**   (2 :3:1.3.1)

b. Summarize the steps involved in back-propagation using stochastic gradient descent.   **10**   (2 :3:1.3.1)

Module-4

7. **a.** Rahul is known to tell truth in 5 cases out of 6, and he states that a white ball was drawn from a bag containing 8 blacks and 1 white ball. What is the probability the ball drawn by Rahul was white?   **06**   (3:5:1.3.1)

b. Summarize the working principle of Gibb's algorithm.   **06**   (2:5:1.3.1)

c. Explain minimum description length principle.   **08**   (2:5:1.3.1)

(OR)

8. **a.** Given dataset contains types of tissues produced by a company and its clients response: **08**   (3:5:1.3.1)

Type of Tissue	Acid Durability	Strength	Class
Type – 1	7	7	Bad
Type – 2	7	4	Bad
Type – 3	3	4	Good
Type – 4	1	4	Good

Find the class label of the new instance (test data) with acid durability = 3, strength = 7 using K-NN Algorithm (assume: K=3).

b. Summarize the working principle of non-parametric locally weighted logistic regression method.   **06**   (2:5:1.3.1)

c. Explain the radial basis function network.   **06**   (2:5:1.3.1)

Module-5

9.	**a.**	Explain Density Based Clustering (DBSCAN) algorithm.	**08**	(2:4:1.3.1)
	b.	Summarize any two types of clusters.	**06**	(2:4:1.3.1)
	c.	Outline the working principle of Bisecting K-means algorithm.	**06**	(2:4:1.3.1)

(OR)

10	**a.**	Explain Agglomerative Hierarchical clustering with an example.	**08**	(2:4:1.3.1)
	b.	Differentiate between classification and clustering	**06**	(2:4:1.3.1)
	c.	Summarize the three types of graph based clustering.	**06**	(2:4:1.3.1)

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