USN										Course Code	2	1	E	C	6	4	1

Sixth Semester B.E. Degree Examination- September 2024
MACHINE LEARNING WITH PYTHON

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:PO)*
		Module-1		
1.	a.	Discuss the role of machine learning in data mining and artificial intelligence.	4	2:1:1.4.5
	b.	Write a brief note on, a) Prior Knowledge b) Missing Feature c) Mereology d) Invariances e) Costs and Risks.	8	2:1:1.4.5
	c.	Draw the histogram of four class for the following salary (in Thousands) data of a small company in thousands.	8	3:1:1.4.5

24	25	25	27	27	29	30	35	35	35
35	36	38	38	39	40	40	40	45	45
45	45	47	52	52	58	59	61	61	67
68	68	70							

OR

2.	a.	List any five applications of classification.	4	2:1:1.4.5
	b.	"Complex model for classification leads to complicated decision boundary", discuss this issue with fish classification problem.	8	2:1:1.4.5
	c.	Draw the two-dimension feature space diagram for the following data also an optimal decision boundary.	8	3:1:1.4.5

Male	Height	73	68	74	71	69	67	68	68	67	63
	Weight	241	162	212	220	206	152	183	167	175	156
Female	Height	58	65	63	64	61	65	62	65	61	63
	Weight	102	141	131	128	129	156	114	165	111	104

Module-2

3.	a.	Define machine learning with example.	4	2:2:1.4.5
	b.	Apply the Find 'S' algorithm for the following table.	8	3:2:1.4.5

EXAMPLE	SKY	AIRTEMP	HUMIDITY	WIND	WATER	FORECAST	ENJOYSPORT
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Sunny	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cold	Change	Yes

	c.	Discuss the learning representation of the target function of checkers learning system.	8	2:2:1.4.5

OR

4.	a.	Define concept learning with an example.	4	2:2:1.4.5

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

| | **b.** | Implement Candidate elimination algorithm for given table with target concept Enjoy Sport. | **8** | 3:2:1.4.5 |

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

| | **c.** | Define version space, consistent space general boundary, specific boundary and version space representation theorem. | **8** | 2:2:1.4.5 |

Module-3

5.	**a.**	Sketch the simple machine learning process diagram.	**4**	2:3:1.4.5
	b.	With the help of diagram describe process of classification and also mention the typical classification problems.	**8**	2:3:1.4.5
	c.	Discuss the Linear Regression with an example.	**8**	2:3:1.4.5

OR

6.	**a.**	Differentiate supervised and unsupervised learning	**4**	2:3:1.4.5
	b.	With the help of diagram describe process of Reinforcement learning.	**8**	2:3:1.4.5
	c.	Discuss the unsupervised learning with an example	**8**	2:3:1.4.5

Module-4

7.	**a.**	Define prior probability, posterior probability.	**4**	2:4:1.4.5
	b.	Discuss the three measures in learning association rule applied to basket analysis.	**8**	2:4:1.4.5
	c.	Write a short note on a) Loss function b)Expected risk c) Discriminant functions	**8**	2:4:1.4.5

OR

8.	**a.**	Define prior density and posterior density	**4**	2:4:1.4.5
	b.	Discuss any three procedures to fine tune the model complexity.	**8**	2:4:1.4.5
	c.	Discuss parametric classification in detail.	**8**	2:4:1.4.5

Module-5

9.	**a.**	List the characteristics of problems best suited for decision tree algorithm.	**4**	2:5:1.4.5
	b.	Summarize the learning by ID3 algorithm for Boolean valued functions	**8**	2:5:1.4.5
	c.	Illustrate the ID3 algorithm for following problem with target concepts Play Tennis.	**8**	3:5:1.4.5

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

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

OR

10	a.	With neat sketch explain the structure of biological neuron	4	2:5:1.4.5
	b.	Illustrate the McCulloch-Pitts (MP) model, Implement the same for NOR and NAND gate.	8	3:5:1.4.5
	c.	Write a short note on, a) Widmw'~Adaline model of a neuron b) Rosenblatt's perceptron model of a neuron.	8	2:5:1.4.5

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