USN											18CS62

B. E. Degree (Autonomous) Sixth Semester End Examination (SEE), June/July 2022

MACHINE LEARNING

(Model Question Paper - III)

[Time: 3 Hours] **[Maximum Marks: 100]**

Instructions to students:

1. **Answer any one from question number 1 and 2**
2. **Answer any one from question number 3 and 4**
3. **Answer any one from question number 5 and 6**
4. **Answer any one from question number 7 and 8**
5. **Answer any one from question number 9 and 10**

Q. No.		QUESTIONS	Marks	COs	RBT Level
1	A)	Explain the steps in designing a learning system in detail. Unit1 Page3	12M	CO1	L2
	B)	Explain Inductive Bias. Unit1 Page 27	08M	CO1	L2
		OR			
2	A)	Write candidate elimination algorithm. Apply the algorithm to obtain the final version spacefor the training example. Unit1 Page18	10M	CO2	L3
	B)	Write FIND-S algorithm. Using Find-S Algorithm find the hypothesis to figure out if a person is Covid Positive or notusing the data given below with: Same question in first model paper	10M	CO2	L3
3	A)	Give Decision trees to represent the Boolean Functions: a) A && ~ B b) A V [B && C] Unit 2 Last few pages c) A XOR B d) [A&&B] V [C&&D]	10M	CO2	L3
	B)	(i) What are Restriction Biases and Preference Biases and differentiate between them. Unit2 Page19 (ii) Discuss Hypothesis Space Search in Decision tree Learning.Unit2 Page16	10M	CO1 CO2	L2
		OR			

Sl. No.	Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoy sport
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

SI No.	Breathing difficulty	Cough	Fever	Covid
1	Yes	Yes	Yes	Positive
2	Yes	Yes	No	Positive
3	Yes	No	Yes	Negative
4	No	Yes	Yes	Negative
5	No	No	Yes	Negative
6	No	No	No	Negative

4 A) Give Decision trees for the following set of training examples

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

Unit2 Page8 — **12M** | **CO3** | **L3**

B) Discuss Inductive bias in decision tree learning Unit2 Page18 — **08M** | **CO2** | **L2**

5 A) Implement XOR function using McCulloch Pitts(MP) neuron(Use binary data representation) Unit3 Page98 — **10M** | **CO3** | **L3**

B) Design a Hebb net and implement logical AND function. [Using bipolar Inputs and bipolar targets.] Unit3 Page123 — **10M** | **CO3** | **L3**

OR

6 A) Explain radial Basis function network with its architecture and training algorithm. Unit3 Page280 & 283 — **10M** | **CO3** | **L3**

B) Find the weights required to perform the following classification using perceptron network. The vectors (1,1,1,1) and (-1,1,-1,-1) are belonging to the class(so to have target value 1), vectors(1,1,1,-1) and (1,-1,-1,1) are not belonging to the class(so have target value -1). Assume learning rate as 1 and initial weights as 0.
Similar to pattern problem in Unit3 Page187 — **10M** | **CO3** | **L4**

7 A) Discuss Minimum description length principle in detail. Unit4 Page13 — **08M** | **CO3** | **L2**

B) Explain EM algorithm with k-means algorithm derivation. Unit4 Page25-26 — **12M** | **CO4** | **L3**

OR

8 A) Describe Brute-force MAP learning algorithm. Unit4 Page6
Discuss the Naïve Bayees classifier. Unit4 Page15 — **10M** | **CO3** | **L2**

B) The following table gives data set about stolen vehicles. Using Naïve bayes classifierclassify the new data (Red, SUV, Domestic)

Unit4 Page41

Color	Type	Origin	Stolen
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	SUV	Imported	No
Yellow	SUV	Imported	Yes

10M | **CO3** | **L3**

			Yellow	**SUV**	**Domestic**	**No**				
			Red	**SUV**	**Imported**	**No**				
			Red	**Sports**	**Imported**	**Yes**				
9	**A)**	Define the following terms Unit5 Page15 a) Mean and Variance b)Estimators, Bias and Variance						**10M**	**CO2**	**L2**
	B)	Explain Central Limit Theorem. Unit5 Page19						**10M**	**CO4**	**L3**
OR										
10	**A)**	Write short notes on the following: (i)Estimating Hypothesis accuracy. Unit5 Page10 (ii)Binomial distribution. Unit5 Page14						**10M**	**CO4**	**L3**
	B)	Explain CADET System using Case based reasoning. Unit5 Page8						**10M**	**CO4**	**L3**