

MACHINE LEARNING & APPLICATIONS
(Information Technology)

Max. Marks: 60

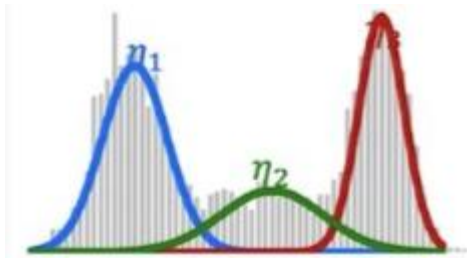
Time: 03 Hours

- 1. Question paper comprises of **Part A** and **Part B**.
- 2. **Part A** is compulsory which carries 10 marks. Answer all questions in Part A.
- 3. **Part B** (for 50 marks) consists of **five questions** with **“either” “or”** pattern. Each question carries 10 marks and may have a,b,c as sub questions. The student has to answer any one full question.

PART-A

(Answer 10 questions. Each question carries 1 mark)

Q.No.	Question	Marks	CO	BTL
Q.1	a) What are types of machine learning?	[01]	CO1	[L2]
	b) Provide one application where unsupervised machine learning algorithm can be used.	[01]	CO2	[L2]
	c) Which is ideal – a large decision tree or a smaller one? Justify.	[01]	CO1	[L4]
	d) List two appropriate problems where training using neural networks may be used for learning.	[01]	CO3	[L2]
	e) Name two types of Instance Based Techniques.	[01]	CO1	[L1]
	f) State Baye’s theorem.	[01]	CO1	[L1]
	g) Explain why supports and margins are important in SVMs.	[01]	CO4	[L4]
	h) What does the figure depict? Where it can be used?	[01]	CO3	[L2]



- i) What are the features useful for Face Recognition? [01] CO2 [L2]
- j) Suggest selection operator which is probabilistic in nature. [01] CO2 [L2]

END OF PART A

PART-B

(Answer 05 full questions. Each question carries 10 marks)

Q.No.	Question	Marks	CO	BTL																									
Q.2(a)	<table><tr><th>Animal</th><th>Legs</th><th>Fur</th><th>Flies</th><th>Class</th></tr><tr><td>A1</td><td>4</td><td>Yes</td><td>No</td><td>Yes (positive)</td></tr><tr><td>A2</td><td>4</td><td>Yes</td><td>No</td><td>Yes (positive)</td></tr><tr><td>A3</td><td>2</td><td>No</td><td>Yes</td><td>No (negative)</td></tr><tr><td>A4</td><td>4</td><td>No</td><td>No</td><td>No (negative)</td></tr></table>	Animal	Legs	Fur	Flies	Class	A1	4	Yes	No	Yes (positive)	A2	4	Yes	No	Yes (positive)	A3	2	No	Yes	No (negative)	A4	4	No	No	No (negative)	[05]	CO3	[L3]
Animal	Legs	Fur	Flies	Class																									
A1	4	Yes	No	Yes (positive)																									
A2	4	Yes	No	Yes (positive)																									
A3	2	No	Yes	No (negative)																									
A4	4	No	No	No (negative)																									

Use Version Space or Candidate Elimination Algorithm to find:

- S (Most Specific Hypothesis)
- G (Most General Hypothesis)

- (b) Describe any three important issues in machine learning, which makes it difficult to learn any task. [05] CO1 [L2]

OR

- Q.3(a) Which type of machine learning should be applied to identify a spam mail? Describe the design Issues and Perspectives in ML. [05] CO1 [L2]
- (b) Why version space is very important in concept learning? Justify with example. [05] CO2 [L4]

Q.4(a)

Calculate the Entropy using the above Frequency Table.

[05]

CO3

[L3]

		Play Golf		
		Yes	No	
Outlook	Sunny	3	2	5
	Overcast	4	0	4
	Rainy	2	3	5
				14

(b)

Role of training set, validation set and testing set in the neural network. Which comes first and which is the final?

[05]

CO5

[L2]

OR

Q.5(a)

Draw Schematic Diagram of Gradient Descent(Perceptron).

[05]

CO1

[L2]

(b)

(i) If decision tree has an overfitting issue, how it can be solved?
(ii) What are the applications of decision trees?

[05]

CO3

[L3]

Q.6(a)

List the assumptions of Naïve Bayes Classifier.

[05]

CO4

[L2]

(b)

What is the role of K in K Nearest Neighbor? How to choose the right number of K? Discuss with an example.

[05]

CO3

[L3]

OR

Q.7(a)

What are instance based techniques? List the algorithms that come under it and discuss any one algorithm with an example.

[05]

CO4

[L2]

(b)

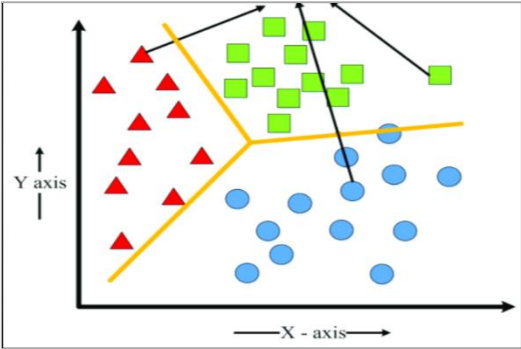
Compare and Contrast Lazy vs Eager Learning, Cite an example of ML algorithm for each type.

[05]

CO4

[L1]

Q.8(a)



[05]

CO3

[L3]

- i) The black arrows points to Triangle, square and a circle. What do each one of them depict?
- ii) Which type of classification can be used to segregate these three classes? Redraw the diagram accordingly.

(b)

i) Define Domain Theory
ii) Define Perfect Domain Theory. Name an algorithm that works under this assumption.

[05]

CO6

[L2]

OR

Q.9(a)

i) Define Sparse Kernel Machines. Give an example of one such algorithm.
ii) Explain any two examples of applications of Sparse Kernel Machines.

[05]

CO3

[L2]

(b)

i) Define Analytic Learning
ii) Give an example, how to learn the process of stacking one object on another in a safe manner.

[05]

CO6

[L2]

Q.10(a)

i) Who invented Genetic Programming? Discuss parallelizing genetic algorithms.
ii) Show an example of crossover in GP.

[05]

CO1

[L2]

(b)

Which approach you would use for News topic Classification - supervised or unsupervised? Justify.

[05]

CO5

[L3]

OR

Q.11(a)

What is the motivation behind Genetic Algorithms and explain the hypothesis search space?

[05]

CO1

[L2]

(b)

List three useful applications of Face Recognition algorithm.

[05]

CO3

[L3]