

ROLL NO. _____

ENROLLMENT NO. _____

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHOOL OF ENGINEERING SCIENCES & TECHNOLOGY
JAMIA HAMDARD

Semester Examination 2022
 BTCSE AI 501
 MACHINE LEARNING

TIME: 3 HRS

MAXIMUM MARKS: 75

Note: Do not write anything on paper except Roll No. & Enrollment No. Use of mobile phone is not allowed. Please follow proper numbering while answering the questions Proper steps are required to be specified for all questions

SECTION A

*All questions of Section A are compulsory (7*5)*

S.NO	QUESTIONS	MARKS	CO	BL
Q1.	What are the major tasks in data pre-processing? Apply different binning techniques on the following data : 4, 8, 9, 15, 21, 21, 24, 25, 26, 28, 29, 34	5	CO2	L3
Q2.	How Machine Learning plays a vital role in different domains? Explain its applications.	5	CO3	L2
Q3.	A survey done 10 years ago. Of Certified Public Accountant in the U.S. found that their average salary was \$74,914. An Accounting researcher would like to test whether over the years this average has increased or not? A Sample of 112 CPAs produced a mean salary of \$78,695. Also given that the population standard deviation $\sigma = \$14,530$. Take $z = 1.645$ for 5% level of significance.	5	CO2	L1
Q4.	Why is Sampling important for the analysis of any population? Explain the different Sampling techniques.	5	CO1	L4
Q5.	Explain feature selection and feature extraction method for dimensionality reduction.	5	CO4	L5
Q6.	What is Reinforcement Learning? What are advantages of using this approach.	5	CO5	L6
Q7.	Discuss the issues involved in decision tree learning.	5	CO4	L3

SECTION B

*Answer any 4 questions in Section B (4*10)*

S.NO	QUESTIONS	MARKS	CO	BL		
Q1.	The marks obtained by a student are dependent on her/his study time. Given the study time in min and marks out of 2000, find the relationship between study time and marks using the concept of linear regression. Also predict the marks for a student if she/he studied for 790 minutes.	10	CO3	L2		
	S.No.				Study Time (min)	Marks Obtained
	1				350	520
	2				1070	1600
	3				630	1000
	4				890	850
	5				940	1350
	6				500	490
Q2.	Compute the gain ratio for the attribute HUMIDITY in the given dataset.	10	CO3	L3		

	<table><tr><th>DAY</th><th>OUTLOOK</th><th>TEMP</th><th>HUMIDITY</th><th>WIND</th><th>PLAY</th></tr><tr><td>Day 1</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>NO</td></tr><tr><td>Day 2</td><td>Sunny</td><td>Hot</td><td>High</td><td>Strong</td><td>NO</td></tr><tr><td>Day 3</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>YES</td></tr><tr><td>Day 4</td><td>Overcast</td><td>Mild</td><td>High</td><td>Weak</td><td>YES</td></tr><tr><td>Day 5</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Weak</td><td>YES</td></tr><tr><td>Day 6</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Strong</td><td>NO</td></tr><tr><td>Day 7</td><td>Rain</td><td>Cool</td><td>Normal</td><td>Strong</td><td>YES</td></tr><tr><td>Day 8</td><td>Overcast</td><td>Mild</td><td>High</td><td>Weak</td><td>NO</td></tr><tr><td>Day 9</td><td>Sunny</td><td>Cool</td><td>Normal</td><td>Weak</td><td>YES</td></tr><tr><td>Day 10</td><td>Sunny</td><td>Mild</td><td>Normal</td><td>Weak</td><td>YES</td></tr><tr><td>Day 11</td><td>Rain</td><td>Mild</td><td>Normal</td><td>Strong</td><td>YES</td></tr><tr><td>Day 12</td><td>Sunny</td><td>Mild</td><td>High</td><td>Strong</td><td>YES</td></tr><tr><td>Day 13</td><td>Overcast</td><td>Mild</td><td>High</td><td>Weak</td><td>YES</td></tr><tr><td>Day 14</td><td>Overcast</td><td>Hot</td><td>Normal</td><td>Weak</td><td>YES</td></tr><tr><td>Day 15</td><td>Rain</td><td>Mild</td><td>High</td><td>Strong</td><td>NO</td></tr></table>	DAY	OUTLOOK	TEMP	HUMIDITY	WIND	PLAY	Day 1	Sunny	Hot	High	Weak	NO	Day 2	Sunny	Hot	High	Strong	NO	Day 3	Sunny	Hot	High	Weak	YES	Day 4	Overcast	Mild	High	Weak	YES	Day 5	Rain	Cool	Normal	Weak	YES	Day 6	Rain	Cool	Normal	Strong	NO	Day 7	Rain	Cool	Normal	Strong	YES	Day 8	Overcast	Mild	High	Weak	NO	Day 9	Sunny	Cool	Normal	Weak	YES	Day 10	Sunny	Mild	Normal	Weak	YES	Day 11	Rain	Mild	Normal	Strong	YES	Day 12	Sunny	Mild	High	Strong	YES	Day 13	Overcast	Mild	High	Weak	YES	Day 14	Overcast	Hot	Normal	Weak	YES	Day 15	Rain	Mild	High	Strong	NO			
DAY	OUTLOOK	TEMP	HUMIDITY	WIND	PLAY																																																																																															
Day 1	Sunny	Hot	High	Weak	NO																																																																																															
Day 2	Sunny	Hot	High	Strong	NO																																																																																															
Day 3	Sunny	Hot	High	Weak	YES																																																																																															
Day 4	Overcast	Mild	High	Weak	YES																																																																																															
Day 5	Rain	Cool	Normal	Weak	YES																																																																																															
Day 6	Rain	Cool	Normal	Strong	NO																																																																																															
Day 7	Rain	Cool	Normal	Strong	YES																																																																																															
Day 8	Overcast	Mild	High	Weak	NO																																																																																															
Day 9	Sunny	Cool	Normal	Weak	YES																																																																																															
Day 10	Sunny	Mild	Normal	Weak	YES																																																																																															
Day 11	Rain	Mild	Normal	Strong	YES																																																																																															
Day 12	Sunny	Mild	High	Strong	YES																																																																																															
Day 13	Overcast	Mild	High	Weak	YES																																																																																															
Day 14	Overcast	Hot	Normal	Weak	YES																																																																																															
Day 15	Rain	Mild	High	Strong	NO																																																																																															
Q3.	What are the different types of Machine Learning techniques? Compare them based upon different parameters.	10	CO1	L1																																																																																																
Q4.	Consider the data with two attributes (acid durability and strength) to classify whether a special paper tissue is good or not. Four training samples are listed in the following Table. Consider K= 3. Determine the category Y of the nearest neighbor using KNN Algorithm. Sample table for classification	10	CO4	L4																																																																																																
	<table><tr><th>X1= Acid Durability</th><th>X2 = Strength(kg/m2)</th><th>Y= Classification</th></tr><tr><td>7</td><td>7</td><td>Bad</td></tr><tr><td>7</td><td>4</td><td>Bad</td></tr><tr><td>3</td><td>4</td><td>Good</td></tr><tr><td>1</td><td>4</td><td>Good</td></tr></table>	X1= Acid Durability	X2 = Strength(kg/m2)	Y= Classification	7	7	Bad	7	4	Bad	3	4	Good	1	4	Good																																																																																				
X1= Acid Durability	X2 = Strength(kg/m2)	Y= Classification																																																																																																		
7	7	Bad																																																																																																		
7	4	Bad																																																																																																		
3	4	Good																																																																																																		
1	4	Good																																																																																																		
Q5.	Explain the concept of Support Vector Machines when the problem is linearly separable and non-linearly separable using examples.	10	CO5	L5																																																																																																
Q6.	What are ensemble methods? Explain the different ensemble methods.	10	CO2	L6																																																																																																

BLOOMS TAXANOMY LEVELS (BL)

1-REMEMBERING, 2-UNDERSTANDING, 3-APPLYING, 4-ANALYSING,
5-EVALUATING, 6-CREATING