Reg. No. | | | | | | | | | | | | | |

B.E / B.TECH. DEGREE EXAMINATION, MAY 2023

Sixth Semester

CS18604 – MACHINE LEARNING TECHNIQUES

(Computer Science and Engineering)

(Regulation 2018 / Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	To understand the fundamental concepts of Machine learning techniques.	**2**
CO 2	To enable the students to gain knowledge of parameter estimation methods.	**3**
CO 3	To study the concepts of non-parameter estimation methods and dimensionality reduction techniques.	**3**
CO 4	To understand various discriminative learning models.	**4**
CO 5	To understand decision tree algorithm and schemes of combining models.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is machine learning? Why it is required?	**1**	**1**
2.	Differentiate between supervised and unsupervised machine learning algorithm.	**1**	**2**
3.	What is called bias and variance?	**2**	**1**
4.	Give suitable example for independent and dependent event.	**2**	**2**
5.	What do you mean by dendrogram?	**3**	**1**
6.	Why the parameter K should not be chosen neither small nor large in KNN algorithm?	**3**	**2**
7.	What is called perceptron in machine learning? Give one example.	**4**	**1**
8.	Define the term kernelling in SVM.	**4**	**2**
9.	What are the uses of bagging?	**5**	**1**
10.	What is the need for pruning in decision tree?	**5**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Consider the given dataset. Apply the bayes rule to predict the solution as per the give new facts such as X=Outlook=Sunny; Temp=Cool; Humidity=High; Wind=Strong.	**(14)**	**1**	**3**

Outlook	Temperature	Humidity	Wind	Play
Sunny	Hot	High	Weak	No
Sunny	Hot	High	Strong	No
Overcast	Hot	High	Weak	Yes
Rainy	Mild	High	Weak	Yes
Rainy	Cold	Normal	Weak	Yes
Rainy	Cold	Normal	Strong	No
Overcast	Cold	Normal	Strong	Yes
Sunny	Mild	High	Weak	No
Sunny	Cold	Normal	Weak	Yes
Rainy	Mild	Normal	Weak	Yes
Sunny	Mild	Normal	Strong	Yes
Overcast	Mild	High	Strong	Yes
Overcast	Hot	Normal	Weak	Yes
Rainy	Mild	High	Strong	No

(OR)

(b)	Write about the reinforcement learning in detail. Show case an example to illustrate the process of actions and rewards.	**(14)**	**1**	**3**

12. (a)	**(i)**	Assume a disease so rare that it is seen only in one person out of every million. Assume also that we have a test which is effective if a person has a disease. There is 99% chance that the test result will be positive. However, the test is not perfect and there is 1 in 1000 chance that the test result will be positive on a health person. Assume that a new patient arise and the test result is positive, what is the probability that the person has the disease?	**(7)**	**2**	**3**
	(ii)	Write about the model selection procedures in detail.	**(7)**	**2**	**3**

(OR)

(b)	Consider the below dataset and predict the monthly premium insurance for the driver with 13 years of experience using linear regression.		**(14)**	**2**	**3**

Experience in Years (X)	Monthly Premium in $ (Y)
5	64
2	87
12	50
9	71
15	44
6	56
20	42

13. (a) Consider the similarity matrix given below. Find the hierarchy of clusters created by the single linkage and complete linkage clustering algorithm. **(14) 3 4**

Points	P1	P2	P3	P4	P5	P6
P1	1.0000	0.7895	0.1579	0.0100	0.5292	0.3542
P2	0.7895	1.0000	0.3684	0.2105	0.7023	0.5480
P3	0.1579	0.3684	1.0000	0.8421	0.5292	0.6870
P4	0.0100	0.2105	0.8421	1.0000	0.3840	0.5573
P5	0.5292	0.7023	0.5292	0.3840	1.0000	0.8105
P6	0.3542	0.5480	0.6870	0.5573	0.8105	1.0000

(OR)

(b) Reduce the dimension of below dataset by converting the correlated values to linearly un-correlated values using principal component analysis. **(14) 3 4**

X	Y
3	1
5	4
7	0
9	6
10	5
11	2

14. (a) **(i)** Write short notes on types of activation function in perceptron. **(7) 4 3**

(ii) Explain the back propagation algorithm with an example. **(7) 4 3**

(OR)

(b) Discuss the support vector machine in detail. Why SVM is an example of a large margin classifier? **(14) 4 3**

15. (a) Classify the output using decision tree. **(7) 5 4**

Eyes	Color	Height	Class
Blue	Fair	Tall	+ve
Blue	Dark	Medium	+ve
Green	Dark	Tall	+ve
Blue	Dark	Medium	+ve
Brown	Dark	Short	-ve
Green	Dark	Short	-ve
Brown	Dark	Medium	-ve
Green	Fair	Tall	-ve

(OR)

(b) Discuss about combining multiple learners with all its types. Give an example to each one. **(14) 5 4**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Consider the following table – it consists of the height, age and weight (target) value for 6 people. As you can see, the weight value of ID6 is missing. Predict the weight of this person based on their height and age. Apply the kNN to provide the solution.	**(10)**	**3**	**5**

ID	Height	Age	Weight
1	5	40	70
2	5.6	30	55
3	5.3	32	58
4	5.8	27	57
5	5.4	32	59
6	5.5	33	?