QP Code: RN21BTECH565 | Reg. No | | | | | | | | | | | AR 21

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Seventh Semester - Regular) Examinations, November – 2024

21BECPE47021 – Machine Learning

(Electronics and Communication Engineering)

Time: 3 hrs | Maximum: 70 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. What is Machine Learning and write its key concepts.	CO1	K1
b. Define Bayes' Rule?	CO2	K1
c. Differentiate between supervised, unsupervised and reinforcement learning.	CO2	K3
d. Write any two limitations of Decision Tree approach.	CO3	K1
e. What do you mean by Confusion Matrix? What is its significance in ML?	CO3	K2

PART – B **(15 x 4 = 60 Marks)**

Answer ***All*** the questions	Marks	CO #	Blooms Level
2. a. What is the role of data in ML? Explain the different categories of data with example.	8	CO1	K1
b. Explain Machine Learning Process with suitable diagram?	7	CO1	K1
(OR)			
c. Build a linear regression model to predict y based on x for the data given below. You can proceed up to 5 iterations. Use MSE as cost function.	15	CO1	K3

x	y
1	2
2	3
3	4
4	5
6	7

3.a.	Write the steps of Gradient Descent Algorithm.	7	CO2	K1
b.	What is Overfitting and Underfitting in decision tree? What are its symptoms and mitigation strategies?	8	CO2	K2
	(OR)			
c.	Minimize the quadratic function $\boldsymbol{J(\theta) = \frac{1}{2}(\theta - 5)^2}$ using Gradient Descent Algorithm. Consider $\boldsymbol{\alpha = 0.1}$. (Use 3 iterations)	15	CO2	K3
4.a.	Build a Decision Tree based on the given data. Also predict the play condition based on 15th Day data: Outlook='Rain', Humidity='High' and Wind='Weak'.	15	CO2	K3

Outlook	Temperature	Humidity	Wind	Played football(yes/no)
Sunny	Hot	High	Weak	No
Sunny	Hot	High	Strong	No
Overcast	Hot	High	Weak	Yes
Rain	Mild	High	Weak	Yes
Rain	Cool	Normal	Weak	Yes
Rain	Cool	Normal	Strong	No
Overcast	Cool	Normal	Strong	Yes
Sunny	Mild	High	Weak	No
Sunny	Cool	Normal	Weak	Yes
Rain	Mild	Normal	Weak	Yes
Sunny	Mild	Normal	Strong	Yes
Overcast	Mild	High	Strong	Yes
Overcast	Hot	Normal	Weak	Yes
Rain	Mild	High	Strong	No

(OR)

b.	What is Random Forest in ML and how it works?	8	CO2	K1
c.	Explain KNN algorithm. What are the different distance metrics used in KNN?	7	CO3	K1
5.a.	For the given data apply KNN to identify that the new data point (X1=3, X2=4) would belong to which class? (Use K=3)	8	CO3	K3

ID	X1	X2	Class
1	1	2	A
2	2	3	B
3	3	3	B
4	6	5	B
5	7	8	B

b.	Explain the requirement of PCA in ML? Write the steps of PCA algorithm.	7	CO3	K2

(OR)

c.	Draw a simple architecture of CNN and explain the functions of each layer.	8	CO3	K1
d.	Differentiate between Classification and Clustering in machine learning.	7	CO3	K2

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