Roll Number:_____

Thapar Institute of Engineering and Technology Patiala
Computer Science and Engineering Department

BE Third Year August 2019 Auxiliary Exam	ML501: Machine Learning
Time: 3 Hours	Max Marks:100
Instructor: Dr. Singara Singh Kasana	

Note: Attempt all questions. All parts of a question must be answered in order. A new question must start from new page.

Q1.	(a) Discuss the principle of Bayesian Learning. with suitable example. (b) What is KNN? Discuss the working of kNN approach.	[20]
Q2	How decision tree is used in machine learning models? Discuss and compare the procedures which are used in creating a decision tree	[20]

Q3	Calculate model evaluation parameters for regression model b/w observed pH values(X) and predicted pH values (Y) of water sample. Make assumption if any.
	
	 <table><tr><td>X</td><td>5.5</td><td>6.5</td><td>6.25</td><td>7.2</td><td>7.4</td><td>6.3</td><td>6.4</td><td>7.6</td></tr><tr><td>Y</td><td>6.1</td><td>6.3</td><td>6.5</td><td>7.6</td><td>6.9</td><td>6.2</td><td>6.8</td><td>7.5</td></tr></table>
	
	   (i) Correlation (r)
	   (ii) Determinant of Coefficient (R)
	   (iii) Root Mean Squared Error
	   (iv) Mean Absolute Error
	   (v) Accuracy (with ±0.2 error)
		[10]

Q4.	Compare between inductive and analytical learning in a tabular manner.	[10]
Q5	Why clustering is used? Discuss different types of clustering. Write the steps of K Mean algorithm and calculate these steps on the following given data: <table><tr><td>Marks in ML</td><td>Marks in DS</td></tr><tr><td>20</td><td>100</td></tr><tr><td>20</td><td>50</td></tr><tr><td>80</td><td>40</td></tr></table>	[20]

P.T.O.

50	80
70	50
60	40
10	20
40	90

Create three clusters, by taking initial centers as $C_1(20, 100)$, $C_2(50,80)$ and $C_3(10,20)$. Use Rectilinear distance as the similarity measure which is defined between two vectors $v1(x1,y1)$ and $v2(x2,y2)$ as

$$d (v1, v2) = |x2 - x1| + |y2 - y1|$$

| Q6 | Discuss GA optimization model, by giving suitable diagram. Also give examples of cross over and mutation, by assuming suitable data and fitness function. | [20] |

_____ All the Best _____

Model Solution

2