

Sessional I

ITPC-41 (Machine Learning)

Max. Marks: 15

Duration: 50 Min

Q.1. Differentiate between supervised/semi-supervised/unsupervised and reinforcement learning with example. **4**

Q.2. Define Cross Validation. Explain k-fold cross validation. What do you mean by **k** in k-fold cross validation? **3**

Q.3. Let us analyze the following 3-variate dataset with 10 observations. Each observation consists of 3 measurements on a wafer: thickness, horizontal displacement, and vertical displacement.

$$X = \begin{bmatrix} 4 & 1 & 8 \\ 6 & 3 & 5 \\ 8 & 6 & 1 \\ 8 & 5 & 7 \\ 7 & 2 & 9 \\ 5 & 3 & 3 \\ 9 & 5 & 8 \\ 7 & 4 & 5 \\ 8 & 2 & 2 \\ 7 & 4 & 3 \end{bmatrix}$$

Find PCA.

3

Q.4. You have 1000 fruits which could be either 'banana', 'orange' or 'other'. The training data to form a counts table like this.

Fruit	Long	Not Long	Sweet	Not Sweet	Yellow	Not Yellow	Total
Banana	400	100	350	150	450	50	500
Orange	0	300	150	150	300	0	300
Other	100	100	150	50	50	150	200
Total	500	500	650	350	800	200	1000

Let's say you are given a fruit that is: Long, Sweet and Yellow can you predict what fruit it is? Using Naïve Bayes' Classifier. **3**

Q.5. Explain the importance of gradient descent algorithm and its application. **2**