Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
FEBRUARY 2022 (MAKEUP)
SUBJECT: Machine Learning (ECE 4052), Program Elective-III

TIME: (75+10) minutes **MAX. MARKS: 20**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Questions	Marks
1A.	Describe the Gram-Schmidt orthogonalization for multiple regression using univariate regression. Clearly give all the steps, starting from the simple univariate regression.	4
1B.	In a linear regression learning, show that the model parameters are given by, $\vec{\hat{\beta}} = \left(X^T X\right)^{-1} X^T Y$. Here X denotes the input data matrix and Y is the output vector.	3
1C.	Explain the importance of Shrinkage methods. Describe the ridge regression and obtain the expression for ridge parameters.	3
2A.	What is the criteria used in optimal separating classifier? Explain and obtain the objective function for this case.	4
2B.	Explain the Maximum A Posteriori (MAP) parametric estimation method with the help of necessary expressions.	3
2C.	How the Boolean functions AND and OR can be learned using perceptron? Give their structures, geometric interpretations and limitations.	3