Name:_____
Roll No:_____

**MAR ATHANASIUS COLLEGE OF ENGINEERING KOTHAMANGALAM - 686666**

**(Govt. Aided Autonomous Institution)**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**B. TECH FIRST SERIES EXAMINATION, AUGUST 2026**
**(S7 ECE A &B) ECT463 MACHINE LEARNING**

Max. Marks: 40 Duration: 1.5 Hours

***PART A***

***Answer all questions. Each question carries 3 marks.***

| | | |
|---|---|---|
| 1 | Explain curse of dimensionality in machine learning. | CO1 |
| 2 | A machine learning-based Battery Management System monitors lithium-ion batteries to determine their health status. Identify the input features, describe any feature extraction involved and specify the target vector. | CO1 |
| 3 | Examine the difference between regression and classification with the support of a suitable example. | CO2 |
| 4 | Differentiate between Bias and Variance. | CO2 |

***PART B***

***Answer all questions. Each question carries 14 marks.***

| | | |
|---|---|---|
| 5. a) | Apply the principles of decision theory to a machine learning-based predictive maintenance system for industrial motors. Explain how each step of decision theory contributes to classifying the motor condition as Normal, Warning or Faulty. | CO1<br>8 marks |
| b) | Differentiate between different learning techniques used in machine learning. | CO1<br>6 marks |
| 6. a) | Explain the different types of regression. | CO2<br>7 marks |
| b) | A student wants to predict the final examination marks of students based on the number of hours studied per week using Simple Linear Regression.<br>Predict the examination marks of a student who studies 7 hours per week. | CO2<br>7 marks |

| Hours studied | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| Exam Marks | 50 | 60 | 70 | 80 | 90 |