

Question Paper

Exam Date & Time: 15-Jun-2023 (09:30 AM - 12:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

**INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION-MAY 2023
IV SEMESTER B.Sc.(APPLIED SCIENCES) IN ENGG.**

MACHINE LEARNING [ICS-237 - S2]

Marks: 50

Duration: 180 mins.

Answer all the questions.

Missing data, if any, may be suitably assumed.

- 1) What is the tradeoff between bias and variance in machine learning? (5)
- a)
- b) How can underfitting and overfitting be detected in a machine learning model? (5)
- 2) Compute m (estimated slope) for below Air pollution datasets using Linear Regression? (3)
- a)
- b) Compute c (estimated intercept) for below Air pollution datasets using Linear Regression? (3)
- c) Compute R-Squared for below Air pollution datasets? (4)
- Air pollution Datasets**

| Year | Pm10 |
|------|------|
| 2009 | 210 |
| 2010 | 260 |
| 2011 | 270 |
| 2012 | 280 |
| 2013 | 290 |
| 2014 | 300 |

- 3) Assume that we have two coins c_1 and c_2 . bias for c_1 is probability of getting heads with c_1 and bias for c_2 is probability of getting heads with c_2 . Find out c_1 and c_2 by performing number of trials for coin tosses are given below. Assume θ_A is 0.60 and θ_B is 0.50. (10)

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4) Explain linear and nonlinear Support Vector Machine? (5)

a)

b) Write a python program to classify iris species using support vector machine method? (5)

5) Calculate the information gain when splitting on A and B. Which attribute would the decision tree induction algorithm choose. Datasets is given below? (5)

a)

b) Calculate the gain in the Gini index when splitting on A and B. Which attribute would the decision tree induction algorithm choose. Datasets is given below? (5)

| A | B | Class Label |
|---|---|-------------|
| T | F | + |
| T | T | + |
| T | T | + |
| T | F | - |
| T | T | + |
| F | F | - |
| F | F | - |
| F | F | - |
| T | T | - |
| T | F | - |

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