



# UNIVERSITY OF EMBU

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2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE,  
BACHELOR OF SCIENCE (COMPUTER SCIENCE)

CSC 323: MACHINE LEARNING

DATE: APRIL 11, 2017

TIME: 2:00-4:00PM

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INSTRUCTIONS:

Answer Question ONE and ANY other two Questions

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QUESTION ONE (30 MARKS)

- a) Define the term as used in machine learning (5 Marks)
- i) Learning.
  - ii) Bias.
  - iii) Classifier.
  - iv) Hypothesis
  - v) Over-fitting.
- b) Draw a decision tree to represent the following boolean function:  $(A \text{ XOR } B)$ . (2 Marks)
- c) Describe ANY FIVE learning methodologies. (3 Marks)
- d) Give main features of Bayesian learning method. (4 Marks)
- e) Describe Four problems that are appropriate to be solved through BACKPROBAGATION. (4 Marks)
- f) Give reasons why Instance-based learning is different from all other approaches. (4 Marks)
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- g) List steps of Rule-pruning method in finding high accuracy hypothesis. (4 Marks)
- h) Describe Case-based reasoning. (4 Marks)

**QUESTION TWO (20 MARKS)**

- a) Explain the following issues in Decision Tree Learning:
- i) Over-fitting the data (5 Marks)
  - ii) Continuous-valued attributes. (5 Marks)
- b) Describe how to derive Gradient Descent Rule. (10 Marks)

**QUESTION THREE (20 MARKS)**

- a) Discuss ANY TWO learning methods used in Artificial Neural Networks. (10 Marks)
- b) Describe in details ANY FIVE areas that machine learning has been successfully been applied. (10 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Give advantages of instance-based learning method. (6 Marks)
- b) Explain the representational power of Perceptron. (7 Marks)
- c) Discuss the maximum a posteriori (MAP) hypothesis. (7 Marks)

**QUESTION FIVE (20 MARKS)**

- a) Give advantages of converting decision trees to rules before pruning. (4 Marks)
- b) Explain how Radial Basis Method is a blend of ANN and instanced based learning method. (8 Marks)
- c) Explain in details k-Nearest Neighbour learning. (8 Marks)

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