

Indian Maritime University
(A Central University, Govt of India)

End Semester Examinations – June 2026

Programme Name: B Tech (Marine Engineering)

Semester: VI

Subject Code: UG11T4601

Subject Name: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Date: 01.06.2026

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. Which search algorithm finds the least-cost path first when all step costs are equal?

- a) Depth-First Search (DFS)
- b) Uniform Cost Search (UCS)
- c) Breadth-First Search (BFS)
- d) A* Algorithm

2. Face Recognition system is based on which type of approach?

- a) Weak AI approach
- b) Applied AI approach
- c) Cognitive AI approach
- d) Strong AI approach

3. K-Nearest Neighbors (KNN) is classified as what type of machine learning algorithm?

- a) Instance-based learning
- b) Parametric learning
- c) Non-parametric learning
- d) Model-based learning

4. Which model is suitable when the output is binary in nature?

- a) Linear Regression
- b) Logistic Regression
- c) K-Means
- d) PCA

5. What is an Artificial Neural Network (ANN)?

- a) A computational model inspired by the human brain

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- b) A machine learning algorithm used for image processing
c) A statistical analysis technique for data clustering
d) A programming language for neural network implementation
6. Which neural network architecture is specifically designed to capture spatial features?
a) Recurrent Neural Network (RNN) b) Convolutional Neural Network (CNN)
c) Perceptron d) LSTM
7. Method in which the previously calculated probabilities are revised with values of new probability is called _____
a) Revision theorem b) Bayes theorem
c) Dependent theorem d) Updation theorem
8. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually a six.
a) $1/8$ b) $5/8$
c) $2/7$ d) $3/8$
9. In reinforcement learning, an agent improves performance through:
a) Direct supervision b) Random guessing
c) Reward and penalty mechanism d) Static rules
10. AI-driven ship systems are mainly used to:
a) Reduce computational power
b) Enhance operational decision-making
c) Eliminate navigation systems
d) Replace all human roles completely

Section B

Five Questions of 02 Marks each

11. What are the advantages of heuristic function?
12. Define posterior probability.
13. Give any two differences between classification and regression.
14. What is a filter bubble and how does it work? Give examples.
15. Explain Algorithmic Bias with example.
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Section C

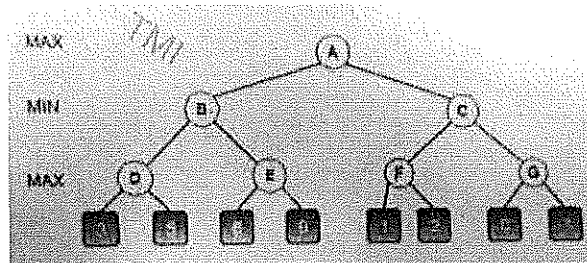
Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. (a) Explain how Artificial Intelligence systems differ from traditional programming approaches with suitable examples. (5 Marks)

(b) Explain the major risks and negative societal impacts of AI systems with examples. (5 Marks)

17. (a) Explain sigmoid function of Logistic regression. (5 Marks)

(b) Apply the minimax search algorithm and find the most convenient path for the Max. node.



(5 Marks)

18. (a) What is Machine Learning? Explain different types of Machine Learning.

(5 Marks)

(b) An AI-based diagnostic system is used on a ship to detect engine failure.

Probability of engine failure ≈ 0.05

Probability of (alarm signal / engine failure) = 0.92

Probability of (alarm signal / without engine failure) = 0.08

Using Naïve Bayes theorem, calculate the probability that an engine failure has occurred given that the alarm signal is active. (5 Marks)

19. Discuss in details the historical evolution of Artificial Intelligence. (10 Marks)

20. (a) Explain in details about Perceptron and its types? (5 Marks)

b) Explain about multi-layer artificial neural network (5 Marks)

21. a) Explain Conditional Probability and explain Bayes rule in detail. (5 Marks)

b) Explain in details about logistic regression in machine learning. (5 Marks)

22. Analyse the role of Artificial Intelligence in modern maritime operations with respect to risk prediction, energy optimization, environmental protection, and decision support systems. (10 Marks)

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