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Question Paper Code : 82309

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Sixth Semester

Electronics and Communication Engineering

CS 3491 — ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(Common to Biomedical Engineering/Electronics and Telecommunication Engineering/Medical Electronics)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. List any two applications of AI.
2. Define adversarial search.
3. What is a prior probability?
4. What is the difference between likelihood and posterior probability?
5. What is Bayesian Linear regression?
6. Differentiate between discriminative and generative models.
7. Define Euclidean distance as used in KNN.
8. Define centroid in the context of K-means.
9. What is ReLU?
10. State the purpose of regularization in deep learning.

PART B — ($5 \times 13 = 65$ marks)

11. (a) Describe the architecture of a problem-solving agent. How does it solve problems using search?

Or

- (b) Describe the architecture problems in AI. Explain with the help of genetic algorithms of simulated annealing.

12. (a) Explain the working of the Naïve Bayes model. Discuss its applications and limitations.

Or

- (b) Describe any two approximate inference techniques used in Bayesian networks.
13. (a) Describe linear regression using least squares method for both single and multiple variables.

Or

- (b) Discuss decision tree construction using entropy and information gain.
14. (a) Explain how instance-based learning differs from model-based learning with examples.

Or

- (b) Discuss bagging, boosting and stacking with suitable examples and comparisons.
15. (a) Discuss the Multilayer perception. Compare it with activation function and network training.

Or

- (b) Explain hyper parameter turning in deep learning. Mention techniques and tools used.

PART C — (1 × 15 = 15 marks)

16. (a) Describe the probabilistic generative model with Naïve Bayes as an example.

Or

- (b) Explain the Expectation-Maximization (EM) algorithm with the steps of expectation and maximization.