

**MASTER OF COMPUTER
APPLICATIONS (MCA) (NEW)**

Term-End Examination

December, 2022

**MCS-224 : ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING**

Time : 3 Hours

Maximum Marks : 100

Weightage : 70%

***Note :** Question No. 1 is compulsory. Attempt any*

***three** questions from the rest.*

1. (a) Compare Artificial Intelligence (AI), Machine Learning and Deep Learning. 6
- (b) Briefly discuss the Adversarial search. Name the techniques used for adversarial search. 5
- (c) Write algorithm for BFS (Breadth-First Search). Write the time complexity and space complexity of BFS. 5

- (d) Obtain Conjunctive Normal Form (CNF) for the formula : 5

$$D \rightarrow (A \rightarrow (B \wedge C))$$

- (e) What is Skolomization ? Skolomize the expression : 4

$$(\exists X_1)(\exists X_2)(\forall Y_1)(\forall Y_2)(\exists X_3)(\forall Y_3)$$

$$P(X_1, X_2, X_3, Y_1, Y_2, Y_3)$$

- (f) What is Reinforcement Learning ? Classify the various reinforcement learning algorithms. 5
- (g) What is Logistic Regression ? Briefly discuss the various types of logistic regressions. 5
- (h) Differentiate between linear regression and polynomial regression techniques. 5
2. (a) In context of Intelligent Agents, what are task environments ? Explain the standard set of measures for specifying a task environment under the heading PEAS. 10
- (b) Briefly discuss the following (give suitable example for each) : 10
- (i) Rote learning
 - (ii) Supervised learning
 - (iii) Unsupervised learning
 - (iv) Delayed-Reinforcement learning

3. (a) Briefly discuss the Min-Max Search Strategy. What are the properties of Minimax Algorithm ? Also give advantages and disadvantages of Minimax search. 10
- (b) Differentiate between the following, with an example for each : 10
- (i) Classification techniques and Regression techniques
- (ii) Lazy learner algorithms and Eager learner algorithms
4. (a) What is Iterative Deepening Depth First Search (IDDFS) ? How is it different from Depth First Search ? Give time and space complexities of IDDFS. Also give advantages and disadvantages of IDDFS. 10
- (b) Discuss support vector regression. Draw suitable diagram in support of your discussion. Also give *two* applications of support vector regression. 10
5. Write short notes on any *five* of the following : 5×4=20
- (a) Forward Chaining
- (b) Semantic Nets

- (c) Bayes' Networks
- (d) Rough Set Theory
- (e) Recurrent Neural Networks
- (f) Restricted Boltzmann Machines
- (g) Ensemble Methods
- (h) K-Nearest Neighbour
- (i) Principal Component Analysis
- (j) Association Rules