MCS-224

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.*

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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

P. T. O.

(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

P. T. O.

 (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

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