

No. of Printed Pages : 6

MCS-224

**MASTER OF COMPUTER
APPLICATIONS**

(MCA-NEW)

Term-End Examination

June, 2026

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

Time : 3 Hours

Maximum Marks : 100

Weightage : 70%

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any three questions from the
remaining questions.*

1. (a) Compare supervised learning and unsupervised learning. List the algorithms for each type of learning. 5
- (b) What is dimensionality reduction ? Briefly discuss the ways to achieve it. 5
- (c) Briefly discuss the formulation of state space search, with a suitable example. 5
- (d) Obtain disjunctive Normal form for the well form formula given below : 5
$$\sim (A \rightarrow (\sim B \wedge C))$$
- (e) Write Bayes' theorem and elaborate the meaning of each component in it. 5
- (f) What is Turing Test ? What is criticism to the Turing Test ? 5

- (g) What is Adversarial search ? Discuss the issues with Adversarial search. 5
- (h) What is reinforcement-learning ? List the components involved in it. 5
2. (a) Differentiate between CNF and DNF. Give suitable example for each. Also obtain a Prenex normal form for the formula : 10
- $$(\forall x) (\forall y) ((\exists z)(P(x, y) \wedge P(y, z)) \rightarrow (\exists u) Q(x, y, u))$$
- (b) Draw the block diagram of machine learning cycle and briefly discuss the role of each of its components. 10

3. (a) Differentiate among joint, marginal and conditional probability with an example of each. 6
- (b) What do you understand by the term “Density based clustering” ? 4
- (c) List the classification algorithms under the categories of linear and non-linear models. Also discuss the various methods used for evaluating a classification model. 10
4. (a) How does regression differ from classification ? What is the similarity between the two ? Briefly discuss the following types of regression : 10
- (I) Linear regression

(II) Multiple linear regression

(III) Polynomial regression

(IV) Logistic regression

(b) Discuss the utility of sigmoid function in neural network. Compare sigmoid function with the binary step function. 5

(c) Differentiate between lazy Learner Algorithm and Eager learner algorithms. 5

5. Write short notes on any *five* of the following : 5×4=20

(a) K-nearest neighbor

(b) Principal component analysis

(c) Alpha-beta pruning algorithm

- (d) Semantic Network
- (e) Support Vector machine
- (f) Partition Based clustering
- (g) Backpropagation Algorithm

× × × × ×