(6 pages) **Reg. No. :** .....

Code No. : 5466 **Sub. Code : ZCSM 22**

M.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2023

Second Semester

Computer Science — Core

MACHINE LEARNING

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The categories in which Machine learning approaches can be traditionally categorized are
   (a) Supervised learning
   (b) Unsupervised learning
   (c) Reinforcement learning
   (d) All of the above

2. Supervised learning and unsupervised clustering both require at least one
   (a) hidden attribute
   (b) output attribute
   (c) categorical attribute
   (d) input attribute

3. What are general limitations of back propagation rule?
   (a) local minima problem
   (b) slow convergence
   (c) scaling
   (d) all of the mentioned

4. How the computation is generalized in the Backpropagation algorithm?
   (a) Static Rule (b) Dynamic Rule
   (c) Delta Rule (d) Sigma Rule

5. What are the advantages of Classification and Regression Trees (CART)?
   (a) Decision trees implicitly perform variable screening or feature selection
   (b) Can handle both numerical and categorical data
   (c) Can handle multi–output problems.
   (d) All of the above

6. The K-means algorithm

(a) requires the dimension of the feature space to be no bigger than the number of samples

(b) has the smallest value of the objective function when k = 1

(c) minimizes the within class variance for a given number of clusters

(d) converges to the global optimum if and only if the initial means are chosen as some of the samples themselves

7. How many types of reinforcement learning exist?

(a) 2 (b) 3

(c) 4 (d) 5

8. Reinforcement learning is a

(a) Prediction-based learning technique

(b) Feedback-based learning technique

(c) History results-based learning technique

(d) Labeled data

9. How many components does Bayesian network have?

(a) 2 (b) 3

(c) 4 (d) 5

10. What does the Bayesian network provides?

(a) Complete description of the domain

(b) Partial description of the domain

(c) Complete description of the problem

(d) Full distribution

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Enumerate the types of machine learning.

Or

(b) Identify McCulloch and Pitts Neurons.

12. (a) Discuss about the multi-layer perceptron.

Or

(b) Explain about the radial basic function algorithm.

13. (a) Examine AdaBoost Algorithm.

Or

(b) Write down the self-organising feature map algorithm.

14. (a) Analyze the principal components analysis algorithm.

Or

(b) Categorize Markov decision processes.

15. (a) Evaluate hidden Markov models.

Or

(b) Summarize tracking methods.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe about supervised learning.

Or

(b) Examine the perceptron learning algorithm.

17. (a) Discuss about the multi-layer perceptron algorithm.

Or

(b) Explain about the back-propagation algorithm.

18. (a) Illustrate constructing decision trees.

Or

(b) Develop the k-means algorithm.

19. (a) Categorize multi-dimensional scaling.

Or

(b) Classify the genetic algorithm.

20. (a) Summarize Markov chain Monte Carlo.

Or

(b) Justify Bayesian networks.

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