



Register Number: \_\_\_\_\_  
Date: \_\_\_\_\_

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**  
**M.Sc(BIG DATA ANALYTICS) —III SEMESTER**  
**SEMESTER EXAMINATION:OCTOBER 2022**  
**(Examination conducted in December 2022)**  
**BDA 3321:Machine Learning II**

**TIME: 2.5 hrs**

**MAXIMUM MARKS: 70**

**This paper has 2 printed pages and 3 parts.**

**Part A**

**Answer ALL questions. More than one options may be correct.**

**(1 × 10 = 10)**

1. A perceptron and neuron are different words for the same structure.  
A. True B. False (1)
2. Which of the following is used for language translation models?  
A. Single Layer Perceptron B. Recurrent Neural Network C. Convolution Neural Network D. A single neuron (1)
3.  $n$ -gram language models can be made using:  
A. Markov Chains(models) B. HMMs C. Encoders D. CNN (1)
4. Genetic algorithms are popular because:  
A. They are computationally inexpensive B. They perform well for biological systems C. They are easy to build D. Computations can be easily parallelized. (1)
5. Consider a variable outlook that can take three values  $\in \{\text{Sunny, Overcast, Rainy}\}$ . If we use a 3 bit string to represent a hypothesis, then the hypothesis "Overcast or Rainy" is represented by:  
A. (1, 1, 1) B. (1, 0, 1) C. (0, 1, 1) D. (1, 1, 0) (1)
6. A decision tree is a bayesian network.  
A. True B. False (1)
7. A topological ordering can be found for a decision tree.  
A. True B. False (1)
8. Naive Bayes classifier can be represented using a DAG  
A. True B. False (1)
9. Arrows in DAGs show:  
A. Correlation between variables B. Dependence of variables C. Independence of variables (1)
10. A cyclic graph can have a topological ordering.  
A. True B. False (1)

**PART B**

**Answer ANY SIX questions.**

**(6 × 5 = 30)**

11. Explain the perceptron algorithm along with its time complexity. (5)
12. Explain briefly feed-forward and backpropagation. (5)
13. Explain briefly the different components of translation of language model. (5)
14. Explain the basic structure of an RNN. (5)
15. Explain how a new population is created in the context of genetic algorithms. (5)
16. Explain the difference between a directed tree and a bayesian network. (5)
17. Mention any three applications of DAGs and represent them graphically. (5)
18. What is a topological ordering? How can we use this to define the ordered markov property? (5)
19. What are Markov random fields? Give some applications of the same. (5)

**PART C**

**Answer ANY THREE questions.**

**(3 × 10 = 30)**

20. (a) Explain how a CNN works and represent it diagrammatically. (6)  
(b) Explain briefly the concept of computational graphs. Show atleast two examples. (4)
21. (a) Explain GABIL (7)  
(b) Explain any one short coming of GAs and how to overcome this. (3)
22. (a) Explain n-gram model for modelling languages. (5)  
(b) Highlight the pros and cons of the n-gram models and potential fixes. (5)
23. (a) Explain MCMC. (5)  
(b) Explain the Metropolis-Hastings algorithm. (5)