Roll No. | | | | | | | | | | |

B.E (FT) END SEMESTER EXAMINATIONS – APR / MAY 2022

Computer Science and Engineering
Sixth Semester
CS6301, Machine Learning
(Regulation 2018 - RUSA)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Write short notes on different types of machine learning models.
2. Differentiate McCulloch and Pitts Neural model from the biological neuron.
3. Find the number of distinct instances, syntactically distinct hypotheses and semantically distinct hypotheses possible for the problem given in question number 16.
4. Define the need of bias node and momentum in neural networks. What is the preferred value of momentum in neural network?
5. List out the possible activation functions.
6. Define vector quantization.
7. Differentiate bagging and boosting.
8. What is Markov Decision Process?
9. Given a sample confusion matrix to represent three class classification problem. Find sensitivity, specificity and F1-score.
10. What are the impacts of filter size and stride value with convolution operation?

PART – B (8 x 8 = 64 marks)
(Answer any 8 questions)

11. Consider the training samples given below and generate the version space using candidate elimination algorithm.

Marks	Technical knowledge	Communication skill	Interaction	Logical thinking	Interest	Result
Above 90	excellent	good	yes	fast	yes	selected
Above 90	good	good	yes	fast	yes	selected
Above 80	good	good	no	fast	no	Not selected
Above 90	good	good	yes	slow	no	Not selected
Above 70	bad	poor	no	slow	no	Not selected

12. Write the perceptron algorithm and design and trace the perceptron model for NOR gate with bias node value as 1 and initial weights w0=0.5 (bias weight), w1=0.07, w2=0.4 and learning rate as 0.9.
13. Construct RBF network for solving XOR problem using 4 Gaussian functions (for (0,0), (0,1),

(1,0), and (1,1) as centers respectively) with the weights 1, -1,-1 & 1 and 2 neighbors and all 4 variances are assumed to be equal to 1.

14. Explain the components of reinforcement learning algorithm. Write down SARSA algorithm.

15. Apply LDA to the following set of points (1,1), (2,1), (1,2), and (2,2) belongs to class 1 and (8,8), (8,10), (10,8), and (10,10) belongs to class 2.

16. Consider the following training set. Construct the decision tree (C4.5) for the same.

Sl. No.	Assessment	Assignment	Project	Seminar	Result
1	good	yes	yes	good	pass
2	average	yes	no	poor	fail
3	good	no	yes	good	pass
4	poor	no	no	poor	fail
5	good	yes	yes	good	pass
6	average	no	yes	good	pass
7	good	no	no	fair	pass
8	poor	yes	yes	good	fail
9	average	no	no	poor	fail
10	good	yes	yes	fair	pass

17. Explain Naïve Bayes algorithm. Find whether the result is pass / fail where Assessment = good, Assignment = no, Project =no, Seminar = good, for the samples given in the problem no. 16, using Naïve Bayes model.

18. Apply K-means clustering algorithm to cluster the following samples with K=3
(1,1,1), (1,2,1), (1,2,2), (5,6,5), (6,6,6), (10,9,9) and (9,9,9)

19. Consider the following samples (3,1), (3,2), (4,0) belongs to positive class and (1,0), (0,1), and (0,-1) belongs to negative class. Find an optimal hyperplane and offset to classify the samples with SVM.

20. Write genetic algorithm and explain its operations.

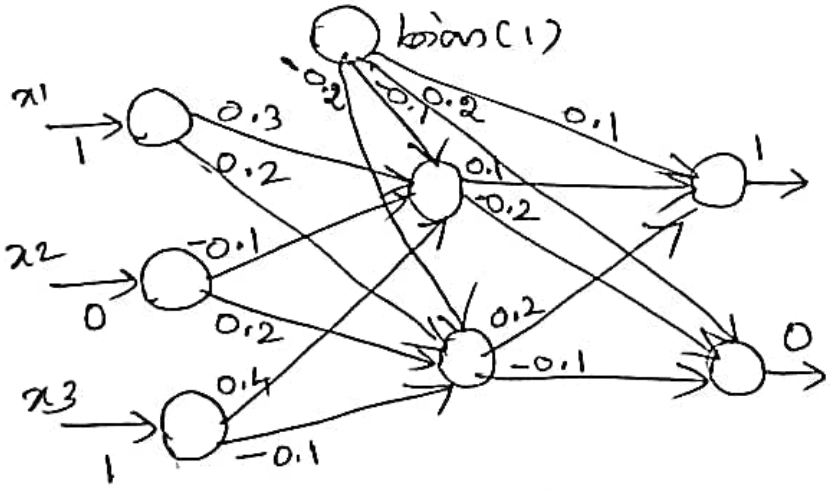
21. Differentiate classification from regression models. Consider the following wind speed on a particular day. Predict the wind speed by 11 pm using linear regression.

hours	11 am	2 pm	5 pm	8 pm	11 pm
Wind speed in km/h	11	19	19	14	?

22. Explain –CNN model and its few real time applications.

PART – C (2 x 8 = 16marks)

23. Write down the multi-layer perceptron algorithm. Design and trace the following MLP model with initial learning rate of 0.9.



24. Derive the backpropagation algorithm of MLP.