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**Question Paper Code : 30148**

M.C.A. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Third Semester

MC 4301 – MACHINE LEARNING

(Regulations – 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

1. List out four types of data with appropriate example.
2. Mention the importance of data remediation.
3. Why is cross-validation good for testing?
4. What is meant by feature transformation?
5. How is maximum likelihood estimated?
6. What is the usage of EM algorithm?
7. Compare and contrast on: biological neuron and Artificial Neuron.
8. Highlight the role played by Bias and Variance in ML.
9. Compare and contrast on: discrete and Continuous Attribute.
10. Why Hinge loss function is important in SVM?

PART B — ( $5 \times 13 = 65$  marks)

11. (a) Explain the steps involved in data preprocessing with an example.

Or

- (b) Explain the steps involved in Machine learning model preparation.



12. (a) Elaborate on the feature selection methods to reduce dimensionality.

Or

- (b) How do you evaluate and improve the performance of a model? Explain with suitable example.

13. (a) Explain about components of Bayesian Belief networks with an example.

Or

- (b) Explain the process of maximum likelihood and least square error in bayesian learnign.

14. (a) Illustrate the different type's logistic regression with suitable example.

Or

- (b) Illustrate the significance of the activation functions. Tanh, Sigmoid, Relu and PRelu.

15. (a) Examine how decision trees are effective as classifier.

Or

- (b) Illustrate about the SVM kernels with suitable examples.

PART C — (1 × 15 = 15 marks)

16. (a) Expand on Bayes optimal classifier and apply in to the following scenario: Vincent has a lot of folders in office to classify as business or family. He has classified the first bookshelf full of folders and is using this to estimate the probabilities that business or family folders have particular words in their lables.  $P(\text{'Travel'}/\text{Family})=0.4$ ;  $P(\text{'Travel'}/\text{Business})=0.2$ ;  $P(\text{'Records'}/\text{Family})=0.3$ ;  $P(\text{'Records'}/\text{Business})=0.6$ ;  $P(\text{'Spain'}/\text{Family})=0.2$ ;  $P(\text{'Spain'}/\text{Business})=0.1$ ;  $P(\text{Family})=0.4$ ;  $P(\text{Business})=0.6$ ; Using these estimates, he decides to classify future folders. What estimate will Vincent get for  $P(\text{Family}/\text{'Spain'}, \text{'Travel'}, \text{'Records'})$ ?

Or

- (b) Evaluate the Perceptron Neural Network in detail. Also using Perceptron find the new weights: Vectors:  $(-1, 1, -1, -1)$ ,  $(1, 1, -1, -1)$  belong to class 1(1) and Vectors:  $(-1, 1, 1, -1)$ ,  $(1, -1, 1, 1)$  belong to class 2(-1). Use a learning rate of 1 and starting weights of 0. Using the training vectors as input, test the response of the net using algorithm.