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# Question Paper Code: 57B03

B.E./B.Tech. DEGREE EXAMINATION, DEC 2020

Seventh Semester

Biomedical Engineering

15UBM 703 - NEURAL NETWORKS AND PATTERN RECOGNITION

(Regulation 2015)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

1. The structure of Bayes classifier is determined by CO1- R

   (a) Conditional densities P(x/wi) (b) Prior probabilities

   (c) Both a and b (d) Joint probabilities

2. Error correction learning is type of? CO1- U

   (a) Supervised learning (b) Unsupervised learning

   (c) Can be supervised or unsupervised (d) None of the mentioned

3. The recalled output in pattern association problem depends on CO2- R

   (a) Nature of input-output (b) Design of network

   (c) Both input and design (d) None of the mentioned

4. What is the minimum no. of variables/ features required to perform clustering? CO2- R

   (a) 0 (b) 1 (c) 2 (d) 3

5. A perceptron is CO3- U

   (a) A single layer feed-forward neural network with pre-processing

   (b) An auto-associative neural network

   (c) A double layer auto-associative neural network

   (d) A neural network that contains feedback

6. Below are the 8 actual values of target variable in the train file. CO3- U

[0,0,0,1,1,1,1,1] What is the entropy of the target variable?

(a) -(5/8 log(5/8) + 3/8 log(3/8)) (b) 5/8 log(5/8) + 3/8 log(3/8)

(c) 3/8 log(5/8) + 5/8 log(3/8) (d) 5/8 log(3/8) – 3/8 log(5/8)

7. Minimum error rate discriminant function can be written as CO4- R

(a) G(x) = P(w1/x) / P(w2/x) (b) G(x) = P(w1/x) + P(w2/x)

(c) G(x) = P(w1/x) - P(w2/x) (d) G(x) = P(w2/x) - P(w1/x)

8. Which of the following is true for neural networks? CO4- U
(i) The training time depends on the size of the network.
(ii) Neural networks can be simulated on a conventional computer.
(iii) Artificial neurons are identical in operation to biological ones.

(a) (ii) is true (b) (i) and (ii) are true (c) All of the mentioned (d) None of the above

9. Fuzzy logic is usually represented as CO5- U

(a) IF-THEN-ELSE rules (b) IF-THEN rules

(c) Both a & b (d) None of the mentioned

10. Fuzzy logic is a form of CO5- R

(a) Two-valued logic (b) Crisp set logic (c) Many-valued logic (d) Binary set logic

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. State the Bayes Rule and explain how it is applied to pattern classification problems. Show that in a multiclass classification task the Bayes decision rule minimizes the error probability. CO1- App (8)

12. Explain the concept of clustering. Which are the two schemes of hierarchical clustering algorithm? Give brief descriptions. CO2- U (8)

13. Explain the Karhunen – Loeve transformation with equations. How this transformation is different from principal component analysis? CO3- U (8)

14. Why is back propagation algorithm so called? Explain the significance of its activation function in relation to its cost function. CO4- U (8)

15. Discuss briefly about the fuzzy rule base system for a home heating system. CO5- U (8)