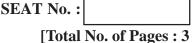
Total No. of Questions : 8]

PA-1534



[5926]-15

T.E. (Mechanical Engineering)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (2019 Pattern) (Semester - II) (302049)

Time : 2¹/₂ Hours]

[Max. Marks : 70

[6]

Instructions to the candidates.

- **1**) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagram must be drawn wherever necessary.
- Figures to the right side indicate full marks. 3)
- **4**) Use of calculator is allowed.
- 230 14010209.04.115 Assume^v suitable data wherever necessary. 5)
- Explain following terms: *Q1*) a)
 - Accuracy i)
 - Precision ii)
 - iii) Recall
 - F-1 Score iv)
 - Explain the procedure to find out the optimum value of K in K-means b) clustering? [5]
 - What is over-fitting in decision tree? Explain the techniques to avoid c) over-fitting. [6]

OR

- Explain the steps in KNN algorithm. *Q2*) a) [6] What is SVM? How does it work? b) [5] Explain the evaluation parameters for regression model. c) [6]
 - *P.T.O.*

- **Q3**) a) Explain the steps involved in development of ML model.
 - Quality Engineer wants to solve a two-class classification problem for b) predicting whether a product is defective. The actual number of products containing no defect are 950 (Truly predicted positives = 900), the actual number defective products are 150 (Truly predicted negatives = 130). So, calculate accuracy, precision, recall and f1 score. [4]

[7]

Explain hyperparameter tuining in decision tree. Why is it required? [7] c)

OR

- **Q4**) a) What are the different cross validation techniques? Explain K-fold cross validation with neat sketch. [7]
 - A sugar factory produces 3 sizes of sugar from three different nets. b) Daily 1000 tons of sugar produced from net-1,3000 tons produced from net-2 and 2000 tons produced from net-3. The last year season experience shows that 1.5% of the total sugar produced from net 1 is waste sugar. The corresponding fractions of waste sugars for the remaining nets are 2.5% and 2% respectively. A certain amount of sugar is taken as a sample at random and is found to be waste sugar. Find out the probability that it is produced from : [4]
 - i) Net 1
 - Net 2 ii)
 - iii) Net 3
 - What are the different classification algorithms? Explain logistic regression c) with neat sketch. [7]

05) a)

winn mg: 240-210-2401/2 2,200-210-2401/2 2,200-210-2401/2 Explain the concept of Reinforcement learning with suitable example. Define following terms in Reinforcement learning: [8]

- i) Agent
- ii) State
- iii) Environment
- Reward iv)

[5926]-154

2

- b) Define Markov property. Explain why Markov property is most applicable in solving Reinforcement learning problems. [6]
- The transfer function of neuron on one layer of a neural network is c) assumed to be of sigmoid form. Evaluate the output of neuron corresponding to input x = 0.62. How is the nature of sigmoid function? (Justify the answer with plot). [4]

OR

- Explain Convolution Neural Network (CNN) using neat flow diagram. *Q6*) a) Explain padding and striding in CNN. [8]
 - b) Explain Q-learning algorithm with flow diagram. [6]
 - A neuron with 4 inputs has the weights 1, 2, 3, 4 and bias 0. The activation c) function is linear, say the function f(x) = 2x. If the inputs are 4, 8, 5, 6 compute the output. Draw a diagram representing the neuron. [4]
- How deep learning can be used for image classification? **Q7**) a) [6]
 - Explain human-machine interaction with suitable examples. b)
 - Explain in detail various applications of AI in mechanical engineering.[6] c)

[5]

[5]

OR

- [6] **08**) a)
 - b)
 - [6] c)