Total No. of Questions : 8]

SEAT No. :

PD4365

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[6403]-164

T.E (Automobile/Mechanical)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

(2019 Pattern) (Semester - VI) (302049)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) Compare bagging and boosting ensemble techniques. Does the Random forest tree algorithm fall into any of these categories? Justify. **[6]**

b) How can you evaluate the performance of an SVR model, and what are the typical regression metrics used for evaluation? **[5]**

c) State down the pros and cons of logistic regression. **[6]**

OR

Q2) a) How do classification algorithms help in material selection? **[6]**

b) Explain cost function in linear and logistic regression. **[5]**

c) The commonly used steps in Naive Bayes classification. **[6]**

Q3) a) How can missing values in a dataset be handled during data pre-processing? **[6]**

b) Explain interpretation of confusion matrix. What is four key metrics of confusion matrix? **[6]**

c) What is the trade-off between overfitting and underfitting in hyperparameter tuning? **[6]**

OR

P.T.O.

Q4) a) What is feature scaling, and why is it necessary in data pre-processing? **[6]**

b) When should data dimensionality reduction techniques be applied? **[6]**

c) What are the different cross validation techniques? Explain Leave-p-out cross-validation cross validation? **[6]**

Q5) a) What are some specific applications of deep learning in the field of mechanical engineering? **[7]**

b) Difference between Positive vs Negative Reinforced Learning. **[6]**

c) What is Q-learning in reinforcement learning, and how does it work? **[5]**

OR

Q6) a) In reinforcement learning, what are three main categories of algorithms based on their approach to solving problems? **[7]**

b) What are the components of a Markov Decision Process? **[6]**

c) What are the several advantages and disadvantages of Artificial Neural Networks (ANNs) compared to other conventional algorithms. **[5]**

Q7) a) In What few ways AIML can be used in process optimization? **[6]**

b) How does over-tuning or under-tuning affect control systems? **[5]**

c) How AI and machine learning can be applied to traffic control using image-based classification? **[6]**

OR

Q8) a) What is the different Techniques for Dynamic System Order Reduction? **[6]**

b) Write any 3 key ways in which machine learning and AI are used in health management. **[5]**

c) What is the future of Human machine Interaction with emerging technologies like virtual reality and brain-computer interfaces? **[6]**