

Total No. of Questions : 8]

SEAT No. :

**P451**

**[6003]-556**

[Total No. of Pages : 2

**T.E. (Artificial Intelligence and Machine Learning)  
MACHINE INTELLIGENCE FOR DATA SCIENCE  
(2019 Pattern) (Semester - II) (318552)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right side indicate full marks.*
- 4) Assume suitable data if necessary.*

- Q1)** a) What are the assumptions of linear regression? [6]  
b) How do you interpret linear regression coefficients. [6]  
c) What is difference between logistic regression and linear regression? [6]

OR

- Q2)** a) What is maximum likelihood estimation, and how does it relate to logistic regression? [6]  
b) How do you evaluate the performance of a logistic regression model, and what metrics are used? [6]  
c) How do you visualize the relationship between predictors and response in logistic regression. [6]

- Q3)** a) How does SVM work, and what are its strengths and limitations. [6]  
b) What are ensemble methods, and how can they improve classification accuracy? [6]  
c) What is bagging, and how does it reduce model variance? [5]

OR

- Q4)** a) What is boosting, and how does it reduce model bias? [6]  
b) What is random forest, and how does it use bagging and random feature selection? [5]  
c) What metrics are used to evaluate classification models? [6]

***P.T.O.***

- Q5)** a) What is a decision tree, and how does it partition the feature space? [6]  
b) What is entropy, and how is it used to construct decision trees? [6]  
c) What is random forest, and how does it combine multiple decision trees to improve accuracy? [6]

OR

- Q6)** a) What is boosting, and how does it iteratively adjust weights to improve accuracy? [6]  
b) What is XGBoost, and how does it improve on gradient boosting algorithms? [6]  
c) How do you evaluate decision tree or ensemble model performance, and what metrics are used? [6]

- Q7)** a) What is clustering, and how is it used in unsupervised learning? [6]  
b) What is k-means clustering, and how does it assign data points to clusters? [6]  
c) What is DBSCAN, and how does it identify clusters of varying shapes and densities? [5]

OR

- Q8)** a) What is hierarchical clustering, and how does it create a dendrogram to visualize cluster relationships? [6]  
b) What is agglomerative clustering, and how does it combine small clusters into larger ones? [5]  
c) What is divisive clustering, and how does it split larger clusters into smaller ones? [6]

