Total No. of Questions : 8]

SEAT No. :

PB4008

[Total No. of Pages : 2

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T.E. (Honors in Artificial Intelligence and Machine Learning)

COMPUTATIONAL STATISTICS

(2019 Pattern) (Semester - I) (310301)

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) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Make suitable assumptions whenever necessary.***

Q1) a) List out various methods of statistical analysis? Explain hypothesis testing, null hypothesis, and alternative hypothesis with example. **[9]**

b) Explain the Type-I and Type-II errors in hypothesis testing. What is the role of significance level and p-value in hypothesis testing? **[9]**

OR

Q2) a) Define following terms. **[8]**

i) Sensitivity

ii) Specificity

iii) Degree of Freedom

iv) ROC and AUC

b) Consider the confusion Matrix given below. Calculate Accuracy, Precision, Recall and F-score. **[5]**

Predicted Class / Actual Class	Spam	No Spam
Spam	142	22
No Spam	29	110

c) What is confusion Matrix? Explain the True Positive, False Positive, False Negative and True Negative with example. **[5]**

P.T.O.

Q3) a) What is Normalization and Standardization? Explain different feature scaling techniques. **[9]**

b) Explain hyperparameter Tuning with GridSearchCV. **[8]**

OR

Q4) a) What is Regularization? How does it solve the overfitting problem in Machine Learning? Explain the LASSO (Least Absolute shrinkage and Selection Operator) Regularization Method. **[8]**

b) Explain the following cross validation Techniques. **[9]**

i) K-fold

ii) LOOCV

iii) Stratified K-fold,

Q5) a) What dimension reduction? State few advantages of dimension reduction. Explain any one dimension reduction technique in detail. **[10]**

b) Write short notes on under-sampling and over re-sampling. **[8]**

OR

Q6) a) Write short note on: **[10]**

i) LDA

ii) PCA

b) Explain in detail the Chi-square Test for feature selection with the help of suitable example. **[8]**

Q7) a) Write short notes on Correlation coefficient and Rank Correlation. **[8]**

b) What is Multilinear Regression? How Multilinear Regression is different from Linear Regression? Explain with suitable example. **[9]**

OR

Q8) a) Explain in detail Linear and Logistic regression with the help of suitable examples. **[8]**

b) Explain in detail the Bayes Theorem of conditional probability. **[9]**