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UG/5th Sem/STAT(H)/T/19

2019

B.Sc. (Honours)

5th Semester Examination

STATISTICS

Paper - C 12-T

(Linear Models)

Full Marks : 40

Time : 2 Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

1. Answer any *five* out of eight questions : $5 \times 2 = 10$
- (a) State Gauss Markov Theorem. 2
 - (b) Define homoscedasticity. 2
 - (c) When is a quantile quantile plot used ? 2
 - (d) What is a linear model ? 2

[Turn Over]

(2)

- (e) What is the main objective of analysis of variance ? 2
- (f) State the hypothesis and the corresponding test statistic to test the parallelism of two regression lines. (Clearly define all the notations used.) 2
- (g) Write down the analysis of variance table for the two way classified data under fixed effects model. 2
- (h) Define a concomitant variable. 2

Group - B

2. Answer any *four* out of six questions : 4×5=20

- (a) Distinguish between fixed, random and mixed effect models. Explain with examples. 5
- (b) Describe the method of least squares to estimate the parameters of a Gauss Markov linear model. 5
- (c) Based on observations, (X_i, Y_i) , $i = 1(1)h$ of independent variable x and dependent variable y respectively, explain how you will test for linearity of regression of Y on X . 5
- (d) Discuss briefly the analysis of one way classified data under random effects model. 5

(3)

- (e) What problem arises when the assumption of collinearity is violated in a linear model ? How do you eliminate the problem ? 3+2
- (f) Describe the method of estimation of error variance of a Gauss Markov linear model. 5

Group - C

3. Answer any *one* out of two questions : 1×10=10

(a) Based on observations $(Y_i, X_{i1}, X_{i2}, \dots, X_{ik})$,

$i = 1 (1)n$ of dependent variable Y and K independent variables X_1, X_2, \dots, X_n , describe how you will test for the presence of multiple regression of Y on X_1, X_2, \dots, X_K . 10

(b) Describe the analysis of covariance in two way classified data with one concomitant variable. (assume equal number of observations per cell). 10
