M.Sc. Examination, 2018
Semester-I
Statistics
Course : MSC-12

(Regression Analysis)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Answer **any four** questions

1. a) Briefly write down the application of regression analysis.
   b) Find ols estimator of σ^2 for a simple linear centered regression model.
   c) In simple linear regression, find a 95% confidence interval of the mean response for a particular value of the regressor variable. 3+3+4=10

2. a) In usual notations for multiple linear regression, show that $SSR = y'[H = -\frac{1}{n}J]y$.
   Hence find the distribution of $\frac{SSR}{\sigma_2}$.
   b) Discuss the testing procedure for a set of regression coefficients equals to zero.
   c) Describe the unit length scaling procedure in multiple linear regression. (2+3)+3+2=10

3. a) Write notes on PRESS Residuals, R-Student residuals, Added variable plot.
   b) Show that $S_{(i)}^2$ can be written as $S_{(i)}^2 = \frac{(n-p)MS_{\text{Re}s} - e_i^2/(1-h_{ii})}{n-p-1}$, where $S_{(i)}^2$ is the estimate of σ^2 after deleting the i^{th} observation, MS_{Res} is the estimate of σ^2, e_i is the i^{th} residual and h_{ii} is the i^{th} diagonal of the hat matrix. (2+2+2)+4=10

4. a) How orthogonal polynomials are constructed and used in regression setup?
   b) In multiple linear regression, show that the generalized least squares estimator of β is BLUE. 4+6=10

5. Discuss the criteria for evaluating subset regression models. 10

6. a) Discuss a parameter estimation method in non linear regression model.
   b) How do you interpret the parameters in a Logistic regression model. 5+5=10