SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.Statistics - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - V
20USTCT5011 - Regression Analysis

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. List the properties of multiple correlation coefficients.
2. Describe the concept of multiple and partial correlation coefficients.
3. Evaluate the significance of residual analysis in the context of a simple linear regression model. What key aspects would you check to ensure the validity of the model?
4. Explain the least squares method for estimating parameters in a simple linear regression model. Why is this method preferred?
5. What is the need of transformation of variables in regression analysis? Also state transformation used in regression analysis.
6. Explain i) Homoscadasticity ii) Weighted least square
7. Explain 'Generalized Least Squares' and discuss the estimation of the regression parameters and ANOVA.
8. Discuss the t-test and ANOVA approach to test for significance of the slope coefficient in a simple regression model with intercept.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Show that if $X_3 = aX_1 + bX_2$, the three partial correlations are numerically equal to unity, $r_{13.2}$ having the sign of a, $r_{23.1}$ the sign of b and $r_{12.3}$ the opposite sign of a/b.
10. Consider the simple linear regression model,
    $y = \beta_0 + \beta_1 + \in$, $E(\in) = 0$, $V(\in) = \sigma^2$

    Compute (i) E(β_0) (ii) E(β_1) (iii) V(β_1) and (iv) V(β_0)

Contd...

11. Depict five different scenarios that can show up in plotting residuals versus the fitted values and explain how these plots help in detecting model inadequacies.
12. Obtain the Least squares estimator of Multiple Linear Regression coefficients.
13. (i) State the assumptions of an OLS regression model. (5)
    (ii) Explain the method of testing for overall significance of model coefficients.(5)

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