

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.

M.Sc.Biostatistics - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - II

**21PBSCT2005 - Applied 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 assumptions of the simple linear regression model and explain its significance.
2. Define the coefficient of determination  $R^2$  and Give its interpretation in simple linear regression.
3. State and explain the Gauss-Markov theorem in the context of multiple linear regressions.
4. Distinguish between  $R^2$  and adjusted  $R^2$ ? Why is adjusted  $R^2$  preferred in multiple regression?
5. Illustrate how residual plots are used to check normality and homoscedasticity in regression models?
6. What are dummy variables in regression analysis? Explain their role with an example.
7. What are the sources of multicollinearity in regression models?
8. Briefly explain forward selection method for variable selection in multiple regression.

**Section C**

I - Answer any **TWO** questions ( $2 \times 10 = 20$  Marks)

9. Explain the general linear hypothesis in multiple regression and how it is tested.
10. Explain Cook's distance, DFFITS, and DFBETAS in detecting influential observations. How can these help in identifying data points that significantly affect a regression model?
11. Explain the Box-Cox transformation and how it helps in selecting an appropriate transformation analytically.

**Contd...**

12. Compare forward selection, backward elimination, and stepwise regression. Also state their advantages and disadvantages in model building.

II - Compulsory question (1 × 10 = 10 Marks)

13. Derive the least squares estimators of the regression coefficients ( $\beta_0$  and  $\beta_1$ ) in a simple linear regression model.

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