

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

THIRD YEAR

B.A./B.SC. FIFTH SEMESTER (July – December) 2014

Mid-Semester Examination, September 2014

Date : 15/09/2014

Time : 2 pm – 4 pm

ECONOMICS (Honours)

Paper : V

Full Marks : 50

[Use a separate answer book for each group]

Group – A

(Answer any five questions)

1. Consider the following model : $Y_i = \alpha_1 + \alpha_2 D_i + \beta X_i + u_i$
where Y = annual salary of a college professor, X = years of teaching experience, D = dummy for gender
Consider three ways of defining the dummy variable.
 - a. $D = 1$ for male, 0 for female
 - b. $D = 1$ for female, 2 for male
 - c. $D = 1$ for female, -1 for male.Interpret the preceding regression model for each dummy assignment. Is one method preferable to another? Justify your answer. [5]
2. Describe a linear probability model explaining clearly the context where it is used. Discuss how in general it violates the assumptions of a classical normal linear regression model. [5]
3. The following model with 3 regressors (including the constant) is estimated over 15 observations
 $y = \beta_1 + \beta_2 x_2 + \beta_3 x_3 + u$
Consider, $(x'x)^{-1} = \begin{bmatrix} 2 & 3.5 & -1 \\ 3.5 & 1 & 6.5 \\ -1 & 6.5 & 4.3 \end{bmatrix}$; $x'y = \begin{bmatrix} -3 \\ 2.2 \\ 0.6 \end{bmatrix}$ & $\hat{u}'\hat{u} = 10.96$
 - a) Calculate $\hat{\beta}$
 - b) Calculate the estimated standard errors for $\hat{\beta}_1, \hat{\beta}_2$ & $\hat{\beta}_3$. [5]
4. Consider the linear regression model $y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \epsilon_i$ where ϵ_i 's are identically, independently distributed as $N(0, \sigma^2)$.
The estimated OLS regression line based on 18 observation is as follows :
 $\hat{y} = 30 + x_1 - 5x_2$ & the estimated \sqrt{MSE} (i.e $\hat{\sigma}$) is 7.
Given the matrix $(x'x)^{-1} = \begin{pmatrix} 1 & 0 & -9 \\ 0 & 1 & 0 \\ -9 & 0 & 5 \end{pmatrix}$, test the hypothesis $H_0 : \beta_1 = 4\beta_2$ against $H_1 : \beta_1 > 4\beta_2$ at $\alpha = 0.05$.
[A number of t values at 5% level of significance are provided. Use the one that's required for you.
 $t_{14,0.05} = 1.76$; $t_{15,0.05} = 1.75$; $t_{16,0.05} = 1.74$] [5]
5. If the u_i are normal variables with
 $E(u_i) = 0$; $i = 1, 2, \dots, n$

$$E(u_i^2) = \sigma^2 \quad ; i = 1, 2, \dots, n$$

$$E(u_i u_j) = 0 \quad i \neq j$$

Show that $E(u' Au) = \sigma^2 \text{tr}(A)$, where A is a square matrix of order $n \times n$. [5]

6. Consider the general linear model $\underline{y}^{n \times 1} = \underline{x}^{n \times k} \underline{\beta}^{k \times 1} + \underline{u}^{n \times 1}$ with the assumptions

$$E(\underline{u}) = \underline{0}$$

$$E(\underline{u} \underline{u}') = \sigma^2 \underline{I}_n$$

\underline{u} follows Multivariate Normal $(\underline{0}, \sigma^2 \underline{I}_n)$

X has rank $k < n$

Let the OLS estimated regression equation be $\underline{y} = \underline{x} \hat{\underline{\beta}} + \underline{e}$, where $\hat{\underline{\beta}}$ is the estimated parameter vector & \underline{e} is the estimated residual vector.

Find the distribution of $\frac{\underline{e}' \underline{e}}{\sigma^2}$. [5]

Group – B

Unit - I

(Answer **any two** Questions)

7. Mention some of the reasons for unsatisfactory performance of the Indian banking sector prior to economic reforms. [8]
8. Mention briefly the reasons for relatively better performance of India in the B.O.P front during post-reform period. [8]
9. Discuss some of the reforms undertaken in Indian insurance sector in recent period. [8]

Unit - II

(Answer **any one** Question)

10. Discuss in detail the institutional reforms contributing high agricultural growth in 1980s in West Bengal. [9]
11. Discuss the historical factors and policy issues responsible for the dismal performance of industry in West Bengal. [9]

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