

Ref. No.: VB/EXAM/REG/02/PG/ECO./Sem-I/33218/2023

M.A. (Economics) Examination, 2023

SEMESTER-I

Subject: Economics

Course: Econometrics (C3)

Time: 3 hours

Attempt any FOUR from the following questions

Full Marks: 40

(4X10 = 40 Marks)

1. (a) What are the causes of serial correlation in regression estimates? How will you detect the presence of serial correlation in regression estimates?
(b) What are the underlying assumptions of Durbin-Watson d statistic?
(3+4+3=10)
2. (a) Show that the generalized least square (GLS) estimates are BLUE.
(b) How will you apply the Breusch-Godfrey test for the detection of the heteroscedasticity?
(5+5=10)
3. (a) What is the variance inflation factor (VIF)? How is it used in the detection of multi-collinearity?
(b) What are the differences in assumptions and estimates of population parameters by the method of maximum likelihood (ML) and the ordinary least square (OLS)?
(2+2+6=10)
4. In a sample of 20 observations corresponding to the model $Y_i = \alpha + \beta X_i + U_i$, where the $U_i \sim \text{IID}(0, \sigma^2)$, gave the following information: $\sum Y_i = 21.9$, $\sum (Y_i - \bar{Y})^2 = 86.9$, $\sum (X_i - \bar{X})(Y_i - \bar{Y}) = 106.4$, $\sum X_i = 186.2$, $\sum (X_i - \bar{X})^2 = 215.4$.
(a) Estimate α and β ; and also
(b) Calculate their estimated standard errors.
(c) Also, estimate the conditional mean value of Y corresponding to $X = 10$.
(4+4+2=10)
5. (a) What is 'dummy variable trap'?
(b) Consider the following model:
 $Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$
where Y_i = annual clothing expenditure of the i-th person
 $X_{1i} = 1$ if the person is a female
= 0 Otherwise
 $X_{2i} = 1$ if the person is a Ph. D.
= 0 Otherwise
Show that for the above model, differential effect of sex dummy is constant across two levels of education and differential effect of education dummy is constant across two levels of sexes. How do you modify the model to capture any possible interaction between the two dummies?
(3+4+3=10)
6. Explain, with suitable examples, how the dummy variable technique may be applied to examine stability of estimated regression. Why the dummy variable technique is considered superior for this purpose compared with the Chow test?
(7+3=10)
7. (a) In the K variable linear regression model, obtain the unbiased estimator of the error variance (σ^2)?
(b) How is the correlation coefficient in 2- variable model different from the regression coefficient? Explain.
(6+4=10)