Total number of printed pages–7

63/1 (SEM–4) CC10/ECOHC4106

2025

ECONOMICS

Paper : ECOHC4106

(Introductory Econometrics)

Full Marks : 80

Pass Marks : 20

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer from the following : ***(any six)*** 1×6=6

   (a) Heteroscedasticity means

   (i) Variance of the error term is not a constant

   (ii) Variance of the independent variable is not a constant

   (iii) The error term has zero mean

   (iv) Perfect correlation among explanatory variables

(b) The power of a test is

(i) Probability of rejecting H_0 when it is correct

(ii) *I*-probability of accepting H_0 when it is falls

(iii) Also depends on the value of population mean (μ)

(iv) Both *(ii)* and *(iii)*

(c) Which one of the following statement is correct ?

(i) Incorrectly reject H_0 is called *type I error*

(ii) Incorrectly accept H_A is called *type II error*

(iii) Probabilities of *type I* and *type II errors* are inversely related

(iv) Both *(i)* and *(ii)*

(d) An estimator (in small sample case) is said to be unbiased if

(i) E(*Sampling error*) = 0

(ii) Bias = 0

(iii) Bias < 0

(iv) Both *(i)* and *(ii)*

(e) If the mean of a sampling distribution of an estimator is found to be equal to the true value of the population parameter, then the estimator is called

(i) Good estimator

(ii) Perfect estimator

(iii) Biased estimator

(iv) Unbiased estimator

(f) Choosing certain level of probability with which we would be willing to risk error of *type I* is called

(i) Test of significance

(ii) Critical region

(iii) Level of significance

(iv) Power of a test

(g) Which one of the following is a *correct* statement ?

(i) Consistent estimators are asymptotically unbiased

(ii) Sample variance is an unbiased estimator of population variance

(iii) Mean square error is the difference of two quantities : variance and square of the bias

(iv) All of the above

(h) Which of the following is a key assumption of the linear regression model ?

(i) The error term has normal distribution

(ii) Variance of the error term is a constant

(iii) Non-autocorrelation

(iv) All of the above

(i) Goodness of fit of a distribution is tested by

(i) *t*-test

(ii) R^2

(iii) Chi-square test

(iv) *F*-test

(j) When *two* explanatory variables are highly correlated, this is referred to as

(i) Autocorrelation

(ii) Heteroscedasticity

(iii) Multicollinearity

(iv) Biased estimation

2. Answer the following questions : ***(any five)*** 2×5=10

(a) What is homoscedasticity ?

(b) What do you mean by level of significance ?

(c) State the Gauss-Markov theorem.

(d) Mention *two* properties of normal distribution.

(e) What is dummy variable ?

(f) Mention *two* properties of a good estimator.

(g) Define confidence interval.

3. Answer the following questions : ***(any six)*** 5×6=30

(a) Discuss the properties of normal distribution.

(b) Write a short note on student's t-test.

(c) Distinguish between *type-I* and *type-II* error.

(d) State the assumptions of a linear regression model.

(e) Write a short note on goodness of fit.

(f) Describe how you would make a model involving dummy independent variable.

(g) Distinguish between point and interval forecasting.

(h) Write a short note on Chi-square test.

(i) What does adjusted R-squared mean? What is the difference between unadjusted and adjusted R-squared? 2+3=5

(j) What tests are used to compare parameters from *two* samples? When to reject a null hypothesis? 3+2=5

4. Answer the following questions : ***(any two)*** 10×2=20

(a) Discuss the small sample and large sample properties of estimators.

(b) The following data estimate t-ratios and their significance :

Output	210.8	210.1	211.5	208.9	207.4	205.3	198.8	192.1	183.2	176.8
Workers('000)	706.2	703.1	701.8	699.1	697.4	795.3	692.7	630.2	602.1	531

(c) Discuss in detail the steps of hypothesis testing.

(d) Make a comparative analysis of commonly used functional forms of regression models.

5. Answer the following questions : ***(any one)*** 14×1=14

(a) Obtain the usual regression results from the following data of 20 pairs of observations on X and Y.

$\Sigma x_i = 228$, $\Sigma Y_i = 3121$, $\Sigma X_i Y_i = 38927$, $\Sigma X_i^2 = 3204$, $\Sigma y_i^2 = 19837$, $\Sigma x_i^2 = 604.8$, $\Sigma x_i y_i = 3347.6$ 2+2+5+5=14

(b) Prove that under usual assumptions OLS estimators are BLU.

(c) Estimate the parameters of the following multiple linear regression model

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + U_i$$ 3+5+6=14