2022

ECONOMICS

Paper : CC–10

(Introductory Econometrics)

Full Marks : 80

Time : 3 hours

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

1. Choose the correct answer :　　　　1×6=6

(a) The mean of a standard normal variate is

(i) less than 1

(ii) 0

(iii) greater than 1

(iv) None of the above

1

(b) A COVID infected patient reported a negative result in an antigen test is

    (i) type I error

    (ii) type II error

    (iii) stochastic error

    (iv) None of the above

(c) Coefficient of determination (R^2) is given by

    (i) $1 + RSS/TSS$

    (ii) $1 - RSS/ESS$

    (iii) $1 - RSS/TSS$

    (iv) $1 \times RSS/ESS$

(d) If a quantitative variable has m categories, we can introduce

    (i) only $m-1$ dummy variables

    (ii) only m dummy variables

    (iii) only $m+1$ dummy variables

    (iv) only $m \times 2$ dummy variables

        (*Continued*)

(e) Which one of the following statements is true for OLS estimates?

    (i) The explanatory variable is non-stochastic.

    (ii) The explanatory variable is stochastic.

    (iii) The explanatory variable is having a distribution.

    (iv) Each explanatory variable has assigned probabilities.

(f) Which of the following means unbiasedness of $\hat{\beta}$?

    (i) $\hat{\beta} = \Sigma W_t X_t$

    (ii) $E\hat{\beta} = \beta$

    (iii) $\sigma_{\hat{\beta}2} = \sigma^2 / \Sigma X_{t2}$

    (iv) None of the above

2. Answer the following questions : 2×5=10

    (a) What is power of test?

    (b) What is goodness of fit?

    (c) Show that $Z \sim N(0, 1)$.

                  (Turn Over)

(d) What is the shape of an *F*-distribution curve? What determines the shape of the *F*-distribution curve?

(e) What is a dummy variable?

3. Answer any *six* from the following questions :

$5 \times 6 = 30$

(a) Mention any five properties of normal distribution.

(b) Explain the process of testing of hypothesis.

(c) Give the rationale for the introduction of the random disturbance term in linear regression model.

(d) In an examination, 12 students in one class had a mean grade of 78 with a standard deviation of 6 while 15 students in another class had a mean grade of 74 with standard deviation of 8. Is the difference between the means of the groups significant? (Test at 5% level of significance)

(*Continued*)

(e) Discuss the objectives of econometric study.

(f) What do you mean by errors in sampling?

(g) Mention the conditions for validity χ^2-test.

(h) In a distribution, exactly normal 8% of the items are under 40 and 92% of the items are over 70. What are the mean and median of the distribution?

(i) Distinguish between ANOVA and ANCOVA.

4. Answer any *two* from the following questions :

$$10 \times 2 = 20$$

(a) Discuss χ^2-test of goodness of fit. Mention its properties.

(b) Discuss the standard ordinary least square assumptions for two variable regression models.

(c) The local authorities in a certain city installed 10000 electric lamps in the streets of a city. Assume that the lives of the lamps are normally distributed with an average life of 1000 burning hours and a standard deviation of 200 hours.

(i) What number of lamps might be expected to fail between 800 hours and 1200 hours?

(ii) After what period of burning hours would you expect that 10% of lamps would fail and after what period of burning hours would you expect that 10% of the lamps would be still burning?

5. Answer any *one* from the following questions : 14

(a) Explain the nature and scope of econometrics. Suppose at your college you are asked to find the relationship between weekly hours spent on studying and weekly hours spent on leisure. Does it make sense to characterize the problem as inferring whether study causes leisure or leisure causes study? Explain.

(b) (i) In an anti-COVID campaign in an area, 1624 persons were vaccinated out of total population of 6496. The number of people with fever is shown below :

Treatment	Fever	No Fever	Total
Vaccine	40	1584	1624
No Vaccine	440	4432	4872
Total	480	6016	6496

Discuss the usefulness of vaccine in checking COVID-19.

(ii) Explain the uses of χ^2-test.

★ ★ ★