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(b) Properties of an estimator (5)

(c) Explain type 1 and type 2 error. Is Type 1 Error
+ Type 2 Error Equal to 1? (5)

(500)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 6008

J

Unique Paper Code : 2922072401

Name of the Paper : Basics of Econometrics

Name of the Course : **BBA(FIA)**

Semester : IV

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Use of a scientific (non-programmable) calculator is permitted.
3. No negative marking.
4. Marks are indicated against each question.

P.T.O.

1. Attempt all parts

(5 x 3 = 15)

1. If a regression equation exhibits multicollinearity, does it affect the BLUE property of the estimates?
2. If the error terms do not follow a normal distribution, can we conclude that the regression estimates are not BLUE?
3. Write down the formula of Slope.
4. Write the Null Hypothesis of jb test.
5. What does Breusch-Godfrey LM Test diagnose

2. Consider the following regression equation:

(15)

$$\text{Price_Tea} = \alpha + \beta_1 \times \text{Quantity_Tea} + \beta_2 \times \text{Price_Coffee} + \text{Error Term}$$

 $R^2 \text{ for } X_3 = 0.30$

Using these values, calculate the **Variance Inflation Factor (VIF)** for each variable. Based on the results, determine if multicollinearity is present and interpret the findings.

(b) Explain all the assumptions of Ordinary Least Squares (OLS) Regression Model. (10)

5. (a) Given that: $Y = \alpha + \beta_1 X + \beta_2 X^2 + \epsilon$, calculate how much Y will be change with the change of 1 unit of X. (5)

(b) Explain Logit and probit model in detail. (10)

6. (a) Consider the regression equation: $Y = \alpha + \beta_1 X + \epsilon$, where the estimated coefficient (β_1) is -0.75, and its standard error is 0.00345. Calculate the F-statistic of the model. (5)

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- Log likelihood : -66.10793

Calculate:

- Akaike information criterion (AIC),
- Bayesian information criterion (BIC)
- Hannan-Quinn information criterion (HQC)

4. (a) A researcher is analyzing multicollinearity in a multiple regression model with three independent variables: X_1 , X_2 , and X_3 . The coefficient of determination (R^2) values for each variable when regressed on the other independent variables are given below: (5)

$$R^2 \text{ for } X_1 = 0.45$$

$$R^2 \text{ for } X_2 = 0.75$$

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Given the following data:

- Number of Observations (n) : 50

- Mean Sum of Squares of : 8.892618

Regression (MSR)

- Mean Sum of Squares : 0.876618

of Residual (MSE)

- Intercept (α) Coefficient : 7.641402836
- Standard Error of Intercept : 0.701741696
- Coefficient of Quantity_Tea : -0.096387958

(β_1)

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- Standard Error of β_1 : 0.03806602
- Coefficient of Price Coffee : 0.318723819
(β_2)
- Standard Error of β_2 : 0.070768406

Compute the following regression statistics:

1. Multiple R
2. R^2 (Coefficient of Determination)
3. Adjusted R^2
4. Standard Error of Regression
5. Test whether the intercept, β_1 (Quantity_Tea), and β_2 (Price_Coffee) are significantly different from zero at a 5% significance level.

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(a) Null Hypotheses:

(i) $H_0 : \alpha = 0$

(ii) $H_0 : \beta_1 = 0$

(iii) $H_0 : \beta_2 = 0$

(b) Determine whether each coefficient is statistically significant based on its t-statistic.

3. Consider the following regression equation:

(15)

$$\text{Price_Tea} = \alpha + \beta_1 \times \text{Quantity_Tea} + \beta_2 \times \text{Price_Coffee} + \text{Error Term}$$

Given the following data:

- Number of Observations (n) : 50

P.T.O.