

**BACHELOR OF ARTS EXAMINATION, 2025**  
**ECONOMICS**  
**2nd Year, 2nd Semester**  
**Subject Code : ECO/B/C 4.3 (OLD)**  
**INTRODUCTORY ECONOMETRICS**

**Time : Two Hours**

**Full Marks : 30**

**Answer any three questions**

1. (a) Explain the reasons behind the inclusion of the disturbance term in the regression model.  
 (b) Justify whether the following statements are true or false:  
 In a two variable classical linear regression model,
  - (i) The variance of error terms should depend on time.
  - (ii) Covariance of the error term of the equation should depend on the explanatory variable.
  - (iii) The assumptions regarding the distribution of the error terms are important for estimation of the parameters of the regression equation using OLS. [4+2×3=10]
  
2. (a) Formulate a multivariate classical linear regression model of your own. Explain the necessary assumptions highlighting their importance.  
 (b) In case of multivariate classical linear regression model  

$$Y = X\beta + u, Y : nx1, X : nxk, \beta: kx1, u = nx1$$
 Define variance covariance matrix of the least square estimator of  $\beta$ . How do you estimate such variance covariance matrix? [5+5 = 10]
  
3. (a) Explain the concept of unbiased estimator.  
 (b) Justify whether the following statements are true or false :  
 In a classical linear regression model,
  - (i) If the variances of error terms depend on the explanatory variables, then resulting estimator will be unbiased.
  - (ii) If the variances of error terms depend on the explanatory variables, then resulting estimator will have minimum variance.

(iii) If the variances of error terms depend on the explanatory variables, then resulting estimator will not be unbiased and will have minimum variance property. [4+2×3=10]

4. (a) Explain the problem of autocorrelation.

(b) Justify whether the following statements are true or false :

In a classical linear regression model with autocorrelation,

(i) The mean of the error terms of the model will depend on time.

(ii) Covariance of the error terms will depend on time.

(iii) Variance covariance matrix of the error term will be a diagonal matrix. [4+2×3=10]

5. (a) Explain the problem of multicollinearity.

(b) Justify whether the following statements are true or false:

In a classical linear regression model with multicollinearity,

(i) The resulting estimator of the model will not exist.

(ii) The error terms of the model will not be correlated.

(iii) Dropping of the variables can solve the problem of multicollinearity. [4+2×3=10]

6. Write short note on : (any two) [5×2=10]

(a) Test for Autocorrelation.

(b) Maximum Likelihood method of estimation.

(c) Logit model.

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