

Cutting, Overwriting, Erasing, Fluid painting and use of Lead Pencil will earn no marks. Write answer of the Question No.1 and 2 on this sheet and handover it to the supervisory staff of examination within first 35 minutes.

**a) Encircle the correct answer:**

 $1 \times 4$ 

Sign of Supdt..

i) A model that is linear in parameters; it may or may not be linear in:

- a) Coefficients                      b) Variables  
c) Constants                         d) Function

ii)  $R^2$  is sensitive to the number of  $\mathbf{X}$  included in the model.

- a) Explained variable                      b) Explanatory variable  
c) Parameters                                d) Constants

iii) The variance of the error variable  $\sigma^2 \varepsilon$  is constant:

- a) Heteroscedasticity                      b) Homoscedasticity  
c) Multicollinearity                        d) Auto Correlation

iv) Which is not the cause of Coefficient Variation?

- a) Use of Proxy Variable                      b) Use of Policy Variable  
c) Use of Non-Aggregated data            d) Specification error

**b) Encircle True or False:**

 $1x8$ 

- |       |  |                     |
|-------|--|---------------------|
| i)    | Econometrics is a branch of Economics concerned with the empirical estimation of Forecasting.            | <b>TRUE / FALSE</b> |
| ii)   | The Coefficient of determination $r^2$ is a measure of individual significance of a parameter.           | <b>TRUE / FALSE</b> |
| iii)  | Heteroscedasticity is a common feature of cross sectional data.  | <b>TRUE / FALSE</b> |
| iv)   | Durbin-Watson Test can be applied in the absence of intercept term.                                      | <b>TRUE / FALSE</b> |
| v)    | In case of over identified equation, the best estimation technique is 2SLS or Maximum Likelihood Method. | <b>TRUE / FALSE</b> |
| vi)   | Prediction can be done by two ways<br>a) Point Forecasting                      b) Maximum Forecasting.  | <b>TRUE / FALSE</b> |
| vii)  | Multicollinearity means presence of linear relationship among dependant and explanatory variables.       | <b>TRUE / FALSE</b> |
| viii) | In order to make “n” comparisons, “n-1” dummy variables have to be used.                                 | <b>TRUE / FALSE</b> |

**c) Fill in the blanks meaningfully:**

*1x4*

- i) The purpose/objective of Econometrics is a) \_\_\_\_\_ b) \_\_\_\_\_ c) \_\_\_\_\_.
- ii) Auto Correlation is a common feature of \_\_\_\_\_.
- iii) \_\_\_\_\_ is the most appropriate estimation technique in case of exactly identified equation.
- iv) \_\_\_\_\_ exists if one or more of the variables can be expressed as linear combination of the other variable(s).

(Continued Overleaf)

**2- Give short answers of the following questions: 2x8**

i) Define Regression.

---

---

---

---

ii) Give an example of Simultaneous Equation from economics?

---

---

---

---

iii) What is Recursive Model?

---

---

---

iv) Differentiate between “Structured Form” and “Reduced Form”.

---

---

---

v) Differentiate between Ex-Ante and Ex-Post forecast.

---

---

---

vi) Differentiate between Autoregressive and Distributed Log Models.

---

---

---

vii) State the Order Condition for Identification.

---

---

---

viii) What are the causes of Coefficient Variation?

---

---

---

**SUBJECTIVE PART**

- 1- a) State Assumptions of Classical Linear Regression Model. 5  
b) Given the data and model: 12

Estimate the model using OLS and Interpret results.

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + U_i$$

$$\begin{aligned} n=10 \quad \Sigma Y_i &= 800 \quad \Sigma X_{1i} = 60 \quad \Sigma X_{2i} = 8000 \quad \Sigma X_i^2 = 3450 \quad \Sigma X_{1i}^2 = 30 \\ \Sigma X_{2i}^2 &= 1,580,000 \quad \Sigma y_i x_{1i} = -300 \quad \Sigma y_i x_{2i} = 65,000 \quad \Sigma x_{1i} x_{2i} = -5900 \end{aligned}$$

- 4- a) What are the Consequences of Multicollinearity? 5  
b) Give its Remedies. 3  
c) Annual Consumption and Disposable Income in a country from 2001-2012 is given below. 9  
Apply Gold-Feld Quandt test for detection of Heteroscedasticity to this model.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Consumption	297.0	303.8	308.1	325.2	339.8	338.6	358.0	358	378.7	381.7	413.1	432.8
Income	331.4	333.2	338.1	360.4	378.2	375.7	398.6	410.2	417.7	445.9	462.7	486.8

- 5- a) Define Autocorrelation. 3  
b) What are its Causes? 4  
c) Compute the Durbin-Watson statistics for the following data and test for Auto Correlation at 5% level of significance by clearly stating the null and alternative hypothesis. 10  
Residuals ( $e_i$ ) = -0.16, 0.43, 0.12, -0.22, -0.50, 1.25, -1.31, -0.24, -0.24, -0.43 and 1.07

- 6- a) Differentiate between Conditional and Unconditional Forecasting. 5  
b) Using the following: 12  
 $Y_t = \alpha + \beta X_t + U_t$   
Find the Variance of Unconditional Forecast error if  
i)  $\alpha$  and  $\beta$  are both known.  
ii)  $\alpha$  and  $\beta$  are both estimated  
iii)  $\alpha$  is estimated and  $\beta$  is known.

- 7- a) What is meant by Simultaneous Equation System? 4  
b) What is meant by a system of Block Recursive System, give an example? 3  
c) Given the model: 10

$$Y_1 = \alpha_1 + \alpha_2 Y_2 + \alpha_3 X_1 + \mu_1$$

$$Y_2 = \beta_1 + \beta_2 Y_1 + \beta_3 X_2 + \mu_2$$

And estimated reduced form is:

$$\hat{Y}_1 = 4 + 3X_1 + 8X_2$$

$$\hat{Y}_2 = 2 + 6X_1 + 10X_2$$

Determine the Structural Parameters from the estimated reduced form coefficients.

- 8- a) Discuss the Causes of Varying Coefficient in Regression Model. 7  
b) Also distinguish between Randomly Varying and Systematically Varying coefficients in Regression Model. 10