

**M.A. Examination, 2018**  
**Semester-I**  
**Economics**  
**Course – C3 (Core)**  
**(Econometrics)**

**Time: Three Hours**

**Full Marks: 40**

*Questions are of value as indicated in the margin*  
Answer **any four** questions

1. Write down the assumptions of the Classical Linear Regression Model (CLRM) stating clearly the meanings of all the symbols and hence obtain, with detail derivations, the matrix of the autocorrelation coefficients among the disturbances in this Model. 5+5
2. In the context of the CLRM,
  - (a) Show that Total Sum of Squares is the sum of Explained Sum of Squares and Residual Sum of Squares. 5
  - (b) State Gauss-Markov Theorem, and prove the same, given that  $c'b$  is BLUE of  $c'\beta$ , for all  $c_{k \times 1} \in R^k$ . 2+3
3. In the context of the CLRM, show that  $R^2$  equals to 1 if and only if the explained variable is a linear function of the explanatory variables. 5+5
4. For the model :  $Y_i = \alpha + U_i$ ,  $U_i \sim N(0, \sigma^2 \times_i^2)$ ,  $E(U_i U_j) = 0$  for all  $i \neq j$ ,  $X_i$ 's are no stochastic, find, with justification, BLUE of  $\alpha$ . 10
5. (a) Define Autoregressive Process of order 1 (AR(1)). 3  
(b) In the presence of AR(1), derive the dispersion matrix of the disturbance vector and hence obtain the autocorrelation coefficient between  $U_t$  and  $U_{t'}$ , where  $t$  and  $t'$  have their usual meanings. 5+2
6. (a) What is Multicollinearity? 3  
(b) Explain the different remedial measures of multicollinearity. 7
7. (a) What is Linear Probability Model? Why one does not estimate this Model by the standard OLS method? 3+4  
(b) Explain briefly the Logit Model. 3
8. Write short notes on **any two** of the followings. 5+5
  - (a) Durbin-Watson test.
  - (b) Detection of the presence of Multicollinearity.
  - (c) Dummy variable trap.
  - (d) RESET.