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**6 SEM TDC DSE STS (CBCS) 5 (H)**

**2025**

( May )

**STATISTICS**

( Discipline Specific Elective )

( For Honours )

Paper : DSE-5

( **Econometrics** )

*Full Marks : 50*

*Pass Marks : 20*

*Time : 3 hours*

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

1. Choose the correct alternative from the following : 1×5=5

(a) In a regression function  $y = \alpha + \beta x + c$

(i)  $x$  is the regressor

(ii)  $y$  is the regressor

(iii)  $x$  is regressed

(iv) None of the above

(b) In the general linear model in usual notation, the simplest set of assumptions is

(i)  $E(u) = 0$

(ii)  $X$  has rank  $k < n$

(iii)  $E(uu') = \sigma^2 I_n$

(iv) All of the above

(c) What is the range of values that the autocorrelation coefficient can take?

(i) -1 to 0

(ii) 0 to 1

(iii) -1 to 1

(iv) 0 to  $\infty$

(d) Estimating the coefficient of regression model in the presence of autocorrelation leads to \_\_\_\_\_ being not valid.

(i)  $t$ -test

(ii)  $F$ -test

(iii) chi-square test

(iv) All of the above

(e) When error terms across cross-section data are correlated, it is known as

(i) cross-correlation

(ii) cross-autocorrelation

(iii) serial correlation

(iv) spatial autocorrelation



2. Answer the following questions :  $3 \times 4 = 12$

- (a) What are the basic assumptions of general linear regression model?
- (b) What are the main causes of heteroscedasticity?
- (c) What do you mean by the problem of autocorrelation?
- (d) Write in brief about autoregressive and lag model.

3. (a) What is the difference between simple linear regression and classical linear regression? Mentioning the assumptions of a general linear model, obtain an estimate of  $\hat{\beta}$  of the vector of unknown coefficient  $\beta$  in matrix form. Also, find the mean of  $\hat{\beta}$ .  $3+3+3=9$

Or

- (b) Describe the Aitken's estimator and find its mean and variance. Show that it has least variance in the class of all unbiased linear estimators.  $2+4+3=9$

4. (a) Explain simultaneous equations model with the help of an example using economic variable in structural form. 9

Or

- (b) What is meant by autocorrelation? What are the consequences of the presence of autocorrelation? Describe any one method of detecting autocorrelation.  $2+3+4=9$

5. (a) What is meant by multicollinearity?  
What are its consequences? What are  
its remedial measures?  $3+3+3=9$

Or

- (b) What is meant by specification bias?  
What are the main causes of  
specification bias? Explain briefly any  
one of them.  $3+3+3=9$

6. (a) Describe two tests for heteroscedasticity. 6

Or

- (b) Describe the consequences of the  
violation of the assumption of  
homoscedasticity. 6

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