2017/EVEN/03/10/EC-204 (C)/291

PG Even Semester (CBCS) Exam., May-2017

ECONOMICS

(2nd Semester)

Course No. : EC-204 (C)

(Basic Econometrics)

Full Marks: 75 Pass Marks: 30

Time: 3 hours

The figures in the margin indicate full marks for the questions

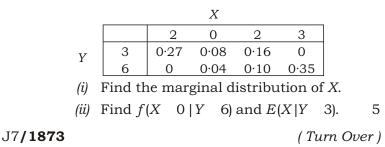
Answer five questions, taking one from each Unit

Unit—I

- **1.** (a) Define joint p.m.f. of two discrete random variables *X* and *Y*. In the context of joint distribution of two discrete random variables, define marginal p.m.f. and marginal distribution; conditional p.m.f. and conditional distribution.
 - (b) The following table gives the joint p.m.f. of discrete random variables X and Y:

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(2)

Show that f(x) defined by (c)

$f(x) = \frac{1}{\sqrt{2}} e^{1/2} \frac{x}{2},$ х

is a probability density function.

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- **2.** (*a*) Prove alternative definitions of 5 econometrics.
 - Justify the necessity of econometrics as a (b) 5 separate discipline.
 - What is the central limit theorem? What (c)are the properties of a good estimator? Explain any one property. 5

UNIT—II

- **3.** (*a*) Define and elaborate the following : $1 \times 5 = 5$
 - (i) Estimated coefficient
 - (ii) Standard error
 - (iii) Sum of squared residuals
 - (iv) Standard error of the regression
 - (v) Best linear unbiased estimator
 - (b) What do you mean by OLS? If Y is linearly regressed on X, find the least squares formula for the parameter estimates. 10

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4. (a) Write down a two-variable CLRM with all standard assumptions.

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(b) Given the model Y_i X_i u_i with all CLRM assumptions. Show that OLS estimators ^ and ^ are unbiased. Hence prove that has minimum variance in a class of linear unbiased estimators. 10

UNIT-III

5. (a) For the model

 $Y_{i} = \frac{1}{2} X_{2i} = \frac{3}{3} X_{3i} = u_{i}$ with all CLRM assumptions, derive the normal equations and find the OLS estimators $\hat{1}$, $\hat{2}$ and $\hat{3}$. 5 (b) From sample data on Y, X_2 and X_3 the following figures were computed : $n \quad 15, \overline{Y} \quad 367 \quad 69, \overline{X} \quad 402 \quad 76, \overline{X}_3 \quad 8 \quad 0$ $(Y_i \ \overline{Y})^2 \ 66042 \ 27$ $(X_{2i} \quad \overline{X})^2 \quad 84855 \ 09$ $(X_{3i} \quad \overline{X}_3)^2 \quad 280 \ 0$ $(X_{2i} \quad \overline{X}_2)(Y_i \quad \overline{Y}) \quad 74778 \ 35$ $(X_{3i} \quad \overline{X}_3)(Y_i \quad \overline{Y}) \quad 4250 \quad 9$ $(X_{2i} \quad \overline{X}_2)(X_{3i} \quad \overline{X}_3)$ 4796 0 Test the H_0 : 2 3 0 and compute the ANOVA table. 10

(4)

- **6.** (*a*) Define and elaborate the following : 2×4=8
 - (i) R^2 and \overline{R}^2
 - (ii) Partial r^2
 - (iii) Degrees of freedom
 - (iv) Analysis of variance
 - Let us suppose that the following (b) estimated equation is obtained by OLS regression using quarterly data for 1990 to 2009 inclusive :

Standard errors are in parentheses the ESS was 112.5 and RSS was 19.5.

- (i) Which of the slope coefficients are significantly different from zero at the 5% significance level? [Given, t_{0 025} 1 96, t_{0 005} 2 58]
- (ii) Calculate the value of R^2 and \overline{R}^2 .
- (iii) Which of these two R^2 and \overline{R}^2 is more preferable? Why?

UNIT-IV

- **7.** (a) What do you mean by multicollinearity? 3
 - (b) What are the consequences of applying OLS in case of near-exact multicollinearity?

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(Continued)

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(5)

- (c) What are the consequences of autocorrelation? Discuss.
- (d) Write a short note on Durbin-Watson test.
- 8. (a) What is heteroskedasticity? Present one formal method for detection. If OLS is applied in the presence of heteroskedasticity, what would be the consequence(s)? 2+5+4=11
 - (b) If $E(u_i^2) = {}^2X_i$, how would you tackle the problem? 4

Unit—V

- **9.** (*a*) Discuss the concepts of structural form equations and reduced form equations. 5
 - *(b)* From the model

the following reduced form equations are obtained :

Check whether the structural equations are identified.

(c) What is a mongrel equation? 3

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(Turn Over)

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- 10. (a) Define rank and order conditions of identification.
 (b) Illustrate the concepts of under-identification, exact identification and overidentification.
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 - (c) Write a short note on indirect least squares. 5
