D 70774 (Pages : 4) Name.....

Reg. No.....

THIRD SEMESTER M.A. DEGREE (REGULAR) EXAMINATION NOVEMBER 2019

(CUCSS)

Economics

ECO 3C 12—BASIC ECONOMETRICS

(2015 Admissions)

Time : Three Hours Maximum : 36 Weightage

Part A

Answer **all** *questions.*

Each bunch of **four** *questions carries a weightage of* 1.

1. In the model $\Delta y = \beta \Delta x$ the parameter β stands for the :

   (a) Slope. (b) Slope and Elasticity.

   (c) Elasticity. (d) Growth rate.

2. The ratio of Total Sum of Squares and Explained Sum of Squares is :

   (a) Co-efficient of correlation. (b) Co-efficient of determination.

   (c) Co-efficient of variation. (d) Co-efficient of covariation.

3. If Z_1 and Z_2 are independently distributed χ^2 variables with k_1 and k_2 degrees of freedom then the variable, $\frac{Z_1 / k_1}{Z_2 / k_2}$ has :

   (a) *t* distribution. (b) χ^2 distribution.

   (c) F distribution. (d) Normal distribution.

4. The lowest significance level at which a null hypothesis can be rejected is :

   (a) F value. (b) *t* value.

   (c) *p*-value. (d) R square value.

Turn over

5. Which of the following is not a formal method of detecting heteroscedasticity ?

   (a) Spearman's rank correlation test. (b) Park test.

   (c) Glejser test. (d) Durbin's m test.

6. Which of the following theorem is utilised to justify the normality assumption of random variable in regression model ?

   (a) Euler's theorem. (b) Chebyshev's theorem.

   (c) Gauss-Markov theorem. (d) Central limit theorem.

7. The Runs test used to detect autocorrelation is :

   (a) Parametric test. (b) Non-parametric test.

   (c) Equivalent test. (d) Hypothesis test.

8. When one or more of the regressors are linear combinations of the other regressors, it is called :

   (a) Autocorrelation. (b) Heteroscedastity.

   (c) Multicollinearity. (d) Serial correlation.

9. Plotting the residuals against time is termed as the :

   (a) Time sequence plot. (b) Box plot.

   (c) Scatter plot. (d) Stem and leaf plot.

10. Which of the following tests is used to find the structural break in the data set ?

    (a) F test. (b) Chow test.

    (c) Dickey-Fuller test. (d) Granger causality test.

11. Which of the following models is used to regress on dummy dependent variable ?

    (a) The LPM model. (b) The tobit model.

    (c) The logit model. (d) All of the above.

12. As a rule of thumb, a variable is said to be highly collinear if the Variance Inflation Factor (VIF) is :

    (a) Exactly 10. (b) Exceeds 10.

    (c) Less than 10. (d) None of the above.

(12 × ¼ = 3 weightage)

Part B

Answer any **five** *questions.*
Each question carries a weightage of 1.

13. Explain various types of data structures used in applied econometric work.
14. State and explain the algebraic properties of OLS statistics.
15. Explain the Gauss-Markov assumptions for simple regression.
16. Write a note on the method of maximum likelihood.
17. Explain how to estimate growth rate using a specific regression model.
18. What is dummy variable ?
19. Explain the role of random term in an econometric model ? Explain.
20. What is correlation matrix ? Explain.

(5 × 1 = 5 weightage)

Part C

Answer any **eight** *questions.*
Each question carries a weightage of 2.

21. What are the consequences of specification error ? Explain
22. Examine the reason behind the normality assumption of random variable.
23. Distinguish between statistical significance and practical significance.
24. How will you interpret the simple and partial correlation coefficients in two variable case ?
25. Briefly explain second degree polynomial regression function.
26. Express the assumptions of Classical Liner Regression model in matrix form.
27. What are the assumptions behind the pattern of heteroscedasticity ? Explain.
28. Write a note on piece-wise linear regression.
29. Given the estimated saving function as $\hat{C} = 5000 + 0.75\ Y$. Find the value of investment multiplier.
30. Discuss the consequences of autocorrelation.
31. Explain the tests for incorrect functional form.

(8 × 2 = 16 weightage)

Turn over

Part D

Answer any **three** *questions.*
Each question carries a weightage of 4.

32. How to detect multicollinearity ? Explain.

33. Given the cross-section data relating to output Q, inputs Labour and capital. Fit a Cobb-Douglas production function by specifying the function as :

$\log Q = \beta_0 + \beta_1 \log L + \beta_2 \log K + u$ and interpret the estimated co-efficients :

Log Q	:	2.56	2.71	2.77	2.89	3.14	3.18	3.22	3.30	3.37	3.40
Log L	:	2.08	2.30	2.40	2.56	2.64	2.77	2.83	2.89	3.00	3.14
Log K	:	1.61	2.08	2.30	2.40	2.56	2.77	2.89	3.09	3.22	3.09

34. State and prove Gauss Markov theorem.

35. What is Durbin-Watson test ? Explain its method and decision rules of Durbin-Watson d test.

36. Examine various types of specification errors.

(3 × 4 = 12 weightage)

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Answer key_Set-2

THIRD SEMESTER M.A. DEGREE EXAMINATION,
Core Course XII _ ECONOMICS (CUCSS)
ECO 03 **Paper IV: BASIC ECONOMETRICS**
(2015 admissions)

Duration: 3 Hours **Maximum: 36 Weightage**

PART A

*Answer **all** Questions.*

Each bunch of four questions carries a Weightage of 1

1. (a) Slope
2. (b) Coefficient of determination
3. (c) F distribution
4. (c) *p*-value
5. (d) Durbin's *m* test
6. (d) Central limit theorem
7. (b) Non-parametric test
8. (c) Multicollinearity
9. (a) Time sequence plot
10. (b) Chow test
11. (d) All of the above
12. (b) Exceeds 10

$(12 \times \frac{1}{4} = 3$ **Weightage)**

PART B

*Answer any **five** Questions.*
Each question carries a Weightage of 1.

13. Cross-sectional, Time series, pooled cross sections, panel data set.

14. The sum of OLS residuals is zero $\sum_{i=1}^{n} \hat{u}_i = 0$, the sample covariance between the regressors **and** OLS residual is zero $\sum_{i=1}^{n} x_i \hat{u}_i = 0$; the point $(\bar{x}, \bar{y})$ is always on the OLS regression line.

15. Linear in parameters, random sampling, sample variation in the explanatory variable, zero conditional mean, homoscedasticity.

16. Estimate the unknown parameters in such a way that the probability of observing the give Y's is as high as possible. Hence find the maximum of the likelihood function by applying differential calculus.

17. Specific regression model is the semi-log model: $\log Y = \beta_o + \beta_1 t$ so that $d(\log Y) = \frac{1}{Y}\frac{dY}{dt} = \beta_1$ is the growth rate. OLS method to estimate the parameter.

18. Dummy variables are used as devices to sort data into mutually exclusive categories assigning value 0 or 1 to indicate the absence or presence of some categorical effect.

19. Disturbance in the model occurs due to omission of variables from the model; errors in model specification; errors of measurement; errors of aggregation; random behaviour of economic agents.....

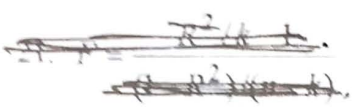
20. Matrix of correlation coefficients. In k variable case,

$$R = \begin{bmatrix} 1 & r_{12} & r_{13} & \ldots\ldots\ldots & r_{1k} \\ r_{21} & 1 & r_{23} & \ldots\ldots\ldots & r_{2k} \\ \ldots & \ldots & \ldots & \ldots & \ldots \\ r_{k1} & r_{k2} & r_{k3} & \ldots\ldots\ldots & 1 \end{bmatrix}$$

(5 × 1 = 5 ***Weightage)***

PART C

Answer any ***eight*** *Questions.*
Each question carries a Weightage of **2.**



21. OLS estimators of the parameters are unbiased and consistent; the error variance is correctly estimated; the confidence interval and hypothesis testing procedures are valid; the estimated parameters are generally inefficient.

22. As the number of independent variables increases indefinitely, by central limit theorem, the distribution of their sum tend to be normal; even if the number of variables is not large their sum may be normally distributed; any linear function of normally distributed variables is itself normally distributed; normal distribution is simple involving two parameters.

23. The probability that relationship among the variables is caused by something other than chance. Statistical hypothesis testing is used to determine whether the result of a data set is statistically significant. Practical significance is related to whether the result is useful in the practical sense.

24. If $r_{12} = 0$, $r_{12.3}$ need not be zero – If $r_{12} = 0$ and r_{13} and r_{23} are non-zero and are of the same sign, $r_{12.3}$ will be negative; if they are of opposite signs, it will be positive – the coefficients $r_{12.3}$ and r_{12} need not have the same sign – As r_{12}^2 lies between 0 and 1 so is the square of partial correlation coefficients – When $r_{13} = r_{23} = 0$ it does not mean that $r_{12} = 0$.

25. $Y_i = \beta_o + \beta_1 X_i + \beta_2 X_i^2 + u_i$. Estimate the parameters using OLS method treating as multiple regression function.

26. $E(\mathbf{u}_{n\times 1}) = \mathbf{0}_{n\times 1}$; $E(\mathbf{uu}') = \sigma^2 I_{n\times n}$; X is non-stochastic with order $n \times k$; $\rho(\mathbf{X}) = k$; $\mathbf{u} \sim N(\mathbf{0}, \sigma^2 \mathbf{I})$

27. $E(u_i^2) = \sigma^2 X_i^2$; $E(u_i^2) = \sigma^2 X_i$; $E(u_i^2) = \sigma^2 [E(X_i)]^2$; Log transformation reduces the incidence of heteroscedasticity compared to the original regression model.

28. Piecewise linear regression is suitable when the data looks somewhat non-linear so that by partitioning them in to sub-sample with the help of threshold and fitting linear regression in each section with different regression coefficients, using dummy variable.

29. $k = 1/1 - mpc = 4$

30. Even when the residuals are serially correlated the parameter estimates of OLS are statistically unbiased – the OLS variances of parameters are likely to be larger – the variances of the random term may be under estimated – the predictions based on OLS estimates will be inefficient..

31. Examination of residuals – using DW d statistics – Ramsey's RESET test – LM test for adding variables.

($8 \times 2 = 16$ Weightage)

PART D

*Answer any **three** Questions.*
*Each question carries a Weightage of **4**.*

32. R-square but few significant t-ratios – high pair-wise correlations among regressors – examination of partial correlation – auxiliary regressions – eigenvalues and condition index – tolerance and variance inflation factor.

33.

	Coefficients	*t Stat*	*P-value*
Intercept	0.96	3.22	0.015
log L	0.61	2.212	0.063
log K	0.181	1.04	0.335
	R Square	0.97	

34. The least square estimators in the class of unbiased linear estimators have minimum variance. $\hat{\beta}_i = \sum k_i Y_i$ linear; $E(\hat{\beta}_i) = \beta_i$ unbiased; $Var(\tilde{\beta}_i) > Var(\hat{\beta}_i)$

35. Run OLS regression and obtain the residual; compute d; for given sample size and given number of independent variables find out the critical d_L and d_U values; Follow the decision rues:

H_o	Decision	If
No + ve autocorrelation	Reject	$0 < d < d_L$
No + ve autocorrelation	No decision	$d_L \le d \le d_U$
No – ve autocorrelation	Reject	$4 - d_L < d < 4$

No – ve autocorrelation	No decision	$4 - d_U < d < 4 - d_L$
No + or – ve autocorrelation	Don't Reject	$d_U < d < 4 - d_U$

36. Omission of relevant variables – *inclusion of unnecessary variable* – accepting a wrong *functional form* – *errors of measurement*..

($3 \times 4 = 12$ Weightage)