International Islamic University Chittagong
Department of Economics & Banking
Semester End Examination
Program: BSS(Hons.) in E&B
Semester: Spring-2023

Course Title: Basic Econometrics
Course Code: ECON-3601

Time: 2.5 Hours
Full Marks: 50

[NB: Answer the following questions. All parts of a question must be answered serially. Figures in the right margin indicate full marks.]

QN	Description of Question	Marks	CLOs & PLOs	Cognitive Learning
1(a)	State the assumptions underlaying the methods of least squares.	3	CLO-2 PLO-3	Understanding
1(b)	Consider the following regression output: $\hat{Y}_i$= -299.5913+ 0.7218X_t se = (28.7649) (0.004423) r^2 = 0.9683; RSS = 10.0544; ESS = 30.0358 Where, Y = personal consumption expenditure (PCE) and X = gross domestic product (GDP) (i) How do you interpret this regression? (ii) Is the estimated slope coefficient significant at the 5 percent level? What is the underlying null hypothesis? (iii)Establish a 95% confidence interval for the regression coefficient. (iv)Determine if the model is statistically significant.	7		Analyzing
2(a)	The mean, sum squares of deviation, and products of deviation for three variables are represented by the data below: $\overline{Y}$ =370.493; $\overline{X_2}$ =202.360; $\overline{X_3}$ = 7.50; n = 20 $\sum(Y_i - \overline{Y})^2$ =58042.469; $\sum(X_{2i} - \overline{X_2})^2$ =72855.086 $\sum(X_{3i} - \overline{X_3})^2$ =285.000; $\sum(Y_i - \overline{Y})(X_{2i} - \overline{X_2})$ =7378.346 $\sum(Y_i - \overline{Y})(X_{3i} - \overline{X_3})$ =5150.900; $\sum(X_{2i} - \overline{X_2})(X_{3i} - \overline{X_3})$ =5396.120 (i) Formulate a regression equation. (ii) Estimate the partial regression coefficients. (iii)Calculate R^2 and adjusted R^2 (iv)Determine if the model is statistically significant.	10	CLO-2 PLO-3	Analyzing& creating
3(a)	Consider the following regression model: $LnX_i = \beta_1 - \beta_2\left(\frac{1}{X_i}\right) + u_i$ (i) Is this a linear regression model? (ii) How would you estimate this model? (iii)What is the elasticity of the model? (iv)Can you give an example where such a model may be appropriate?	10	CLO-2 PLO-3	Evaluating

4(a) The regression findings presented above were derived from a time series dataset spanning from 1991 to 2020. | 10 | CLO-2 PLO-3

Model-1:	**Model-2:**
$\hat{Y}_t = 0.00681 + 0.75815X_t$ SE = ((0.02596) (0.27009) value = (0.5984); (0.0186) $r^2 = 0.4561$	$\hat{Y}_t = 0.76214X_t$ SE = (0.265799) p value = (0.0131) $r^2 = 0.4258$

(i) What is the difference between the two regression models?
(ii) Given the preceding results, would you retain the intercept term in the first model? Why or why not?
(iii) How would you interpret the slope coefficients in the two models?
(iv) What is the theory underlying the two models?
(v) Can you compare the r^2 terms of the two models? Why or why not?

OR

4(a) Based on a hypothetical dataset examining the relationship between incomes and schooling, the following outcome has been identified: | 10 | CLO-2 PLO-3 | Evaluating

$Income_i = 0.3204 + 0.7920\ Schooling_i$
SE = (0.0255); ( )
t = (); (3.2536); $r^2 = 0.8421$; n = 21
$\sum \hat{u}_i^2 = 9.3454$

(i) Fill in the missing numbers.
(ii) Set up the ANOVA table for this example and test whether the model is significant.
(iii) Interpret the coefficient of determination's value.
(iv) What is the average projected income value when the level of education is 21 years of schooling?

5(a) What are the essential methods and criteria for testing the functional form of regression models, specifically when choosing between linear and log-linear regression models? Illustrates the method. | 6 | CLO-2 PLO-3 | Understanding

5(b) Establish the relationship between R^2, adjusted R^2 and F. | 4

OR

5 Write note of the following: | CLO-2 PLO-3 | Understanding

(i) Multiple regression analysis
(ii) Normality test of the data
(iii) Point estimation vs interval estimation
(iv) Type- I-error vs type -II-error