Indian Institute of Technology Kharagpur
Department of Humanities and Social Sciences
Five-Year Integrated M.Sc. in Economics
First Class Test (Autumn Semester: 2021-22)
Subject: Econometric Analysis II (HS40007)
Time: 1hr **Full Marks 25** **Date: 06 September 2021**

(Instructions: Answer all the Questions; Submit the handwritten and signed Answer Script in PDF; No late submission of the Answer Script or its submission through email will be considered.)

Part-I: Select the most appropriate alternative for the following: 1×10=10

1. If we include separate dummy variables for both rural and urban households in a regression model along with the intercept, it will create the problem of:
   A) Omitted variable bias
   B) Heteroscedasticity
   C) Autocorrelation
   D) Multicollinearity

2. Dummy variables are variables of:
   A) Ratio scale
   B) Interval scale
   C) Ordinal scale
   D) Nominal scale

3. Including lagged values of the dependent variable on the right-hand side of a regression equation can cause the OLS estimators of the coefficients to be:
   A) Biased but consistent coefficient
   B) Biased and inconsistent
   C) Unbiased but inconsistent
   D) Unbiased and consistent but inefficient

4. For the multiple regression model $Y_i = \alpha + \beta_1 X_{1i} + ... + \beta_k X_{ki} + u_i$
   $ESS = \beta_1 \sum x_{1i} \hat{y}_i + ... + \beta_k \sum x_{ki} \hat{y}_i$
   A) True
   B) False
   C) Uncertain

5. Omission of a relevant variable from a regression model, will cause the following:
   i) The standard errors will be biased
   ii) If the excluded variable is uncorrelated with the included variables, the slope coefficients will be inconsistent
   iii) If the excluded variable is uncorrelated with the included variables, the intercept will be inconsistent

iv) If the excluded variable is uncorrelated with the included variables, both the slope coefficients and the intercept will be consistent and unbiased but inefficient.

A) (ii) and (iv) only
B) (i) and (iii) only
C) (i), (ii) and (iii) only
D) (i), (ii), (iii) and (iv)

6. The rationale behind the Koyck transformation is that it:
   A) Eliminates the bias
   B) Increases the goodness-of-fit of the model
   C) Exploits an information criterion
   D) Incorporates more information into the estimation process

7. A major problem with distributed lag models is that:
   A) R-square is low
   B) Estimated coefficients are biased
   C) Variances of the estimated coefficients are large
   D) The lag length is impossible to determine

8. Which of the following is true regarding forecasting in econometrics?
   A) In-sample forecasting is a poor test of model adequacy
   B) Forecasts can only be made for time-series data
   C) Model specification errors are certain to produce inaccurate forecasts
   D) Structural forecasts are simpler ac compared to those from time-series models

9. Which of the following test(s) can be applied for the selection of a non-nested model?
   i) Restricted F Test
   ii) Likelihood Ratio Test
   iii) Lagrange Multiplier Test
   iv) Davidson Mackinnon J Test

   A) (i) and (ii) only
   B) (iii) only
   C) (ii), (iii) and (iv) only
   D) (iv) only

10. The logistic functional form:
    A) Forces the dependent variable to lie between zero and one
    B) Is attractive whenever the dependent variable is a probability
    C) Never allows the dependent variable to be equal to zero or one
    D) All of the above

Part II: Comment on the following statements with justification: 3×2=6

1. Consequences of errors in measurement of the dependent variable are more severe as compared to that of the independent variables

2. While estimating a distributed lag model, Almon transformation process should be preferred to the Koyck transformation procedure.

Part-III: Answer the following questions:

1. Consider the following two regression models:

   Model I: $Y_i = \alpha_0 + \alpha_1 D_{1i} + \alpha_2 X_i + \alpha_3 (D_{1i} \times X_i) + u_i$ with Y_i = Monthly per capita consumption expenditure; X_i = Monthly per capita income; $D_{1i} = 0$ for the APL households, and $D_{1i} = 1$ for the BPL households; and

   Model II: $Y_i = \alpha_0 + \alpha_1 D_{1i} + \alpha_2 X_i + \alpha_3 (D_{1i} \times X_i) + u_i$ with Y_i = Monthly per capita consumption expenditure; X_i = Monthly per capita income; $D_{1i} = 0$ for the BPL households, and $D_{1i} = 1$ for the APL households

   How will the regression results differ between these two models in respect of estimates of the coefficients, their standard errors, goodness-of-fit, and statistical significance of the model? Justify your answer.

   3

2. If the model $Y_i = \gamma + \delta X_{1i} + v_i$ is estimated instead of the true model $Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i$, examine if the OLS estimator of the intercept will be unbiased.

   3

3. If the model $Y_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i$ is estimated instead of the true model $Y_i = \gamma + \delta X_{1i} + v_i$, will there be any consequence on statistical significance of the estimated model? Justify your answer.

   3
