Ex/UG/ECO/54/34/2018

BACHELOR OF ARTS EXAMINATION, 2018

(3rd Year, 5th Semester)

ECONOMICS (HONOURS)

APPLIED ECONOMICS

Time : Two hours | Full Marks : 30

Answer any one question

1. To find out the effects of pollution on housing prices consider the following model:
$$\log(price) = \beta_0 + \beta_1 \log(nox) + \beta_2 \log(dist) + \beta_3 rooms + \beta_4 rooms^2 + \beta_5 stratio + u$$

The estimated model is given below:

Source	SS	df MS	Number of obs	= 506	
		F(5, 500)	= 151.77		
Model	50.9872375	5 10.1974475	Prob > F	= 0.0000	
Residual	33.5949875	500 .067189975	R-squared	= 0.6028	
		Adj R-squared	= 0.5988		
Total	84.582225	505 .167489554	Root MSE	= .25921	
lprice	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
lnox	-.901682	.1146869 -7.86	0.000	-1.12701	-.6763544
ldis	-.0867814	.0432807 -2.01	0.045	-.1718159	-.001747
rooms	-.5451128	.1654542 -3.29	0.001	-.8701839	-.2200417
rooms2	.0622612	.012805 4.86	0.000	.037103	.0874194
stratio	-.0475902	.0058542 -8.13	0.000	-.059092	-.0360884
_cons	13.38548	.5664732 23.63	0.000	12.27252	14.49844

Description of the variables are given below:

	storage	display	value
variable	name	type	format
lprice	float	%9.0g	log(price)
lnox	float	%9.0g	log(nox), where ‘nox’ is nitrogen oxide per million.
ldis	float	%9.0g	log (dis), where ‘dis’ is distance.
rooms	float	%9.0g	avg number of rooms

[Turn over

rooms2	float	%9.0g	
stratio	float	%9.0g	average student-teacher ratio

a. Interpret the above result. [5]

b. What kind of relationship exists between log (price) and rooms. Do you really believe that increasing number of rooms actually reduces a house's expected value? [4]

c. Dropping the variable rooms2 we get the following result:

Source	SS	df MS	Number of obs	= 506	
		F(4, 501)	= 175.86		
Model	49.3987586	4 12.3496897	Prob > F	= 0.0000	
Residual	35.1834663	501 .07022648	R-squared	= 0.5840	
		Adj R-squared	= 0.5807		
Total	84.582225	505 .167489554	Root MSE	= .265	
lprice	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
lnox	-.9535388	.1167417 -8.17	0.000	-1.182902	-.7241751
ldis	-.1343395	.0431032 -3.12	0.002	-.2190247	-.0496542
rooms	.2545271	.0185303 13.74	0.000	.2181203	.2909338
stratio	-.0524511	.0058971 -8.89	0.000	-.0640372	-.040865
_cons	11.08386	.3181113 34.84	0.000	10.45887	11.70886

Compare the two models. [6]

2. Data on arrests during the year 1986 and other information on 2,725 men born in either 1960 or 1961 in California were collected. Each man in the sample was arrested at least once prior to 1986. The variable *narr86* is the number of times the man was arrested during 1986: it is zero for most men in the sample (72.29%), and it varies from 0 to 12. (The percentage of men arrested once during 1986 was 20.51.) The variable *pcnv* is the proportion (not percentage) of arrests prior to 1986 that led to conviction, *avgsen* is average sentence length served for prior convictions (zero for most people), *ptime86* is months spent in prison in 1986, and *qemp86* is the number of quarters during which the man was employed in 1986 (from zero to four).

   A linear model explaining arrests is

$$narr86 = \beta_0 + \beta_1 pcnv + \beta_2 ptime86 + \beta_3 qemp86 + u$$

where *pcnv* is a proxy for the likehood for being covicted of a crime and *avgsen* is a measure of expected severity of punishment, if convicted; *ptime 86* captures the incarcerative effects of crime : if an individual is in prison, he cannot be arrested for a crime outside of prison *qepm86* captures labour market opportunities.

The estimated regression results are given below:

Source	SS	df MS	Number of obs	= 2725
Model	83.0741941	3 27.691398	Adj R-squared	= 0.0403
Residual	1927.27296	2721 .708295833	R-squared	= 0.0413
Total	2010.34716	2724 .738012906	Root MSE	= .8416
narr86	Coef.	Std. Err.	[95% Conf.	Interval]
pcnv	-.1499274	.0408653	-.2300576	-.0697973
ptime86	-.0344199	.008591	-.0512655	-.0175744
qemp86	-.104113	.0103877	-.1244816	-.0837445
_cons	.7117715	.0330066	.647051	.776492

a. **Test** $\beta_1=0,\ \beta_2=0,\ \beta_3=0,\ \beta_1=\beta_2=\beta_3=0$ [5]

b. **Interpret the result.** **[6]**

c. If *avgsen* is added to the model, The estimated result is

Source	SS	df MS	Number of obs	= 2725
Model	84.8242895	4 21.2060724	Adj R-squared	= 0.0408
Residual	1925.52287	2720 .707912819	R-squared	= 0.0422
Total	2010.34716	2724 .738012906	Root MSE	= .84138
narr86	Coef.	Std. Err.	[95% Conf.	Interval]
pcnv	-.1508319	.0408583	-.2309484	-.0707154
avgsen	.0074431	.0047338	-.0018392	.0167254
ptime86	-.0373908	.0087941	-.0546345	-.0201471
qemp86	-.103341	.0103965	-.1237268	-.0829552
Constant	.7067565	.0331515	.6417519	.771761

Compare the results of this model with the previous model. [4]

[Turn over

Group -B

Answer any three: **3 x 5=15**

1.(a)How do you select sample size from a population? Is there any rule? (b)Define the Cluster Sampling. What are the advantages of Cluster Sampling over other probabilistic sampling methods? (2+1+1+1)

2. Consider the following curve:
$Y = CXe^{-\beta X}$, where Y=Income Inequality, X=GNP per capita, C>0 and 0<β<1. Examine the nature of the curve. Data on income inequality(Y) and the GNP per capita(X) of 200 countries are given to you. What type of regression model would you suggest in order to estimate the above function? (4+1)

3. Derive the following formula of Gini-Coefficient:

Gini-Coefficient=$1-\sum_i [(q_i + q_{i-1})(p_i - p_{i-1})]$, q and p are the cumulative proportion of income and persons respectively. Show that Gini-coefficient is distribution insensitive. (3+2)

4. Can you apply OLS if the dependent variable becomes dichotomous? What are the possible outcomes if you apply OLS? Can you suggest any method to overcome the difficulties? (1+2+2)

5. Consider a hypothetical production function: $Y(\alpha) = \left[\theta L^{\alpha} + (1-\theta)K^{\alpha}\right]^{1+\infty}$. Find the limiting values of Y(α) if α tends to 1, -1 and 0 given that 0<θ<1. Can you draw any inference from the results? (1+1+2+1)