UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF ANIMAL SCIENCE & EXPORT AGRICULTURE

BSc in Export Agriculture
Third Year Second Semester Examination – December/January 2016/17

Econometrics (EAG 330-2)
Section I – Structured Questions

Instructions:
Answer **all** questions in the given space.
No. of questions : Two (02)
No. of pages : Thirteen (13)
Time : One (01) hour
Total marks allocated : 40%

Index No.

1.

(I) The body of knowledge called statistics is sometimes divided into two main areas, depending on how data are used. Those main two areas are; (2 marks)

a) …….

b) …….

(II) What is meant by those two mentioned in question (I)?

(3.5 marks X 2 = 7 marks)

a) …….
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b) …….
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(III) Define the followings; (5 marks X 2 = 10 marks)

a) Population

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b) Sample

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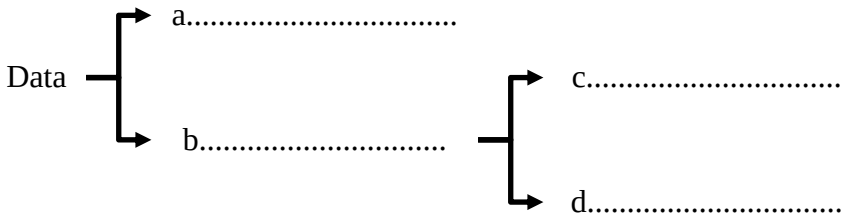
(IV) Fill the following flow chart in relation to data. (4 marks)



(V) Classify each variable as nominal, ordinal, interval, or ratio measurement in the given table. (10 marks)

Description	**Type of Measurement**
Temperature	
Salary	
Grades (A,B,C,D,F)	
Nationality	
Gender	

Rating scale (poor, good, excellent)	
Weight	
IQ	
Eye color	
time	

(VI) List three (03) most common methods of data collection (3 marks)

a) ……

b) ……

c) ……..

(VII) Classify given samples as random, systematic, stratified, or cluster

(4 marks)

Description	**Method of Sampling**
Subjects are selected by dividing up the population into groups, and subjects are randomly selected within groups.	
Subjects are selected by using every k^{th} number after the first subject is randomly selected from 1 through *k*.	
Subjects are selected by random numbers.	
Subjects are selected by using an intact group that is representative of the population.	

(VIII) How do you explain the following methods of sampling?

(5 marks X 3 = 15 marks)

a) Purposive sampling

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b) Snowball sampling

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c) Convenience sampling

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(IX)

a) What is a **hypothesis**? (5 marks)

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b) What is meant by **hypothesis testing**? (5 marks)

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c) The first step of the hypothesis testing is writing the hypothesis. What are the other steps involved? (5 marks)

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d) Identify a suitable method of analysis, a model or a statistical test for the given practical situations (2 marks X 15 = 30 marks)

i. Assume that we started a development program in a village and the mean income of the population (2000 families and the population standard deviation is Rs 200/=) is Rs. 10000. By taking a sample (100 villagers) from this population, we need to test whether their income has increased due to the program.

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ii. We take two samples (100 and 50 in each sample) from the population mentioned in [d) i] and test whether there is a significant difference between the mean incomes of those two samples.

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iii. Assume that we take a small sample (15) from the population mentioned in [d) i] and the population variance is not known. We need to test whether their income has increased due to the program.

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iv. 10 fat ladies were allowed a series of exercises in order to reduce their weight. The body weight of the ladies was measured before and after the exercise course. You need to check whether the exercise course is effective to reduce the body weight

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v. A travel agency found that their profits are increasing with the increase of mileage travelled. You need to test whether there is a relationship between profits and the mileage travelled

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vi. You need to test whether there is an association between latex yield of rubber trees and the girth of the tree.

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vii. Janaka and Nimal are two A/L students. Janaka sat for History paper under new syllabus and Nimal sat under old syllabus. You need to test who did well in the exam.

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viii. You need to test the null hypothesis that all of the model coefficients are 0.

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ix. You need to test each significance of each regression coefficient separately

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x. You need o test whether sample variance is equal to the population variance

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xi. You need to find the factors affecting willingness to pay to maintain the quality of Diyaluma waterfall by the residents in Koslanda area and the visitors

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xii. You need to find the relationship between the milk yield per day of cow and their diet intake per day

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xiii. You to test whether there is a difference between weights of one month old broilers raised in two different cages

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xiv. You need to test whether there is an association between preference to choose varieties of fruits and education level of the buyers.

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xv. You need to test whether there is an association between gender of the children and color preference in buying plastic toys.

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2.

(I) What is meant by **Simple Linear Regression**? (5 marks)

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(II) What are the assumptions made around the error term of the simple linear regression model? (5 marks)

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(III) List three (03) reasons for having an error in a regression. (6 marks)

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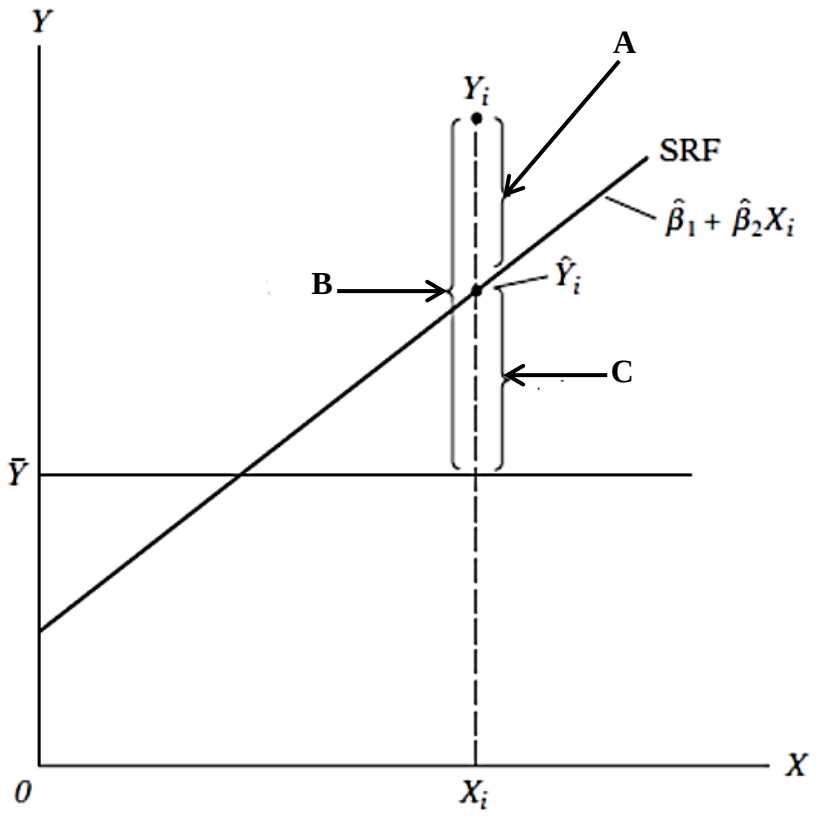
(IV) The following graph shows an estimated regression line where the dependent variable is weekly expenditure and independent variable is weekly income.



a) Identify the areas of A, B and C? (6 marks)

A……..

B……..

C……..

b) Write down the equations for;

i. Explained Sum of Squares (ESS) (2 marks)

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ii. Residual Sum of Squares (RSS) (2 marks)

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iii. Total Sum of Squares (TSS) (2 marks)

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iv. What is meant by **Coefficient of Determination**? (5 marks)

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v. Derive an equation for Coefficient of Determination from the given information in the graph (5 marks)

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(V) Fill in the following table with suitable regression model. (6 marks)

Example	**Regression Model**
You want to find out the determinants of migration and remittances where there are both internal and international migrants.	
The decision of family to own a house or not	
Amount of money that a person or a family spends on a house in relation to socio economic variables.	
To determine factors affecting number of patents received by a firm per year	
You want to model a buying decision of a four wheel tractor, two wheel tractor, or combine harvester	
You want to estimate the technical efficiency of paddy farmers	

(VI) The following table shows a regression model that has been estimated to find the agro climatic variables on the samba rice yield.

Variable notation	**Model**	**Regression coefficients**	**t value**	**Significant value**
	Constant	2.96	2.567	.026
X_1	Maximum temperature (^{0}C)	5.544	3.08	.01
X_2	Average temperature (^{0}C)	-5.584	-3.108	.01
X_3	Diurnal temperature range ($_0$C)	-2.749	-3.074	.011
X_4	Total rainfall of the week (mm)	-.00258	-.971	.353
X_5	Cumulative rainfall for the season up to the week (mm)	.0001457	.126	.902
X_6	Net solar radiation (cal/cm^2/day)	-.00174	-2.322	.040
X_7	Fertilizer (‘000 Mt.)	-.000012	-1.649	.127
X_8	Price (Rs per 100 kg)	-.000063	-2.115	.058
X_9	Time (Year)	.06121	2.863	.015
	R^2	.67		
	Adj R^2	.62		
	F	2.487**		
	Prob > F	0.0000		

a) Is the model significant? Justify your answer. (5 marks)

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b) Distinguish between R-squared and Adj R-squared. (5 marks)

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c) Can you be satisfied with the estimated R-squared? Justify your answer. (5 marks)

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d) What are the significant parameters? You need to state the α level that you consider in finding the significant parameters? (5 marks)

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(VII) How do you interpret the results in relation to the following predictors?

(4 X 5 marks = 20 marks)

a) Maximum temperature(^{0}C)

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b) Average temperature (^{0}C)

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c) Total rainfall of the week (mm)

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d) Net solar radiation (cal/cm^2/day)

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e) Fertilizer (‘000 Mt.)

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(VIII) The above regression model has been estimated using the Ordinary Least Square **(OLS)** method.

a) What is meant by OLS? (5 marks)

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b) State another method used in estimating the unknown parameters in a regression model. (3 marks)

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(IX) Write down the estimated regression equation (3 marks)

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(X) Assuming that the estimated R^2 is 38%, how do you interpret this result? Is this a better model? (5 marks)

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[End of Section I]