



088

UNIVERSITY OF RUHUNA  
FACULTY OF MANAGEMENT AND FINANCE

Bachelor of Business Administration Degree Programme 2000 Level

Semester II End Examination (February/March 2021)

Academic Year 2019/2020

ACC 22113 - Introductory Econometrics

Duration: Three hours

The question paper contains five (5) questions.

Total Marks: 70

Answer all questions.

Scientific calculators are allowed.

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- (1) (A) List four measurement scales. (2 Marks)  
(B) Explain the difference between population and sample using an example. (2 Marks)  
(C) Explain the difference between a parameter and a statistic while giving suitable examples for each. (2 Marks)  
(D) Briefly discuss the difference between theoretical and applied econometrics. (4 Marks)  
(E) Discuss why studying econometrics is important. (4 Marks)  
(Total: 14 Marks)
- (2) (A) What is meant by sampling distribution of mean? (2 Marks)  
(B) Briefly explain the central limit theorem. (2 Marks)  
(C) Briefly explain what is meant by probability using a suitable example. (2 Marks)  
(D) Explain the difference between confidence interval and confidence level using a graphical illustration. (4 Marks)  
(E) Compare and contrast normal distribution and standard normal distribution using suitable graphical illustrations. (4 Marks)  
(Total: 14 Marks)
- (3) (A) List four software used in econometric data analysis. (2 Marks)  
(B) Explain two main categories of data analysis techniques while giving at least one example for each category. (2 Marks)  
(C) Assume that the average age of a person in Sri Lanka is 48 years and the standard deviation is 15 years. The average age of a recent sample of 900 randomly selected persons was 50 years. The data are distributed normally. If you want to see whether the average age of Sri Lankan people has been increased recently based on the sample data, state which test statistic would you calculate and then calculate the test statistic. (2 Marks)

- (D) You have been supplied with the following information relating to the profitability of a sample of firms before the covid-19 pandemic and during the covid-19 pandemic. Assume that you want to investigate whether covid-19 has caused any difference in the performance of firms.

Firm	ROE before Covid-19	ROE after Covid-20
A	10	9
B	7	5
C	8	4
D	12	4
E	12	2
F	11	9
G	10	2

You are required to,

- Name the statistical technique you are going to use in this situation and state the hypotheses.
- Calculate the mean difference and degrees of freedom.
- Calculate the sum of squares and sum of cross products.

(4 Marks)

- (E) The following results relating to a statistical test has been provided to you.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Before - After	4.70305	3.73873	1.32184	1.57739	7.82871	?	7	.009

Explain, with necessary justifications, whether there is a statistically significant difference between before situation and after situation at 5% level of significance based on,

- $p$ -value.
- Confidence interval.
- $t$ -statistic.

(4 Marks)

(Total: 14 Marks)

- State the alternative and null hypothesis relating to  $F$  test in ANOVA using both mathematical symbols and plain English. (2 Marks)
- State a real-world situation relating to accounting or finance where you would choose to apply ANOVA technique and explain why you choose ANOVA rather than another statistical technique. (2 Marks)
- Most of the parametric statistical techniques require observations to be independent. Explain this statement using an example. (2 Marks)
- The following table contains information relating to a certain measurement relating to three independent groups.

	Group A	Group B	Group C
Mean	10	18	30
$n$	7	6	5
Sum of Squares	40	22	26

You are required to,

- (i) Calculate the grand mean.
- (ii) Calculate between group sum of squares (SSB) and within group sum of squares (SSW).
- (iii) Calculate between group degrees of freedom and within group degrees of freedom.

(4 Marks)

(E) The following results relating to a statistical test has been provided to you.

**Test of Homogeneity of Variances**

Levene Statistic	df1	df2	Sig.
.362	2	18	.702

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1259.619	2	629.810	?	.000
Within Groups	163.048	18	9.058		
Total	1422.667	20			

You are required to,

- (i) Calculate the  $F$  statistic.
- (ii) Based on the given results and your calculations, state your conclusion as far as possible in plain English understandable to general audience.
- (iii) State the role of the test of homogeneity of variances in this situation and explain how would you interpret and use the information provided relating to this test in this situation.

(4 Marks)

**(Total: 14 Marks)**

- (5) (A) Explain the difference between correlation and regression. (2 Marks)
- (B) Explain the difference between correlation and causation using an example. (2 Marks)
- (C) Draw a scatter plot showing a strong positive correlation. (2 Marks)
- (D) The following results relating to a statistical test has been provided to you. (3 Marks)

**Descriptive Statistics**

	Mean	Std. Deviation	N
X	98.2000	4.70933	10
Y	118.6000	5.42013	10

**Correlations**

		X	Y
X	Pearson Correlation	1	
	Sig. (2-tailed)		.095
	Sum of Squares and Cross-products	199.600	127.800
	Covariance		
	N	10	10
Y	Pearson Correlation		1
	Sig. (2-tailed)	.095	
	Sum of Squares and Cross-products	127.800	264.400
	Covariance		
	N	10	10

You are required to,

- (i) Calculate the covariance between X and Y.
- (ii) Calculate the Pearson correlation coefficient between X and Y.
- (iii) Based on the given results and your calculations, state your conclusion as far as possible in plain English understandable to general audience.

(4 Marks)

(E) Clearly state your step-by-step interpretations in a proper order for the following results relating to a regression analysis.

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832 <sup>a</sup>	.692	.804	18.38584

a. Predictors: (Constant), Activities, Attendance

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5321.260	2	2660.630	7.871	.016 <sup>b</sup>
	Residual	2366.274	7	338.039		
	Total	7687.535	9			

a. Dependent Variable: Marks

b. Predictors: (Constant), Activities, Attendance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	133.679	43.057		3.105	.017
	Attendance	1.093	.947	.269	1.154	.286
	Activities	15.833	5.447	.678	2.907	.023

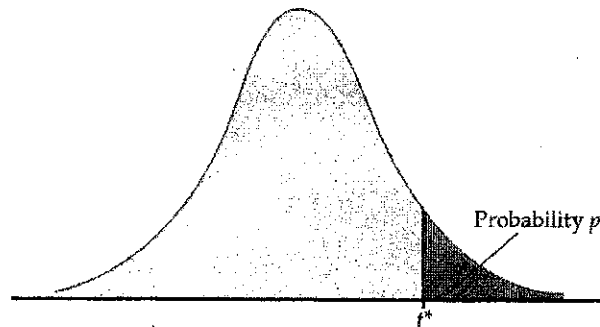
a. Dependent Variable: Marks

(4 Marks)

(Total: 14 Marks)

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Table entry for  $p$  and  $C$  is the critical value  $t^*$  with probability  $p$  lying to its right and probability  $C$  lying between  $-t^*$  and  $t^*$ .



**TABLE D**

$t$  distribution critical values

df	Upper-tail probability $p$											
	.25	.20	.15	.10	.05	.025	.02	.01	.005	.0025	.001	.0005
1	1.000	1.376	1.963	3.078	6.314	12.71	15.89	31.82	63.66	127.3	318.3	636.6
2	0.816	1.061	1.386	1.886	2.920	4.303	4.849	6.965	9.925	14.09	22.33	31.60
3	0.765	0.978	1.250	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.21	12.92
4	0.741	0.941	1.190	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
6	0.718	0.906	1.134	1.440	1.943	2.447	2.612	3.143	3.707	4.317	5.208	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.517	2.998	3.499	4.029	4.785	5.408
8	0.706	0.889	1.108	1.397	1.860	2.306	2.449	2.896	3.355	3.833	4.501	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.398	2.821	3.250	3.690	4.297	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.359	2.764	3.169	3.581	4.144	4.587