



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HUMANITIES AND SOCIAL SCIENCE
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF ARTS IN
DEVELOPMENT AND POLICY STUDIES

2ND YEAR 1ST SEMESTER 2017 APRIL EXAMS

MAIN CAMPUS (REGULAR)

COURSE CODE: ZDS 3213
COURSE TITLE: QUANTITATIVE METHODS II

EXAM VENUE: **STREAM: BA ARTS**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

Instructions:

- 1. Answer Question ONE (COMPULSORY) and ANY other 2 questions**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

Question One (30 Marks)

- a) Two groups of 15 executives were randomly selected, and each group studied the language under a different program. The final scores for the two groups in Educational Services (ES) and Learning Curve (LC), are as follows.

ES	65	57	74	43	39	88	62	69	70	72	59	60	80	83	50
LC	85	87	92	98	90	88	75	72	60	93	88	89	96	73	62

Using the signed rank test is there evidence that The Learning Curve method is more effective? [6 marks]

- b) Discuss briefly the procedures for testing a statistical hypothesis. [6 marks]
 c) The nicotine content, of two brands of cigarettes, measured in milligrams, was found to be as follows.

Brand A	2.1	4.0	6.3	5.4	4.8	3.7	6.1	3.3	-	-
Brand B	4.1	0.6	3.1	2.5	4.0	6.2	1.6	2.2	1.9	5.4

Test the hypothesis, at $\alpha = 0:05$ level of significance, that the median nicotine contents of the two brands are equal against the alternative that they are unequal [6 marks]

- d) A silver-plating process is being used to coat a certain type of serving tray. When the process is in control, the: thickness of the silver on the trays will vary randomly following a normal distribution with a mean of 0.02 millimeter and a standard deviation of 0.005 millimeter. Suppose that the next 12 trays examined show the following thicknesses of silver: 0.019, 0.021, 0.020, 0.019, 0.020, 0.018, 0.023, 0.021, 0.024, 0.023, 0.022. Use the runs test to determine if the fluctuations in thickness from one tray to another are random. Let $\alpha = 0:05$ [5 marks]

- e) The demand and price (in Ksh '000') for a bag of a hybrid 100 kg bag of wheat in different regions of the country are as shown below;

Price (in Ksh '000')	7	9	8	11	13	12
Demand	24	28	25	30	31	30

Calculate the Karl Pearson's correlation coefficient and comment on the value [7 marks]

Question Two (20 Marks)

A random sample of 8 home internet users was selected from Telkom's database and their monthly internet usage (in hours) was identified for March last year (period 1) and again for March this year (period 2) The data are shown in the accompanying table. Telkom's internet marketing manager asked the question: "Is internet usage increasing?" Conduct a hypothesis test, at the 5% significance level to determine if the monthly internet usage per user has increased significantly from period 1 (March last year) to period 2 (March this year).

Internet usage in hours		
Homes	Period 1	Period 2
1	91.50	89.19
2	94.18	90.95
3	92.18	90.46
4	95.39	93.21
5	91.79	97.19
6	89.07	97.04
7	94.72	91.07
8	89.21	92.75

Question Three (20 Marks)

- a) The Table below presents voter reactions to a new property tax plan according to party affiliation. From these data, construct a table of the expected frequencies based on the assumption that there is no relationship between party affiliation and reaction to the tax plan.

Party affiliation	Reaction			Total
	In favour	Neutral	Opposed	
AMANI	120	20	20	160
SAFINA	50	30	60	140
FORD	50	10	40	100
Total	220	60	120	400

Test the null hypothesis that there is no relationship between party affiliation and voter reaction. Take $\alpha = 0.01$ [10 marks]

b) Test the hypothesis by the Kolmogorov - Simonov test that the following sample values:

0.36 , 0.92 , -0.56, 1.86 , 1.74 , 0.56, -0.95, 0.24 , -0.15 , -0.74 , 0.32 , 0.82 ,
0.70 , -0.10 , -1.26, -1.06 , 0.15 , 0.55 , -0.48, -0.49

Came from a normal distribution with mean 0.7 and variance 1. Take $\alpha = 0.05$.

NOTE: $P [D_{20} \leq 0.29] = 0.95$ [10 marks]

Question Four (20 Marks)

a) A researcher tests three different brands of breakfast drinks to see how many milliequivalents of potassium per quart each contains. These data are obtained

Brand A	Brand B	Brand C
4.7	5.3	6.3
3.2	6.4	8.2
5.1	7.3	6.2
5.2	6.8	7.1
5.0	7.2	6.6

At $\alpha = 0.05$, is there enough evidence to reject the hypothesis that all brands contain the same amount of potassium? [10 marks]

b) The following are the speeds (in miles per hour) at which every fifth passenger car was timed at a certain check point;

46, 58, 60, 56, 70, 66, 48, 54, 62, 41, 39, 52, 45, 62, 53, 69, 65, 65, 67, 76, 52, 52, 59,
67, 51, 46, 61, 40, 43, 42, 77, 67, 63, 59,

Test the null hypothesis of randomness at the 0.05 level of significance. [10 marks]

Question Five (20 Marks)

An advertising firm recently embarked on an in-store promotional campaign, with displays of its products featured prominently in supermarkets. The company also ran its usual radio and television commercials. Over a period of 8 weeks, the company kept track of its expenditure on radio and television advertising, variable **X1**, as well as its

spending on in-store displays, variable **X2** The resulting sales for each week in the area studied were recorded as the dependent variable **Y**. The company analyst conducting the study hypothesized a linear regression model.

Y(\$00)	18	7	8	10	18	19	9	7
X1(\$00)	10	6	9	10	12	13	11	9
X2(\$00)	10	5	7	10	12	14	9	5

- (i) Linking sales volume with the two independent variables, advertising and in-store promotions estimate the parameters of the regression relationship. [18 marks]
- (ii) Predict the sales volume that would be produced if its expenditure on radio and television advertising is **\$8** and its spending on in-store displays is **\$8**. [2 marks]