



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
INSTITUTIONAL BASED PROGRAMME (IBP) (DECEMBER SESSION)
EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE
SMA 679: STATISTICAL INFERENCE II

DATE: Friday 4th May 2012

TIME: 9.00a.m – 12.00p.m

INSTRUCTIONS:

Answer question one and other two questions.

Question one (30 marks)

- a) Define the following terms in non parametric inference.
- i) A run length
 - ii) Non parametric tests
 - iii) Sequential analysis. [6marks]
- b) In a 100 families each containing three children the number of girls are shown in the table below.

No. of girls	0	1	2	3
No. of families	6	25	46	22

Test at 0.5 levels of significance that the data comes from a Binomial distribution with parameters 3 and 0.5, i.e. $B(3, 0.5)$. [5marks]

- c) Given the following data, use Spearman's rank test at 5% level of significance to test whether the median score for test A is higher than that of B. [8marks]

Subject		2	3	4	5	6	7	8
A	95	63	89	56	100	82	70	51
B	85	62	90	54	90	80	70	52

- d) Given the following data, 2.4, 2.8, 3.6, 4.1, 3.9, 2.2, 3.8, use the Wilcoxon signed rank to test at 0.05 level of significance that

a) $H_0: M = 3$

V/s $H_1: m > 3$, where m is the median of the distribution.

[8marks]

Question two (20 marks)

- a) Using the rank test at 5% level of significance, test for equality of the distribution function of the two groups.

First group

227	55	184
176	234	88
252	194	161
149	247	161
16	92	171

Second group

202	271	63
14	151	284
165	235	53
171	147	228
292	99	271

- b) The following are scores on 24 Kenyan swimmers in a certain competition. The scores are arranged according to position occupied by each swimmer
205, 300, 285, 325, 320, 415, 345, 240, 330, 495, 375, 265, 410, 440, 395, 465, 445, 535, 160, 305, 235, 405, 465, 425.

Test

H_0 : The sequence of scores in random

H_1 : The sequence of scores in non-random

Question three (20marks)

- a) Let r_1 and r_2 be the number of runs from population 1 and from population 2 respectively.

Let $R = r_1 + r_2$. Obtain the joint distribution of r_1 and r_2 . [10marks]

- b) The win-lose record of Mathare Unites for 50 consecutive games is as follows:

WWWWWWLWWWWWWLWLWWWWLWWLWWLWWWWLWWLWWLWWLWW

Apply the run test to test whether the sequence aptitude test A and B. The scores are shown in the table below.

Question four (20marks)

A psychologist tested a random sample for eight subjects using aptitude test A and B. The scores are shown in the table below.

Subject	1	2	3	4	5	6	7	8
A	135	103	129	96	140	122	110	91
B	125	102	120	94	130	120	110	92

Using Spearman's test at 5% level of significance, test whether the median score for test is higher than that of B. [8marks]

On a road the number of vehicles passing a particular spot is noted for 60 consecutive minutes and are recorded in the table below.

No. of vehicles	0	1	2	3	4	5
No. of minutes	25	15	10	5	3	2

Test at 0.5 level of significance if the data comes from a Poisson distribution, with parameters 0.5. [12marks]