

KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

2008/2009 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN
ECONOMICS & MATHEMATICS**

COURSE CODE: MATH 424

COURSE TITLE: NON-PARAMETRIC METHODS

STREAM: Y4S2

DAY: WEDNESDAY

TIME: 2.00 – 4.00 P.M

DATE: 10/12/2008

INSTRUCTIONS TO CANDIDATES:

1. Answer Question **ONE** and any other **TWO** Questions
2. Show your the workings clearly.

PLEASE TURN OVER

QUESTION ONE (30 MARKS)

- (a) (i) Give three advantages of using nonparametric methods over parametric methods. [3 Marks]
- (ii) What is the advantage of using the Wilcoxon signed rank test over the sign test. [2 Marks]
- (b) A government economist estimates that the median cost per kg of beef is 300 Ksh. A sample of 22 livestock buyers shows the following costs (Ksh) per kg of beef.

321 309 298 289 303 311 286 295 291 300 277
300 303 306 309 315 309 325 308 317 303 311

Using the large sample to Normal distribution, is there enough evidence to reject the economist's claim? Use $\alpha = 0.01$ [13 Marks]

- (c) A union supervisor claims that applicants for jobs are selected without regard to race. The hiring records of the local company, one that contains all male members gave the following sequence of white and black hirings:

W W W W B W W W B B W B B

Do the data suggest a nonrandom racial selection in the hiring of the union's members? Let $\alpha = 0.05$ [5 Marks]

- (d) A national study by the Steadman's company evaluated the top internet companies and their reputations. The following two lists show how 10 Internet companies ranked in terms of reputation and percentage of respondents who said they would purchase the company's stock.

Company	Reputation	Probable Purchase
A	1	3
B	2	4
C	3	1
D	4	2
E	5	9
F	6	5
G	7	10
H	8	6
I	9	7
J	10	8

- (i) Compute the Spearman's rank correlation coefficient(r_s) between reputation and probable purchase.
- (ii) Test to see whether it is significantly different from zero at $\alpha = 0.05$

[7 Marks]

QUESTION TWO (20 MARKS)

- (a) The gap between the yearly earnings of men and women with equal education is narrowing but has not closed. The sample data for seven men and seven women with bachelor's degree are as follows. The data are shown in thousands of Ksh.

Men	1836	4530	2712	3732	2292	2994	3318
Women	2670	2124	1674	2430	1548	2850	1488

- (i) What is the median salary for men? For women?
- (ii) Using $\alpha = 0.05$, conduct the hypothesis test equal populations. What is your conclusion? [14 Marks]

- (b) A special diet is fed to adult turkeys to see if they will gain weight. The before and after weights (in kg) are given below:

Before	28	24	29	30	32	33	25	26	28
After	30	29	31	32	32	35	29	25	31

Use the paired sample sign test at $\alpha = 0.05$ to see if there is weight gain.
[6 Marks]

QUESTION THREE (20 MARKS)

- (a) Three products received the following performance ratings by a panel of 15 consumers.

Product		
A	B	C
50	80	60
62	95	45
75	98	30
48	87	58
65	90	57

Use the Kruskal - Wallis test at $\alpha = 0.05$ to determine whether there is a significant difference in the performance ratings for the products. [11 Marks]

- (b) The winning numbers for the Kenya sweepstake drawing for the month of April are listed below:

457 605 348 927 463 300 620 261 614 098 467 961 957 870 262 571
633 448 187 462 565 180 050

Classifying each number as odd or even, test for randomness at $\alpha = 0.05$.
(Note: no drawings were held on weekends) [9 Marks]

QUESTION FOUR (20 MARKS)

- (a) A researcher wished to determine if customers going to a supermarket made a list before going shopping. He surveyed 288 customers in three supermarkets. The results are shown below:

	Supermarket A	Supermarket B	Supermarket C
Made List	77	74	68
No List	19	22	28

Test at $\alpha = 0.01$ the claim that going to the supermarket and making a shopping list are independent. [11 Marks]

- (b) In the business credit institution industry the accounts receivable for companies are classified as being “**current**”, “**moderately late**”, “**very late**” and “**uncollectable**”. Industry figures show that the ratio of these four classes is 9:3:3:1. Pratt Associates has 800 accounts receivable, with 439, 168, 133 and 60 falling in each class. Are the numbers in agreement with the industry ratio? Use $\alpha = 0.05$ [9 Marks]