MACHAKOS UNIVERSITY

University Examinations for 2024/2025 Academic Year

SCHOOL OF EDUCATION
DEPARTMENT OF EDUCATIONAL MANAGEMENT & CURRICULUM STUDIES

FIRST YEAR FIRST SEMESTER EXAMINATION FOR DOCTOR OF PHILOSOPHY IN EDUCATION

EMP 923: ADVANCED EDUCATIONAL STATISTICS

DATE: 28TH FEBRUARY, 2025 **TIME: 2.00 PM – 5.00 PM**

INSTRUCTIONS:
*Answer question **ONE (Compulsory)** and **any other TWO** questions*

QUESTION ONE *(COMPULSORY)* (20 MARKS)

a) By the use of relevant examples, explain any four levels of measurement. (8 Marks)

b) The Hekima college administration is considering the total ban on students' motorbikes within the college premises. A poll has been conducted on the students and the neighbours who live around the college and the scores have been calculated. On the scale used, a high score indicates a strong opposition to the proposed ban. The scores are presented below for both groups. Calculate an appropriate measure of central tendency and compare the two groups in a sentence. (6 Marks)

Students	10	10	9	8	10	9	11	8	11	7
	11	10	9	5	5	0	2	10	2	1
Neighbours	0	1	0	1	7	11	9	1	10	10
	7	6	0	3	4	0	0	10	9	0

c) Compute the standard deviation for the students and neighbours data in (b) above. What more information is added to help make an informed decision? (6 Marks)

QUESTION TWO (20 MARKS)

a) To be accepted in the roll of honour for certain college examinations, students must have a Grade Point Average (GPA) in the top 10 % of the college. If the mean GPA is 2.78 and the standard deviation is 0.33, which of the following GPAs would qualify? (6 Marks)

3.20 3.21 3.25 3.30 3.35

b) Distinguish between the following terms as used in research:
   i) Point and Interval estimation (2 marks)
   ii) Bias and Efficiency of an estimator (2 marks)

c) A researcher sampled 180 households to gather information about the residents living standards. For each variable below, construct confidence intervals to estimate the population mean. Use 95% level.
   i) An average of 2.5 people resides in each household Standard deviation is 0.35 (5 marks)
   ii) There was an average of 0.78 telephones (s=0.55) per household. (5 marks)

QUESTION THREE (20 MARKS)

a) A school administration assigned several low academic achievers to a remedial academic program. To assess the program, a random sample of 35 has been selected for comparison with all the students in the system. In terms of mean grade achievement, did the program work?

(10 marks)

System wide Performance	Program Performance
μ = 2.47	$\bar{x}$=2.65
	S=0.70
	N=35

b) It is perceived that students who reside within the campus are more involved in campus life than those who live off campus. The data below reports the average number of hours per week students devote to extra-curricular activities. Is the difference between these randomly selected samples of residential and off campus students significant?

(10 Marks)

Residential	Off Campus
$\bar{x}$ = 12.4	$\bar{x}$=10.2
S1=2.0	S2=1.9
N1=158	N2=55

QUESTION FOUR (20 MARKS)

A small random sample of respondents has been selected from the national survey database. Each respondent has been classified as either urban dweller, a suburbanite or a rural dweller. Are there significantly differences by place of residence for any of the variables listed below?

a) Occupational prestige (10 Marks)

Urban	Suburban	Rural
32	40	30
45	48	40
42	50	40
47	55	45
48	55	45
50	60	50
51	65	52
55	70	55
60	75	55
65	75	60

b) Church attendance (10 Marks)

Urban	Suburban	Rural
0	0	1
7	0	5
0	2	4
4	5	4
5	8	0
8	5	4
7	8	8
5	7	8
7	2	8
4	6	5

QUESTION FIVE (20 MARKS)

a) The coach of *Wazee Kitambi* basketball Team believes that his team plays better and scores more points in front of larger crowds. The number of points scored and attendance for the games last season are as reported below. Do these data support the coach's argument?

(10 Marks)

Game	Points Scored	Attendance
1	12	59
2	13	72
3	17	112
4	23	130
5	21	200
6	18	207
7	16	118
8	8	124
9	14	186
10	20	203

b) The state department for education has rated a sample of schools for compliance with the guidelines for quality assurance. Is the quality assurance standard of a school system significantly related to the affluence of the community as measured by the per capita income? **(10 marks)**

	Per Capita Income		
Quality	**Low**	**High**	**Totals**
Low	19	8	24
High	9	17	26
Totals	25	25	50