



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATIONAL MANAGEMENT AND CURRICULUM STUDIES

APRIL SESSION EXAMINATION FOR DOCTOR OF PHILOSOPHY

EDUCATIONAL ADMINISTRATION/ EDUCATIONAL PSYCHOLOGY

ECC 901: ADVANCED EDUCATIONAL STATISTICS.

DATE: 9/8/2019

TIME: 2.00-5.00 PM

INSTRUCTIONS:

Answer QUESTION ONE and any other TWO QUESTIONS

1. The Chi-Square equation is given as: $X^2 = \sum \frac{(O-E)^2}{E}$

- (a) Explain the meaning of O, E, (O-E), (O-E)². (4 marks)
- (b) Study the data in the table below and calculate the expected values for each cell.

	HIGH PERFORMANCE	LOW PERFORMANCE	TOTAL
NATIONAL	250	150	400
COUNTY	100	300	400
TOTALS	350	450	800

Use the information to fill the table below: (8 MARKS).

OBSERVED O	EXPECTED E	O-E	(O-E) ²	(O-E) ² /E
250				
150				
100				
300				

- (c) Find the Chi-Square value by totaling the values in the last Column. (2 marks)

(d) Calculate the degrees of freedom = (R-1) X (C-1). (3 marks)

(e) How significant is the calculated value of Chi-Square at 95% confidence level? (3 marks)

2. Complete the frequency table below (9 marks)

SCORE	FREQUENCY			
X	f	fX	X ²	fX ²
5	5			
15	8			
25	15			
35	20			
45	40			
55	40			
65	20			
75	15			
85	8			
95	5			

Find i) $\sum fx$ (1 mark)

ii) $\sum fx^2$ (1 mark)

iii) $\text{var} = \frac{\sum fx^2 - \frac{(\sum fx)^2}{n}}{n-1}$ (5 marks)

iv) The standard deviation. (4 marks)

3. Spearman Rank Order Correlation coefficient is given as $r = 1 - \frac{6 \sum d^2}{N(N^2-1)}$.

(a) Explain the meaning of $\sum d^2$, N. (4 marks)

(b) Explain the meaning of the value of correlation in the range: 0.8-1.0, 0.7-0.79, 0.5-0.69, 0.0-0.49. (4 marks)

(c) Complete the table for the data below for Maths score (M) and the Physics score (P). (4 marks)

M	Rank	P	Rank	d	d ²
100	1	90	1		
90	2	80	3		
90	2	75	4		
80	4	90	1		
80	4	60	6		
70	6	70	5		
70	6	60	6		
60	8	60	6		
60	8	50	9		
40	10	30	10		

- (i) The value of $\sum d^2$. (2 marks)
- (ii) The spearman correlation coefficient, r. (5 marks)
- (iii) Interpret the value of r obtained. (3 marks)

4. The kruskal – wallis – H test is calculated using the expression:

$$H = \frac{12}{n(n+1)} \sum \frac{r_i^2}{n_i} - 3(n+1)$$

- a) Explain the symbols n , n_i , R_i^2 and $\sum_{i=1}^n \frac{R_i^2}{n_i}$ (6 marks)
- b) Work out the kruskal – wallis H- statistic for the data below. (8 marks)

G1: 71 82 57 48 62 G2: 52 75 102 68 76

G3: 60 55 39 46 66 G4: 79 42 97 70 58

Interpret the value you have calculated. (6 marks)

5 In the mann -Whitney U-test

$$u_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - r_1$$

$$u_2 = n_1 n_2 + \frac{n_2(n_2+1)}{2} - r_2$$

$$z = \frac{u - (n_1 + n_2 + 1)}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

- a) Explain the meaning of $n_1, n_2, r_1, r_2, u_1, z_1$ (8 marks)
- b) Given two samples
 Sample 1: 43, 31, 50, 53, 66, 68.
 Sample 2: 6, 10, 13, 14, 29, 42, 50.
 Compute:
 - i. U_1 (4 marks)
 - ii. U_2 (4 marks)
 - iii. Z (4 marks)