CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF SCIENCE IN NURSING

NURS 393: BIOSTATISTICS

STREAMS: BSC (NURS) Y3S2   **TIME: 2 HOURS**

DAY/DATE: MONDAY 02/12/2019   **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:
- **Answer all questions in section I and TWO questions in section II**
- **Use of calculators and statistical tables is allowed**
- **Do not write anything on the question paper**

SECTION I: COMPULSORY (30 MARKS) – ANSWER ALL QUESTIONS

QUESTION ONE

Explain the following terms as used in experimental design:

(a)   Replication   [2 marks]

(b)   Randomization   [2 marks]

(c)   Treatment   [2 marks]

(d)   Factor   [2 marks]

(e)   Control   [2 marks]

QUESTION TWO

Outline the stages in sampling process   [3 marks]

QUESTION THREE

An Epidemiologist determine the frequency of cancer among members of 600 families of size five. If the probability of cancer is 0.12 and this is a random event, predict the   number of families,

(a)   With exactly one case of cancer   [3 marks]

(b)   With one or more cases of cancer   [3 marks]

QUESTION FOUR

The population of patients is divided into three strata such that $N_1 = 2650$, $N_2 = 24800$ and
       $N_3 = 2360$. Show how a sample size of $n = 384$ should be allocated to the three strata if proportionate sampling is adopted.   [3 marks]

QUESTION FIVE

(a)   In an outbreak of tuberculosis among prison inmates in Kamiti maximum prison in 2012, 28 of 157 inmates residing on the East wing of the dormitory developed tuberculosis, compared with 4 of 137 inmates residing on the West wing.
       Calculate the risk ratio.   [4 marks]

(b)   Using the following data, calculate the vaccine effectiveness from the varicella [4 marks]

	Varicella	Non-case
Vaccinated	18	134
Unvaccinated	3	4

SECTION II (40 MARKS) – ANSWER TWO QUESTIONS

QUESTION SIX (20 MARKS)

(a)   An experiment was carried out to determine the weight of new born babies in a certain hospital. A sample of 50 new born babies was selected and the sample mean weight was obtained as 3500 grams. The population variance is known to be 225 grams. Construct a 95% confidence interval for the population mean.   [4 marks]

(b)   Using the following data set, calculate the mean, mode, median, standard deviation, coefficient of variation and Pearson measure of skewness of successive sale of medication by a given firm.   [16 marks]

Number of sales	0-5	6-11	12-17	18-23	24-29	30-35
Number of salesmen	2	18	38	56	44	28

QUESTON SEVEN (20 MARKS)

(a)   The following data set show the rating of two health care services (HCS) on a scale of 1-9 by 9 patients

Patients	1	2	3	4	5	6	7	8	9
HCS 1	4	8	5	2	6	5	4	5	7
HCS 2	6	4	2	6	9	3	7	8	5

Using an appropriate test, determine if the HCS have equal rating. Take .

[8 marks]

(b)   Using the following data, fit a regression model and obtain a correlation coefficient

[12 marks]

x	1	2	3	4	5	6	7
y	9	16	19	27	38	43	58

QUESTION EIGHT (20 MARKS)

Four doctors each test five treatments for a certain disease and observe the number of days each patient takes to recover. The results (recovery time in days) are given below:

Treatment/doctor	Doctor 1	Doctor 2	Doctor 3	Doctor 4
Treatment 1	10	11	9	8
Treatment 2	14	15	12	13
Treatment 3	23	24	20	17
Treatment 4	18	17	16	17
Treatment 5	20	21	19	20

Perform analysis of variance and test if the treatments are significantly different at 5% significance level.

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