JARAMOGI OGIGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES
MPH EXAMINATION

(KISII LEARNING CENTER)

END SEMESTER EXAMINATION
HMP 5114: BIOSTATISTICS

August 2013

TIME ALLOWED: 2 hours 30 minutes.

Note: Answer question one and any other three questions

QUESTION 1 (COMPULSORY)

a) Name three examples of categorical variables (**3 Mark**)

b) Differentiate between nominal and ordinal variables giving two (2) examples in each case **(4 Marks)**

c) Distinguish between:

    i.   Pie chart and histogram **(2 Marks)**

    ii.   mode and median **(2 Marks)**

    iii.   Student t-test and analysis of variance **(2 Marks)**

    iv.   Qualitative and quantitative variables **(2 Marks)**

QUESTION 2

a) List three (3) examples of measures of variation (**3 Marks**)

b) Define confidence interval (**2 Marks**)

c) The following are weights of students in kilograms:

65	72	66	69	72	67	68	73
66	64	74	67	65	69	63	70
67	74	60	70	67	71	70	68
74	67	69	64	70	67	72	69
63	69	67	70	67	66	70	71
75	71	64	67	76	71	77	73
69	75	71	75	64	62	67	66

| 66 | 70 | 73 | 71 | 67 | 69 | 71 | 68 |

i.   Construct a frequency distribution table (**5 Marks**)
ii. Calculate:
     (a)   The arithmetic mean. (**1 Mark**)
     (b)   The standard deviation. (**4 Marks**)

QUESTION 3

a. State two (2) main approaches of classifying variables (**2 Marks**)

b. Briefly outline types of errors in decision making (**6 Marks**)

c. Ten measurements of a certain blood component are made by two instruments on 10 samples and the following results are obtained

Sample No.	1	2	3	4	5	6	7	8	9	10
I^{st} instrument:	10	9	10	11	8	9	7	8	9	9
2nd instrument:	10	11	9	10	9	11	12	8	10	10

i.   Test the difference in the two measurements (**7 Marks**)

QUESTION 4

a. List three (3) examples of non-parametric test (**3 Marks**)
b. If the probability of a male birth in a community is 0.52. Find the probability that in a family of three:

   i.   All children will be male (**2 Marks**)

   ii. Two of the children will be male (**2 Marks**)

   iii. Atleast one child will be male (**2 Marks**)

   iv. No child will be male (**2 Marks**)

c. Distinguish between:
   i.   Binomial probability distribution and the Poisson probability distribution (**2 Marks**)
   ii. Value and variable (**2 Marks**)

QUESTION 5

a. Define standard error (**2 Marks**)

b. A chromatographic method is employed in order to determine the percentage impurity contained in dye used in foodstuffs. The error variance of an estimate is known to be 0.8. Three independent determinations give an average of 4.2%.

i.   Calculate the standard error (**3 Marks**)

ii.   Calculate a 95% confidence interval for the true percentage impurity assuming that each estimate is normally distributed (**5 Marks**)

iii.   Comment on the confidence interval obtained above (**2 Marks**)

c. State three (3) assumption of normal distribution (**3 Marks**)

QUESTION 6

a. List three (3) discrete probability distributions (**3 Marks**)

b. An experiment was carried out to compare the effects of 3 different food regimes on lipo- protein levels (mg/dl) in human infants. If 10 newborn infants were each allocated to the 3 different groups: Human milk (HM) nucleotide supplemented milk formula (NSMF) and milk formula (MF). If the data were as follows:

Infant No:	1	2	3	4	5	6	7	8	9	10
HM:	56	63	45	41	71	60	78	50	68	62
NSMF:	71	57	64	44	73	50	79	67	84	61
MF :	40	48	60	38	28	44	66	22	45	54

i. State the null hypothesis (**2 Marks**)

ii. Construct analysis of variance table (**8 Marks**)

iii. Given that the F-distribution table, the tabulated value at 5% at (2, 27) degrees of freedom is 3.34. Is there significant effect of level of smoking on the heart rate (**2 Marks**)