JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCHENCES

UNIVERSITY EXAMINATION FOR THE DEGREE IN BACHELOR OF
PUBLIC HEALTH & COMMUNITY HEALTH
3st YEAR 2nd   SEMESTER 2016/2017

TOWN CAMPUS

COURSE CODE: SBI 3326

COURSE TITLE: BIOSTATISTICS 1

EXAM VENUE: STREAM   xxxx

DATE: xxxxx   **EXAM SESSION: 2HRS**

TIME: TWO HOURS

Instructions:

1. **Answer all questions in section A and any other 2 questions in Section B.**

2. **Candidates are advised not to write on the question paper**

3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A   Answer all questions in this section (30 marks)

1. If possible, determine whether the following is a probability distribution: A police department reports that the probabilities that 0, 1, 2, 3, and 4 car thefts will be reported in a given day are 0.202, 0.323, 0.258, 0.138, and 0.055, respectively. **(1 Mark)**

2. Determine whether the given procedure results in a binomial distribution. If not, state the reason why. Choosing 5 people (without replacement) from a group of 62 people, of which 15 are women, keeping track of the number of men chosen. **(2 Marks)**

    a. Procedure results in a binomial distribution.
    b. Not binomial: there are too many trials.
    c. Not binomial: the trials are not independent.
    d. Not binomial: there are more than two outcomes for each trial.

3. What is measured by each of the following?
    a. Variance   **(1Mark)**
    b. Standard deviation   **(1Mark)**
4. Differentiate between a **variable** and **value**   **(1Mark)**

5. We have seen that outliers can produce problematic results. Rank the following measures in order or "least affected by outliers" to "most affected by outliers

        i. mean, median, range **(1Mark)**
    b. According to the empirical rule, approximately what percentage of normally distributed data lies within one standard deviation of the mean? **(1Mark)**

6. A study was done to compare the lung capacity of coal miners to the lung capacity of farm workers. The researcher studied 200 workers of each type. Other factors that might affect lung capacity are smoking habits and exercise habits. The smoking habits of the two worker types are similar, but the coal miners generally exercise less than the farm workers (**4 Mark**)

    i. Identify the outcome variable of interest?
    ii. Is the outcome variable quantitative or qualitative?
    iii. What is the implied population?
    iv. What are the explanatory variables in this case?

7. Categorize these measures according to the following level of measurements:
   Nominal, ordinal, interval, or ratio (3 Mark)

        i. Fear of crime
        ii. Time of first class
        iii. Major field of study
        iv. Course evaluation scale: poor, acceptable, good

    v.   Score on last exam (based on 100 possible points)
   vi.   Age of student

8. Which of the following statement(s) are false about binomial distribution? **(2 Marks)**
    i.   There can be more than two outcomes
   ii.   There are fixed number of trials
  iii.   Each trial has an equal probability of a success occuring

9. Distinguish between the following

    i.   **Bar** graph and **histogram** (**1 Mark**)
   ii.   **Descriptive statistics and inferential statistics** (**1Mark**)
  iii.   **Kurtosis** and **Skewness** (**1Mark)**
  iv.   **Variance** and **Standard deviation** (**1 Marks)**
    v.   **Range** and **Mode** (**1Mark)**

10. Define biostatistics and name four areas where Biostatistics has been applied (**3Marks**)
11. Statistics is useless, since you can design an experiment to statistically prove anything you want to prove **(1Mk)**
   a.   True
   b.   False
12. The age (in years) of 10 randomly selected public health students in Bondo University in 2013 were as follows: 20, 21, 19, 60, 24, 23 22, 25, 22, 26.
    i.   Name three main ways of presenting such data (**2 Marks**)
   ii.   Assume you want to summarize this data, which measure of location will you report? (**1 Marks**)
  iii.   Give the main reason for your answer in ii above (**1 Marks**)

SECTION B Answer any two Questions (40 Marks)

Answer any TWO Questions

Q1.

The blood glucose level, in milligrams per deciliter, for a sample of 60 patients seen by a physician at KNH is shown below.

55	115	118	114	59	109
63	97	90	59	105	81
84	81	82	61	103	77
82	76	68	86	97	80
77	85	69	62	101	83
58	83	101	86	84	78
59	92	88	97	87	92
70	86	72	84	82	84
101	80	93	56	65	91
75	78	100	74	74	90

   i. Construct a frequency distribution for the data set (**12Marks**)

Group	Mid point (X_i)	(f)	cf	fX_i	$\bar{x}$	$X_i - \bar{x}$	$(X - \bar{x})^2$	$f*(X_i - \bar{x})^2$

ii.   Determine the correct width of the class interval **(2Marks)**

iii. Calculate mean, median, mode and standard deviation **(6Marks)**

<u>Q2.</u>

a) Briefly explain when or how to decide which measure of central tendency to (**mean** or **median**) to use? **(2 Marks)**

b) Briefly explain what is meant by right skewed and sketch? **(2 Mark**)

c) The degree of peakedness is called? (**1 Mark**)

d) In a study, 42% of adults questioned reported that their health was excellent. A researcher wishes to study the health of people living close to a nuclear power plant. Among 14 adults randomly selected from this area, only 3 reported that their health was excellent. Find the probability that when 14 adults are randomly selected, 2 or fewer are in excellent health. **(5Mks)**

e) The following data indicates the waiting time in minutes among a sample of 20 patients attending Tabaka mission hospital

9, 2, 5, 4, 12, 7, 8, 11, 9, 3, 7, 6, 12, 5, 4, 10, 9, 6, 9, 5

     i. Calculate the arithmetic mean   (**2 Marks**)

    ii. And calculate variance and standard deviation (**8 Marks**)

NB: Show your work clearly

Q3

a) State (**4**) properties of a normal curve (**2 Marks**)

b) **Sketch** and **explain** the following curves

    a. Normal curve   (**2 Marks**)
    b. Positively skewed curve (**2 Marks**)
    c. Negatively skewed curve (**2 Marks**)
    d. Bimodal curve (**2 Marks**)

c) List (4) ways of assessing skewness or normality assumption (**4 Marks**)

d) Describe (2) main approaches in classifying variables giving two examples in each case (**4Marks**)

e) Name two methods of transformation non-normal data to normal? (**2 Marks**)

Q4

a) Define the term probability and name three approaches in defining probability (**4Marks**)

b) Define the following terms frequently used when calculating probability
    i. Experiment (**1Marks**)
    ii. Trial (**1Marks**)
    iii. Outcome (**1Marks**)
    iv. Sample space (**1Marks**)
    v. Equally likely (**1Marks**)
    vi. Mutually exclusive (**1Marks**)

c) Distinguish between discrete and continuous probability distribution giving one example in each case (**1.5Marks**)

d) Differentiate between simple and compound events in probability (**1.5Marks**)

e) Hospital records show that of patients admitted suffering from Ebola, 80% die of it. What is the probability that of 6 randomly selected patient:-

    i. Only two of them will recover (**2Marks**)
    ii. None will recover (**2Marks**)
    iii. At least one will recover (**3Marks**)