



## **MASENO UNIVERSITY**

### **UNIVERSITY EXAMINATIONS 2013/2014**

**SECOND YEAR THIRD SEMESTER EXAMINATIONS FOR THE  
DEGREE OF BACHELOR OF MEDICINE AND BACHELOR OF  
SURGERY WITH INFORMATION TECHNOLOGY**

**(MAIN CAMPUS)**

### **MCH 200: BIOSTATISTICS**

*Date: 20<sup>th</sup> November, 2013*

*Time: 9.00 – 12noon*

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#### **INSTRUCTION:**

- This paper consists of three sections, I, II and III.
- Answer ALL questions in each section.
- Read each question carefully before answering.

**ANSWER ALL THE QUESTIONS**

**SECTION I: MULTIPLE CHOICE QUESTIONS (10MARKS)**

**INSTRUCTION: THE FOLLOWING QUESTIONS HAVE ONE (1) CORRECT ANSWER ONLY**

1. Which of these is an example of a categorical variable?
  - a) Type of drink a doctor advises each patient to avoid
  - b) height, measured in inches, for each patients in the pediatric ward
  - c) Body temperature of patients experiencing fever at first visit to a clinic
  
2. Numerical and pictorial information about variables such as patient heights are called
  - a) analytical statistics
  - b) descriptive statistics
  - c) inferential statistics
  
3. The entire group patients suffering bone cancer in Kenya studied for a statistical conclusion is called the
  - a) data
  - b) population
  - c) sample
  
4. A subgroup that is representative of a population such as blood donated at a health facility is called
  - a) a category
  - b) data
  - c) a sample
  
5. In bio-statistics, statistical inference is
  - a) the process of estimates and conclusions carefully based on data from a sample
  - b) the process of estimates and conclusions carefully based on data from an entire population
  - c) pictorial displays that summarize data
  
6. Two types of statistical variables used in biomedical studies are
  - a) categorical and descriptive

- b) categorical and numerical
- c) descriptive and numerical

7. Which is best for displaying marital status of clients living with HIV at a given hospital?

- a. bar chart
- b. box and whisker plot
- c. stem and leaf plot

8. Which of the following data displaying methods is good for comparing weight and heights of client seen at a busy nutrition department?

- a. histogram
- b. pie chart
- c. scatterplot

9. Which is best for displaying the age of clients who sought medical care on a particular clinic day?

- a. bar chart
- b. pie chart
- c. stem and leaf plot

10. Which plot does not display all of the values of the data if used to display body temperature of clients seeking malaria treatment?

- a. box and whisker plot
- b. dot plot
- c. stem and leaf plot

**SECTION II: TRUE/FALSE (8MARKS)**

**INSTRUCTION: THIS SECTION HAS EIGHT (8) TRUE / FALSE RESPONSE QUESTIONS. ANSWER ALL THE QUESTIONS**

No	Statement or Question	Option
11	If A is a healthy patient while B is patient who is not healthy a) Then A and B are mutually exclusive event and are also independent	T F
	b) If A and B are mutually exclusive event then A and B are such that $Prob(A \cup B) = 0$	T F
12	A doctor conducted a random sample of size 30 from all clients seen in the last 1 year to determine mean age. Different samples of the same size from the same population have an equal probability of being selected	T F
13	The mean weight of clients is sensitive to extreme weight values	T F
14	$Q_2 - Q_1 < Q_3 - Q_2$ if positive skewed and $Q_2 - Q_1 > Q_3 - Q_2$ if negatively skewed	T F
15	In a binomial experiment (such as modeling number of patients who suffer malaria from a sample of size n given known malaria prevalence rate) have all the fixed n trials being independent	T F
16	The number of medical staffs in a medical clinic with four medical desks can be modeled using a binomial distribution	T F
17	Number of clients who are HIV positive or number of deaths occurring in a given week for known death rates can both be modeled using a discrete probability distribution	T F

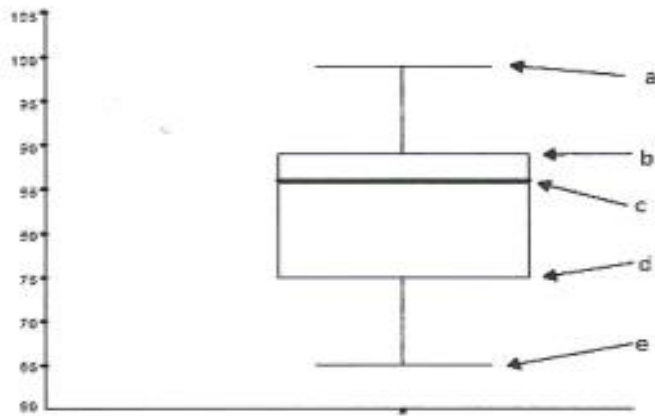
**SECTION III: SHORT ANSWER QUESTIONS (22MARKS)**

**INSTRUCTION: THIS SECTION HAS FOUR (4) QUESTIONS. ANSWER ALL THE QUESTIONS**

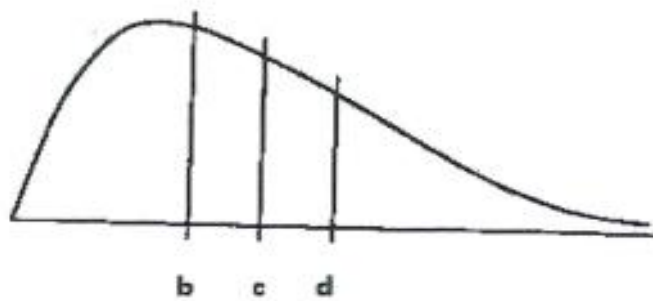
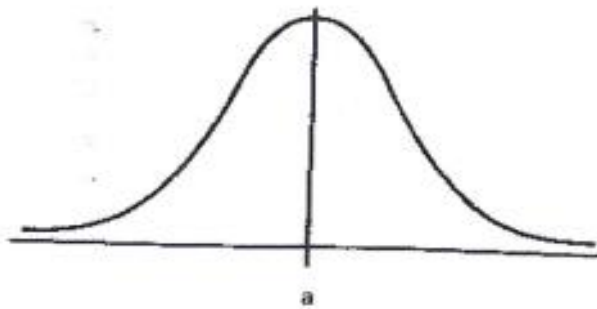
1. Explain briefly why

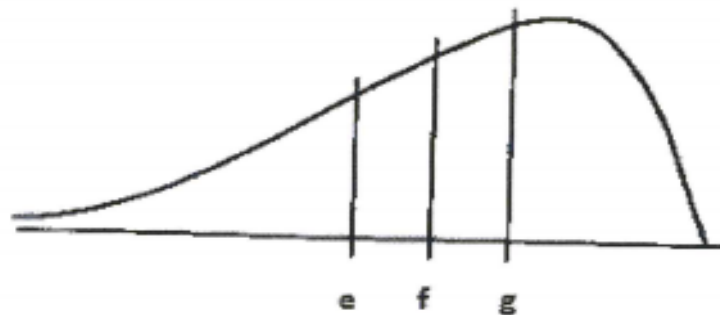
- Number of injections administered by a doctor per week is a quantitative and discrete variate (2mks)
- Height in centimetres is quantitative continuous variate (2mks)
- Type of drugs sold in a pharmacy is a qualitative variate (2mks)

2. Identify the parts of the box plot below: (5Mks)



3. Correctly label the measure of central tendency in the following distributions (6mks)





4. Given the grouped data class "5-9" determine

- Lower and upper class boundaries (1mks)
- Class mid-point (1mks)
- Class width (1mks)

**SECTION IV: LONG ANSWER QUESTIONS (60MARKS)**

**INSTRUCTION: THIS SECTION HAS THREE (3) QUESTIONS. ANSWER ALL THE QUESTIONS**

1. A total of 24 high blood patients were seen at hospital A. each of them was give the same medication and the hours to patient stability drop recorded to the nearest tenth of a minute.

7.4	8.2	6.1	9.3	7.4	8.5	7.2	6.8
6.4	7.7	9.6	8.8	8.9	7.2	7.3	7.0
5.9	8.9	7.6	9.3	7.4	7.9	9.1	5.7

- Clearly display a simple ordered stem and leave diagram for the time to stability. (6mks)
- Display a double stem and leave for the above data (4mks)
- Determine the mean for the data (3mks)
- Determine the mode (1mks)
- Determine the range (1mks)
- Determine the variance for time to stability(5mks)

2. A total of 50 medical students were sent to a community to assess the community health care system. Upon return to the class after their independent assessment they were asked to confidentially rate the health care system on a five point scale; A, B, C, D, & E where A represent excellent health care system while E the very poor health care system. The student's ratings were as follows:

A	C	E	C	C	E	A	C	B	C
E	C	B	B	A	B	C	B	D	D
D	B	D	B	B	B	C	B	C	C
E	B	B	B	D	A	B	A	B	B
C	D	C	E	B	D	C	C	D	D

- Construct a frequency distribution for the frequency distribution for these ratings. (8mks)
- What is the probability that a students in this class will rate the health care system as excellent (4mks)
- What is the probability that a students in this class will rate the health care system as less than excellent (2mks)
- What is the probability that a students in this class will rate the health care system as very poor(4mks)
- What is the probability that a students in this class will rate the health care system as better than very poor(2mks)

3. I) Classify the following sampling methods into probability and non-probability sampling techniques (8mks).

Sampling Method	Probability	Non Probability
a) Simple Random sampling		
b) Convenience Sampling		
c) Quota Sampling		
d) Stratified Sampling		
e) Systematic Sampling		
f) Cluster Sampling		
g) Judgmental sampling		
h) Purposive sampling		

II) Briefly explain the difference between stratified sampling and cluster sampling (6mks)

III) What is a sampling frame? (2mks)

IV) List the four characteristics of a binomial distribution (4mks)