



**MASENO UNIVERSITY
SCHOOL OF MEDICINE
MBCbB PROGRAM
2012/2013 ACADEMIC YEAR**

**MEDICAL BIOSTATISTICS (MCH 200)
END OF SECOND YEAR SUPPLEMENTARY EXAMINATION
FOR THE DEGREE OF
BACHELOR OF MEDICINE AND BACHELOR OF SURGERY
(MBCbB) DEGREE WITH INFORMATION TECHNOLOGY (IT)**

DATE: 8TH JANUARY, 2014

TIME: 2.00 PM - 5.00 PM



READ THE INSTRUCTIONS CAREFULLY

1. The examination paper consists of **FOUR (4)** sections. [Total 100 Marks].
2. **Answer ALL questions in sections A, B and any TWO questions from section C.**
3. **Answer questions in the ANSWER SHEET and BOOKLET provided.**
4. **SECTION A** has ten (10) Multiple Choice Questions. [10 Marks].
5. **SECTION B** has seven (7) True/False Questions. [8 Marks].
6. **SECTION C** has four (4) Short Answer Questions (SAQs). [20 Marks].
7. **SECTION D** has three (3) Long Essay Questions (LEQs). [62 Marks].
8. **Begin every answer on a new page of the ANSWER BOOKLET.**



SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ)

Answer **ALL** questions (10 MARKS)

1. The measure of location which is the most likely to be influenced by extreme values in the data set is the
 - A. Mean
 - B. Median
 - C. Mode
 - D. Range
2. Which of the following is not a property of a binomial experiment?
 - A. The experiment consists of a sequence of n identical trials
 - B. The probabilities of the two outcomes can change from one trial to the next
 - C. Each outcome can be referred to as a success or failure
 - D. The trials are independent
3. The entire group patients suffering bone cancer in Kenya studied for a statistical conclusion is called the
 - A. Data
 - B. Population
 - C. Sample
 - D. All of the above
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
 - D. A group
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 based on data from an entire population
 - C. Pictorial displays that summarizes data
 - D. None of the above
6. Two types of statistical variables used in biomedical studies are
 - A. Categorical and descriptive
 - B. Categorical and numerical
 - C. Descriptive and numerical
 - D. Descriptive and analytical



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
 - D. Line graph
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. Scatter plot
 - D. None of the above
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
 - D. Line graph
10. Convenience sampling is an example of
 - A. Non-probabilistic sampling
 - B. Stratified sampling
 - C. Probabilistic sample
 - D. Cluster sample



SECTION B: TRUE/FALSE QUESTIONS**(Answer ALL questions) (8 MARKS)**

No.	Statement or Question	Option
11	If A is a healthy patient while B is patients 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 $\text{Prob}(A \cup B) = 0$	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	The level of significance is the maximum allowable probability of Type I error	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	In measuring the centre of the data from a skewed distribution, the median would be preferred over the mean for most purposes because the mean may be too heavily influenced by the larger observations and this gives too high an indication of the centre	T F



SECTION C: SHORT ANSWER QUESTIONS (SAQs)

(Answer ALL questions) (20 MARKS)

18. Answer by statements of TRUE/FALSE? (10 Marks)

- (a) The sample mean is more sensitive to extreme values than the median.
- (b) The sample range is more sensitive to extreme values than the standard deviation.
- (c) The sample standard deviation is a measure of spread around the sample mean.
- (d) The sample standard deviation is a measure of central tendency around the median.
- (e) If a distribution is symmetric, then the mean will be equal to the median.

19. How do descriptive statistics differ from inferential statistics (3 Marks)?

20. A sample of 99 distances has a mean of 24 Km and a median of 24.5 Km. But unfortunately, it has just been discovered that an observation which was erroneously recorded as "30" actually had a value of "35". If we make this correction to the data, then: (4 Marks).

- (a) The mean remains the same, but the median is increased
- (b) The mean and median remain the same
- (c) The median remains the same, but the mean is increased
- (d) The mean and median are both increased

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

- a) Lower and upper class boundaries (1 Mark).
- b) Class mid-point (1Mark).
- c) Class width (1Mark).



SECTION D: LONG ANSWER QUESTIONS (LEQs)

(Answer ALL questions) (62 Marks)

22. 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 (6 Marks).
- Display a double stem and leave for the above data (5 Marks).
- Determine the mean for the data (3 Marks)
- Determine the mode (1 Mark).
- Determine the range (1 Marks).
- Determine the variance for time to stability (6 Marks).

23. 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



- (a) Construct a frequency distribution for the frequency distribution for these ratings. (8 Marks).
- (b) What is the probability that a student in this class will rate the health care system as excellent (4 Marks)?
- (c) What is the probability that a student in this class will rate the health care system as less than excellent (2 Marks)?
- (d) What is the probability that a student in this class will rate the health care system as very poor (4 Marks)?
- (e) What is the probability that a student in this class will rate the health care system as better than very poor (2 Marks)?

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

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 (6 Marks).

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

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

