



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

TRIMESTER EXAMINATION

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(NURSING)

HNS 313: BIOSTATISTICS

DATE: JULY 31, 2018

TIME: 11:00AM-2:00PM

INSTRUCTIONS:

Answer:

All MCQs in Section A;

All Short-answer Questions in Section B

All Long-answer Questions in Section C

Cancelled work should be done neatly by crossing with a single line in the essay and by use of X in the MCQs

SECTION A: MULTIPLE CHOICE QUESTIONS (TOTAL: 20 MARKS)

1. Gender, age-class, religion, type of disease, and blood group are measured on:
 - a) Nominal scale of measurement
 - b) Ordinal scale of measurement
 - c) Interval scale of measurement
 - d) Ratio scale of measurement
2. Frequency distribution is characterized by:
 - a) The measure of quartile range
 - b) The measure of central tendency
 - c) The determination of extreme values in a data set
 - d) The estimation of percentile

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3. The median possesses certain properties, they include the following except
 - a) Uniqueness
 - b) Simplicity
 - c) It is affected by each value
 - d) Extreme values have no influence
4. Geometric mean is:
 - a) The n observations, then it is the n th root of the product of the n observation
 - b) More suitable for values changing literally
 - c) Can be used where reciprocal of actual values seem more useful
 - d) Much statistical inference is based on this distribution
5. Suppose that the probability of event A is the same regardless of whether or not B occurs, we say that events are
 - a) Dependent
 - b) Independent
 - c) Conditional
 - d) Joint
6. Large standard deviations suggest that:
 - a) Scores are probably widely scattered.
 - b) There is very little difference among scores.
 - c) Mean, median and mode are the same
 - d) The scores not normally distributed.
7. Type 1 error is:
 - a) Accepting null hypothesis while alternative hypothesis is true
 - b) Accepting null hypothesis while alternative hypothesis is false
 - c) Rejecting null hypothesis while alternative hypothesis is true
 - d) Rejecting null hypothesis while alternative hypothesis is false

8. The statistical approach which helps the investigator to decide whether the outcome of the study is a result of factors planned within design of the study or determined by chance is called:
- a) Descriptive statistics
 - b) Inferential statistics
 - c) Normal distribution
 - d) Standard deviation
9. One sample t test is used to determine:
- a) Whether the mean of a sample is different from the expected value
 - b) Whether the mean of two independent sets of measurement are different
 - c) Whether there are difference between two sets of paired observations
 - d) Whether the mean of the sample is similar to the mean of the population
10. Variables whose values can be expressed numerically are called
- a) Quantitative variable
 - b) Qualitative variables
 - c) Absolute variables
 - d) Continuous variables
11. The mean of a sample is
- a) always equal to the mean of the population
 - b) always smaller than the mean of the population
 - c) computed by summing the data values and dividing the sum by $(n - 1)$
 - d) computed by summing all the data values and dividing the sum by the number of items
12. If a data set has an even number of observations, the median
- a) cannot be determined
 - b) is the average value of the two middle items
 - c) must be equal to the mean
 - d) is the average value of the two middle items when all items are arranged in ascending order

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13. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
- a) frequency distribution
 - b) relative frequency distribution
 - c) frequency
 - d) cumulative frequency distribution
14. The standard deviation of a sample of 100 observations equals 64. The variance of the sample equals
- a) 8
 - b) 10
 - c) 6,400
 - d) 4,096
15. A type of graph which displays the median value by a horizontal bar surrounded by 50% of scores shown within a box:
- a) Histogram
 - b) Box plots
 - c) Frequency polygon
 - d) Normal distribution
16. Non parametric test include
- a) Regression
 - b) Correlation
 - c) Friedman test
 - d) Analysis of variance
17. The table below shows decision made based on hypothesis test, match letters with errors that may occur due to decision made based on the hypothesis.

Truth	Decision	
	True	False
True	W	X
False	Y	Z

- a) X – Type II error, Y – Type I error
- b) X – Type I error, Y – Type II error
- c) W – Type II error, Z – Type I error
- d) W – Type I error, Z – Type II error

18. One-sample sign test is appropriate for testing whether:

- a) Sample median of one measurement taken on a single population is different from the expected value
- b) Sample mean of one measurement taken on a single population is different from the expected value
- c) Sample mode of one measurement taken on a single population is different from the expected value
- d) Median of two sample measurements made on identified population are different from each other

19. The relationship between sample size and mean is best described by:

- a) The smaller the population size, the smaller the relationship will be between sample mean and population mean
- b) The larger the sample size, the closer the sample mean will be to population mean
- c) The smaller the sample size, the closer the sample mean will be the population mean
- d) The larger the population size, the closer the population mean will be to the sample mean.

20. Under what circumstances should we be cautious about using the mean as a measure of central tendency

- a) When data is negatively skewed
- b) When data is skewed
- c) When data is positively skewed
- d) All of the above

SECTION B: SHORT ANSWER QUESTIONS (TOTAL: 20 MARKS)

1. Define the following terms

- a) Platykurtic. (1 mark)
- b) Leptokurtic. (1 mark)
- c) Interquartile range (1 mark)

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- d) Coefficient variation (1 mark)
- e) Percentile (1 mark)
2. State the properties of mean (4 marks)
3. State requirements a table used in frequency distribution must satisfy (4 marks)
4. What are the characteristics of a frequency distribution? (4 marks)
5. Explain two types of research procedures with reference to hypothesis testing are (4 marks)
6. There are various types of problems for which the tests of significance are used for drawing conclusion. The common type of problems are: (4 marks)
7. In health survey of schoolchildren it is found that the mean Hb level of 55 boys is 10.2 per 100 ml with a standard deviation of 2.1. We can consider this group as taken from a population with a mean 11.0 g/100 ml?
- a) State null hypothesis (1 mark)
- b) Calculate Standard error of mean (3 marks)
- c) Critical ratio (3 marks)
8. Explain laws of probability for independent events (8 marks)

SECTION C: LONG ANSWER QUESTIONS (TOTAL: 20 MARKS)

- 1.
- a) Define the following terms
- i) Critical ratio (1 mark)
- ii) Standard error (1 mark)
- iii) Null hypothesis (1 mark)
- iv) Inference (1 mark)
- b) In an otological examination of school children, out of 146 children examined, 21 were found to have some type of otological abnormalities. Given that the prevalence of otological abnormalities in schoolchildren was previously estimated at 20%:
- i) Formulate null hypothesis (2 marks)
- ii) Calculate standard error of proportion (4 marks)
- iii) Calculate critical ration (5 marks)

- iv) Compare with the theoretical value of 95% Confidence interval which is 1.96 at 5% level (2 marks)
- v) Interpret the results (3 marks)

2. The body weight was taken from 80 randomly selected insulin-dependent diabetics individuals. The outcomes are as follows:

107	119	114	120	104	124	88	114	101	121
95	117	107	129	199	134	164	188	144	131
165	100	114	95	127	127	119	199	114	124
88	124	121	121	156	125	100	104	195	107
134	130	104	124	104	114	106	125	152	125
95	137	107	129	199	114	120	104	124	188
121	152	125	100	154	95	127	114	123	124
114	162	100	166	104	139	110	114	99	123

- a)
 - i) Calculate the mean \bar{x} (3 marks)
 - ii) variance s^2 (3 marks)
 - iii) Standard deviations (3 marks)
- b) Plot the histogram, frequency polygon, and cumulative frequency graph (8 marks)
- c) Comment on the shape of frequency polygon (2 marks)
- d) Find the median using your cumulative frequency graph (1 mark)

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