UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY, 2019

COURSE NO: GL 122
COURSE NAME: PROBABILITY AND STATISTICS
CLASS: GD I **TIME:** 3 HOURS

Name**:** _____Index Number: _____

*Attempt **all** questions in Section A and **all** questions in Section B. Each question in Section A attracts 1 mark and each question in Section B attracts 30 marks. Answer Section A on the question paper and Section B in the Answer Booklet*

SECTION A

1. A numerical value used as a summary measure for a sample such as sample mean is known as a …….
   a. Sample Parameter
   b. Population Parameter
   c. Sample Statistic
   d. Population Mean
2. A researcher is curious about the ages of the student of UMaT. The entire group of students is an example of a ……
   a. Parameter
   b. Statistic
   c. Population
   d. Sample
3. What is the mean of the following scores $2, 5, 4, 1, 10$.
   a. 3
   b. 5
   c. 7
   d. 11
4. The median is always
   a. The most frequently occurring score in the data set
   b. The middle score when results are ranked in order of magnitude
   c. The same as the mean
   d. The difference between the maximum and the minimum scores
5. What is the variance for the following set of scores: $2, 2, 2, 2$
   a. 0
   b. 2
   c. 4
   d. 25
6. The set of all the possible outcome of an experiment is referred to as ……..
   a. Trail
   b. Event
   c. Sample Space
   d. Outlier

Consider the ages of the pensioners in two regions in Ghana.

Western Region	65	85	90	61	60	72
Central Region	85	71	65	69	70	80

7. The mean age of the Central Region is …….
   a. 72.53
   b. 75.33
   c. 73.33
   d. 72.35

8. The mean deviation of the Western Region …….
   a. 11.31
   b. 10.78
   c. 11.45
   d. 10.22
9. A population is composed of 60% men and 40% women. It is known that 70% of the men and 45% women smoke cigarette. What is the probability that a person in the population observed is a man?
   a. 0.63
   b. 0.71
   c. 0.81
   d. 0.36
10. The sample variance is denoted by
   a. σ^2
   b. S^2
   c. $\bar{x}$
   d. R^2
11. Interquartile range is defined as the difference between
   a. Second Quartile and First quartile
   b. Fourth Quartile and Second quartile
   c. Third Quartile and First quartile
   d. Second Quartile and Third Quartile
12. Repetition of an experiment is called
   a. Outcome
   b. Trial
   c. Sample Space
   d. Quartile
13. A line graph which is constructed by plotting frequencies against corresponding class marks is referred to as
   a. Pie Chart
   b. Histogram
   c. Cumulative Curve
   d. Frequency Polygon
14. The following are all measure of central tendency except
   a. Arithmetic mean
   b. Trimmed mean
   c. Geometric mean
   d. Mean deviation
15. The following data give speed (in mile per hour) of 10 cars that were stopped at the Accra Highway for over speeding 89, 78, 67, 100, 99, 80, 200, 69, 140, 87. Find the mean speed.
   a. 110.2
   b. 100.11
   c. 100.9
   d. 90.8
16. When locating the median value for raw data consisting of n observations. The first step is to,
   a. Take the observation that is at the $\left(\frac{n+1}{2}\right)^{th}$ position
   b. Take the mean of the value $\left(n/2\right)^{th}$ and $\left(n/2+1\right)^{th}$ position
   c. Calculate the mean deviation
   d. Arrange the data in ascending or descending order
17. Calculate the mean of the data in the table below

Exam score	20-25	25-30	30-35	35-40
Frequency	2	10	5	1

   a. 130
   b. 280
   c. 135
   d. 281
18. The most frequent observed value of a given data set of observation is referred to as…….
   a. Median
   b. Range
   c. Mode
   d. Standard Deviation

19. The degree with which numerical data tend to spread about an average value is referred to as a/an
    a. Outlier
    b. Dispersion
    c. Location
    d. Percentile
20. Consider the marks scored by students in a Quiz. As follows 75, 77, 70, 69, 70, 69, 75, 78, 70, 71. The range of the data is
    a. 45
    b. 9
    c. 70
    d. 75
21. Find the variance of the data below; 6, 7, 4, 2, 3, 1, 5
    a. 7.46
    b. 6.74
    c. 4.67
    d. 7.64
22. Find the standard deviation of 6, 7, 4, 2, 3, 15
    a. 22.17
    b. 22.56
    c. 14.25
    d. 11.35
23. All the following are measure of position except
    a. Quartile
    b. Range
    c. Decile
    d. Percentile
24. If x is normally distributed with a mean 6 and a variance 25, find $P < 6 \leq x \leq 12$
    a. 0.01
    b. 0.38
    c. 1
    d. 0.50
25. The mean for a binomial distribution is given by
    a. $\sqrt{\rho q}$
    b. $n\rho q$
    c. npq
    d. $\rho^2 q^2$
26. A bag contains 5 red and 15 green balls. One ball was drawn at random from the bag. Let $x = 1$ if the ball drawn is red on $x = 0$. If a green ball is drawn. Determine the mean of x
    a. $\frac{20}{5}$
    b. $\frac{7}{20}$
    c. $\frac{5}{20}$
    d. $\frac{15}{20}$
27. All the following are properties of the normal distribution curve except
    a. The graph of a normal curve is symmetric about the horizontal axis through the mean
    b. The total area under the curve is above the horizontal axis is equal to
    c. The normal curve approaches the horizontal axis asymptotically
    d. The curve has its points of inflexion at $x = m \pm \sigma$
28. Which of the following best describe the standard normal distribution of a random variable
    a. $\sigma = 1 \quad m = 0$
    b. $m = 0 \quad \sigma = 1$
    c. $m = 1 \quad \sigma = 1$
    d. $m = 0 \quad \sigma = 0$
29. Given a normal distribution $m = 50$ and $\sigma = 10$, find the probability that x assume a value before 45 and 62
    a. 1.7
    b. 1.5
    c. 1.8
    d. 1.2
30. What is the mode of the following Series 10,11,10,12,15,11,10,10,13
    a. 10
    b. 12
    c. 13
    d. 14
31. The mean and variance are equal in the case of
    a. Normal Distribution
    b. Poison Distribution
    c. Binomial Distribution
    d. Bernoulli Distribution

32. The formula for calculating the class density is

a. $\frac{\text{class width}}{\text{frequency}}$

c. $\frac{\text{frequency}}{\text{class width}}$

b. $\frac{\text{minimum observation}}{\text{maximum observation}}$

d. $\frac{\text{maximum observation}}{\text{minimum observation}}$

33. When two events cannot happen simultaneously they are called

a. Equally events

c. Mutually events

b. Complementing events

d. Discrete events

34. What is the probability of getting exactly 2 heads in 6 toss of a fair coin.

a. $3/6$

c. $15/64$

b. $2/6$

d. $5/6$

35. Method used for to compute average or central value of collected data is considered as

a. Measure of positive variation

c. Measure of the negative skew

b. Measure of central tendency

d. Measure of negative variation

36. Given the following data set. What is the value of the median [2, 43, 61, 8,9, 2, 5, 7]

a. 2

c. 4.5

b. 4.7

d. 10

37. Given the following set of data, what is range [12, 23, 34, 54, 21, 8 ,9 ,67]

a. 55

c. 8

b. 59

d. 56

38. Which of the following is used to represent known value for the population mean.

a. S

c. $\bar{x}$

b. σ^2

d. M

39. The mean temperature for the past ten days was $22^{\circ}C$ CELCIUS. If sum of the temperature for the first nine days was 200. What was the temperature on day 10?

a. 20°

c. 22°

b. 10°

d. 32°

40. Determine the mean of x with the following distribution

x	f
5	100
10	150
15	50

a. 20

c. 30

b. 6.88

d. 10

Section B

QUESTION 1

a. Define the following statistical terms
   i. Range
   ii. Mean Deviation
   iii. Outliers
   iv. Mode

b. Differentiate between the following statistical terms
   i. Parameter and Statistics
   ii. Primary Data and Secondary Data
   iii. Parameter and Statistic

c. A lecturer at UMaT conducted a statistic quiz for ten students. The marks obtained by each students are as follows
   50,55, 60,65 ,70, 80, 85, 89, 96, 98
   After the papers were given to the students, Ama who is one of the students realized a mark of 60 was recorded for her instead of 80. What will be the mean mark for the students after change have been made to Ama's mark.

QUESTION 2

a. Complete the median of the Test Scores below

Score	Frequency
16-20	2
21-25	7
26-30	14
31-35	1
36-40	8
41-45	8

b. State two properties of the median

c. Compute the variance of the test score below

x	f
10-12	5
13-15	6
16-18	7
19-21	8
22-24	4

d. Using the table below calculate the 20^{th} and 70^{th} percentile

Marks(%)	10-15	16-21	22-27	28-33	34-39	40-45	46-51	52-57
frequency	5	10	7	8	16	12	2	4

e. State three properties of the arithmetic mean

QUESTION 3

Define the following statistical terms;

a. Trial
b. Outcome
c. Sample Space

d. The number of telephone calls received in an office between 8:00 am to 5:00 pm has the probability function given by

x	0	1	2	3	4	5	6
$p(x)$	0.05	0.25	0.15	0.20	0.10	0.05	0.20

i. Verify that it is a probability function
ii. Find the probability that that there will be 2 or more calls

e. The probability distribution of a discrete random is specified by the table below

x	0	1	2
$p(x)$	0.16	0.48	0.36

Determine

i. The expectation
ii. The variance
iii. The standard Deviation

f. A random variable x is normally distributed with mean $m = 5$ and $\sigma = 2$ i.e $x \in N(5, 2^2)$

Find

I. $p(4 < x < 6)$

II. $p(x > 8)$

Examiners: Ms Masha Ahoba Buah/ *Dr Mrs C. C. Nyarko*