DANIEL ADJEI 4 SCISA PRESIDENT 22”

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMA

COLLEGE OF SCIENCE

FACULTY OF BIOSCIENCES

DEPARTMENT OF BIOCHEMISTRY AND BIOTECHNOLOGY

BSC (BIOCHEMISTRY)

END OF SEMESTER EXAMINATION, 2021

THIRD YEAR

MATH 153 (STATISTICAL METHODS)

21ST APRIL , 2021 Time allowed: 2 HOURS

A DANIEL ADJEI INITIATIVE

Your index number: | | | | | | | |

Read The Instructions Carefully:

1. WRITE YOUR INDEX NUMBER CLEARLY AT THE TOP RIGHT OF THIS PAGE IN THE SPACES PROVIDED.
2. ANSWER ALL QUESTIONS BY SHADING THE CORRECT OPTION ON THE SCANNABLE SHEET AND CIRCLE YOUR ANSWERS WITH PEN IN THE QUESTION PAPER.
3. DO NOT TAKE ANY EXAMINATION MATERIALS FROM THE HALL.

All the best!

W.A. Pels

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Choose the most correct answer to the following set of questio

1. A subset of data selected from a population is called ...:
   (a) census
   (b) sample
   (c) population
   (d) parameter

2. If a die is tossed twice, what is the probability that the sum of the scores is less than 4
   (a) $\frac{1}{6}$
   (b) $\frac{1}{12}$
   (c) $\frac{2}{6}$
   (d) $\frac{2}{12}$

3. A laboratory assistant measures the weight of a sample of bread. This variable is:
   (a) nominal
   (b) ordinal
   (c) interval
   (d) ratio

4. Determine the value of k if a probability distribution has a probability mass function of
$$p(x) = \begin{cases} k(x-1), & x = 3, 4, 5 \\ 0, & otherwise \end{cases}$$
   (a) $\frac{1}{6}$
   (b) $\frac{1}{9}$
   (c) $\frac{1}{3}$
   (d) 1

5. The name given to the way statist assists us to organize, describe, summ rize, and display experimental data is
   (a) descriptive statistics
   (b) inferential statistics
   (c) decision making statistics
   (d) hypothesis statistics

6. A large retailer purchases a certain ki of product from a manufacturer. T manufacturer indicates that the def tive rate of the product is 3% in a sh ment. The inspector of the retailer ra domly picks 20 items of the produ from a shipment. What is the pro ability that there will be (3) defecti items
   (a) 6.667
   (b) 0.150
   (c) 0.030
   (d) 0.018

7. A collection or set of all objects or me surements that are of interest to the co lector is termed as ... :
   (a) census
   (b) sample
   (c) population
   (d) parameter

8. Which of the following can be terme as observations measured on a numer cal scale:
   (a) qualitative data
   (b) quantitative data
   (c) categorical data
   (d) nominal data

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9. A random variable X has the PDF $f(x)$ given by $f(x) = \begin{cases} cxe^{-x}, & x > 0 \\ 0, & x \leq 0 \end{cases}$

Determine the value of c

(a) $\frac{1}{6}$
(b) $\frac{1}{9}$
(c) $\frac{1}{3}$
(d) 1

10. Categorical data could be further classified as which of the following :

(a) ratio and interval
(b) nominal and ordinal
(c) ratio and nominal
(d) ordinal and interval

11. A fair die is tossed twice, what is the probability that each toss results in the same score?

(a) $\frac{1}{6}$
(b) $\frac{1}{12}$
(c) $\frac{2}{6}$
(d) $\frac{2}{12}$

12. Find the 10th percentile of the data

Length(mm)	Frequency	Cum. Frequency
118-126	3	3
127-135	5	8
136-144	9	17
145-153	12	29
154-162	5	34
163-171	4	38
172-180	2	40

(a) 62.8
(b) 40.0
(c) 144.5
(d) 128.3

13. If $f(x) = qx^2$ is to be the dens tion, find the value of q

(a) $\frac{1}{6}$
(b) $\frac{1}{9}$
(c) $\frac{1}{3}$
(d) 1

14. The sample mean or empirical defined by which of the followi

(a) $\bar{x} = \frac{1}{n}\sum_{i-1}^{n} x_i$
(b) $\bar{x} = n\sum_{i-1}^{n} x_i$
(c) $\bar{x} = \sum_{i-1}^{n} x_i$
(d) $\bar{x} = \frac{1}{n-1}\sum_{i-1}^{n} x_i$

15. Which of the following defines t ple variance:

(a) $s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})$
(b) $s^2 = \sum_{i=1}^{n}(x_i - \bar{x})^2$
(c) $s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$
(d) $s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i^2 - \bar{x})$

16. What is a false positive result:

(a) Open ended questions
(b) multiple choices
(c) This result happens whe indicates a negative statu the true status is positiv
(d) This result happens whe indicates a positive statu the true status is negativ

17. Type of questions included in qu naire to record responses in wh spondents have alternatives are fied as

(a) Open ended questions
(b) multiple choices
(c) Closed ended questions
(d) Itemized questions

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18. A possible outlier (mild outlier) will be any data point that lies ... :

    (a) below $Q_1 - 1.5(IQR)$ or above $Q_3 + 1.5(IQR)$

    (b) below $Q_1 + 1.5(IQR)$ or above $Q_3 - 1.5(IQR)$

    (c) below $Q_1 - 1.3(IQR)$ or above $Q_3 + 1.3(IQR)$

    (d) below $Q_1 + 1.3(IQR)$ or above $Q_3 - 1.3(IQR)$

19. A 6 sided fair die is tossed, with each element in the sample space having a probability of $\frac{1}{6}$. Find the variance if the value 5 occurs.

    (a) $\frac{5}{6}$

    (b) $\frac{5}{36}$

    (c) $\frac{1}{6}$

    (d) $\frac{1}{36}$

20. Class width is computed by :

    (a) $\frac{largest\ data\ value\ -\ smallest\ data\ value}{number\ of\ classes}$

    (b) $\frac{midpoint\ -\ smallest\ data\ value}{frequency}$

    (c) $\frac{largest\ data\ value\ -\ smallest\ data\ value}{frequency}$

    (d) $\frac{median\ -\ smallest\ data\ value}{number\ of\ classes}$

21. What type of probability distribution is the Binomial distribution

    (a) Uniform probability distribution

    (b) Continuous probability distribution

    (c) Discrete probability distribution

    (d) None of the above

22. Using the Normal table, find $P(z \leq -1.95)$

    (a) 0.97441

    (b) 0.02619

    (c) 0.02559

    (d) 0.97381

23. What type of probability distribution i the Normal distribution

    (a) Uniform probability distributio

    (b) Continuous probability distribu tion

    (c) Discrete probability distributio

    (d) None of the above

24. Which type of question is this, are you a male or female?:

    (a) dichotomous - alternative question

    (b) determinant choice question

    (c) frequency determination question

    (d) a check list question

25. Let A and B be events such that $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cup B) = 0.8$. What is $P(A|B)$?

    (a) 0.5

    (b) 0.6

    (c) 0.8

    (d) 0.4

26. Which of the following is not an example of a primary data:

    (a) survey

    (b) personal interview

    (c) questionnaire

    (d) data from databases

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27. The number of telephone calls received by an office averages 4 per minute. Find the probability that no call will arrive in a given one-minute period

(a) 1
(b) 0
(c) 0.0183316
(d) 0.4

28. All the following are measures of central tendency except:

(a) skewness
(b) median
(c) mode
(d) trimmed mean

29. The weekly amount spent for maintenance and repairs in a certain company was observed, over a long period of time, to be approximately normally distributed with a mean of GHC 400 and a standard deviation of GHC 20. If GHC 450 is budgeted for the week, what is the probability that the actual costs will exceed the budgeted amount?

(a) 0.05
(b) 0.02
(c) 0.0062
(d) 0.003

30. Which of the following is not affected by an outlier:

(a) range
(b) median
(c) standard deviation
(d) arithmetic mean

31. Suppose that the probability th man has high blood pressure is Suppose that we randomly select a ple of 6 men, What is the expe number of men with high blood sure in the sample

(a) 0.39933
(b) 0.95266
(c) 0.765
(d) 0.9

32. The number of minutes travelled missiles to hit an object at the sam cation are:
103, 106, 97, 103, 101
What is the value of their mean de tion :

(a) 2.4
(b) 3.4
(c) 2.8
(d) 2.0

33. Suppose that the probability that Frimpong who lives at Aboabo has blood pressure is 0.15. A student f BCHEM 3 randomly select a sampl 6 men, What is the probability there will be exactly 2 men with blood pressure

(a) 0.399
(b) 0.953
(c) 0.765
(d) 0.176

34. The semi interquartile range is co puted as:

(a) $\frac{Q_3-Q_1}{4}$
(b) $\frac{Q_2-Q_1}{2}$
(c) $\frac{Q_3-Q_1}{2}$
(d) $\frac{Q_2-Q_1}{4}$

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35. In a Ludo game between Osborn and Emmanuella, a die was tossed twice, what is the probability that sum of scores on both tosses is a prime number?

(a) $\frac{5}{12}$
(b) $\frac{1}{2}$
(c) $\frac{5}{6}$
(d) $\frac{2}{7}$

36. In a certain population of women, 40% have had breast cancer, 20% are smokers and 13% are smokers and have had breast cancer. If a women is selected at random from the population, what is the probability that she had breast cancer, smokes or both?

(a) 0.4
(b) 0.2
(c) 0.27
(d) 0.47

37. The first quartile of a series of values is:

(a) the value in the ordered series located at 25% of the number of values in the series
(b) the value of the ordered series located at 75% of the number of values in the series
(c) the numeric value for which a quarter of the series values are equivalent
(d) the numeric value for which a quarter of the series values are higher

38. Two sets are said to be mutually exclu sive if

(a) $P(A \cap B) = 1$
(b) $P(A \cap B) = 0$
(c) $P(A \cup B) = 1$
(d) $P(A \cup B) = 0$

39. Branches of statistics includes:

(a) descriptive statistics
(b) inferential statistics
(c) industrial statistics
(d) both (a) and (b)

40. Two or more events are said to be in dependent if .....

(a) the probability of occurrence o one is not influenced by the oc currence or non-occurrence o the other(s)
(b) the probability that event A oc curs given that event B has a ready occurred
(c) the probability of occurrence o one is influenced by the occu rence of the other(s)
(d) None of the above

41. Scale used in statistics which provide difference of proportions as well as mag nitude of differences is considered as

(a) interval scale
(b) ratio scale
(c) ordinal scale
(d) nominal scale

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42. What is the $P(A|B)$?

(a) $P(A|B) = P(A)$

(b) $P(A|B) = \frac{P(A)}{P(B)}$

(c) $P(A|B) = \frac{P(A \cup B)}{P(B)}$

(d) $P(A|B) = \frac{P(A \cap B)}{P(B)}$

43. The stages of a malignant disease (cancer) is recorded using the symbols 0, I, II, III, IV. We say that the scale used is :

(a) alphanumeric

(b) numerical

(c) ordinal

(d) nominal

44. What type of probability distribution is the Poisson distribution

(a) Uniform probability distribution

(b) Discrete probability distribution

(c) Continuous probability distribution

(d) None of the above

45. The median of a series of numerical values is:

(a) a value for which half of the values are higher and half of the values are lower

(b) the value located exactly midway between the minimum and maximum of the series

(c) the most commonly encountered values among the series

(d) a measure of the eccentricity of the series

46. One of the properties of the probabili density function states that $\int_{-\infty}^{\infty} f(x)$ should be

(a) less than 1

(b) greater than 1

(c) equal to

(d) equal to 0

47. The characteristics or quality that m vary from one individual to another called...:

(a) statistic group

(b) dynamic group

(c) variable

(d) individual

48. For continuous random variables, t probability at a point is always

(a) zero

(b) one

(c) less than zero

(d) the same as the point

49. Since the mode is the most frequentl occurring data value, it:

(a) can never be larger than th mean

(b) is always larger than the media

(c) is always larger than the mean

(d) none of the above answers is cor rect

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50. Use the information below to answer 27-30.
The following data shows the number of hours worked by 200 statistics students.

Number of Hours	Frequency
0 - 9	40
10 - 19	50
20 - 29	70
30 - 39	40

The class width for this distribution...

(a) is 9
(b) is 10
(c) is 11
(d) varies from class to class

51. The number of students working 19 hours or less...:

(a) is 40
(b) is 50
(c) is 90
(d) cannot be determined without the original data

52. The relative frequency of students working 9 hours or less...:

(a) is .2
(b) is .45
(c) is 40
(d) cannot be determined from the information given

53. The cumulative relative frequency for the class of 10 - 19:

(a) is 90
(b) is .25
(c) is .45
(d) cannot be determined from the information given

54. In a sample of 800 students in a versity, 160, or 20%, are Business jors. Based on the above informa the school's paper reported that ' of all the students at the universit Business majors." This report is a ample of:

(a) a sample
(b) a population
(c) statistical inference
(d) descriptive statistics

55. Statistical method which facilitate cision making process for popula sample results is classified as:

(a) decision procedure
(b) inferential statistics
(c) elementary statistics
(d) social methodology

56. The mean of a distribution is 14 a the standard deviation is 5. What the value of the coefficient of variatio

(a) 60.4%
(b) 48.3%
(c) 35.7%
(d) 27.8%

57. Which probability distribution has i mean and variance equal

(a) Bernoulli distribution
(b) Poisson distribution
(c) Normal distribution
(d) Binomial distribution

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mean of a distribution is 23, the ian is 24, and the mode is 25.5. It ost likely that this distribution is:

- positively skewed
- symmetrical
- asymptotic
- negatively skewed

many elements are in the sample ce of rolling a die three times?

- 216
- 18
- 36
- 180

hich of the following describe the ddle part of a group of numbers?

- measure of variability
- measure of central tendency
- measure of association
- measure of shape

ppose that the number of dog bite ses at Tech hospital in a year has a isson distribution with average 6 bite ses. What is the probability that in year the number of dog bite cases will e 7

- a) 0.01735
- b) 0.8571
- (c) 1
- (d) 0.13768

62. Which of the following variable is a example of a nominal scale of measure ment
    - (a) Gender
    - (b) Temperature in Kelvin
    - (c) Weight
    - (d) Number of Biochemistry Stu dent

63. Suppose you pick two cards from a dec of 52 playing cards. What is the prob ability that they are both queens
    - (a) $\frac{3}{220}$
    - (b) $\frac{3}{51}$
    - (c) $\frac{1}{221}$
    - (d) $\frac{4}{52}$

64. Which the following is not an exampl of a primary data collection
    - (a) Personal interviews
    - (b) Questionnaires
    - (c) Surveys
    - (d) Internet source

65. The probability of a positive test re sult given the presence of the disease is termed as .....
    - (a) Sensitivity
    - (b) Specificity
    - (c) False positive
    - (d) False negative

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66. Box plots characterize a sample using

(a) the minimum and the first quartile values only

(b) the maximum and the 75th percentile values only

(c) the minimum, 25th, 50th, and 75th percentiles, maximum values only

(d) the minimum, the interquartile range and the maximum values only

67. Let A and B be events such that $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cup B) = 0.8$. What is $P(A \cap B)$?

(a) 0.5

(b) 0.8

(c) 0.4

(d) 0.3

68. The following represents the minimum temperature recorded by a remote sensor for 25 countries in Europe.

-8.1	3.2	5.9	8.1	12.3
-5.1	4.1	6.3	9.2	13.3
-3.1	4.6	7.9	9.5	14.0
-1.4	4.8	7.9	9.7	15.0
1.2	5.7	8.0	10.3	22.1

Calculate the range of the minimum temperature recorded

(a) 22.1

(b) 30.2

(c) -8.1

(d) 39.6

69. Using information provided abo the sample standard deviation

(a) 6.498

(b) 42.227

(c) 22.122

(d) 1.2

70. Alex and Ernest both need to Shirt. The shirt store has a stock brown, three pink, and two blue Alex randomly picks one of the and buys it. Immediately after, does the same. The sale price brown, pink, and blue shirts are G GH200 and GH100, respectively. be the event that Alex bought a shirt, and B be the event that bought a brown shirt.
What is P(A)?

(a) $\frac{3}{8}$

(b) $\frac{1}{8}$

(c) $\frac{4}{9}$

(d) $\frac{1}{8}$

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