

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI  
DEPARTMENT OF STATISTICS

2017/2018 HARMATTAN SEMESTER EXAMINATION

STA 211: INTRODUCTION TO STATISTICS AND PROBABILITY

INSTRUCTION: ANSWER ALL QUESTIONS; TIME: 2 HRS 30 Mins

1. Each class of a class interval contains ----- values.  
(A) compacted (B) opposite (C) heterogeneous (D) homogeneous
2. One of this options is not part of a good statistical Table.  
(A) Content title (B) Table label (C) Foot source (D) Foot note
3. Table 1 stands for -----.  
(A) First Table in Chapter one (B) First Table for data one (C) First Table in the work (D) First Table seen in Page one
4. Non-numeric data are ----- in nature. (A) distinct (B) Qualitative (C) calculative (D) quantitative
5. Information employed for a study which had been collected by another investigator is ----- data.  
(A) Supplementary (B) Primary (C) secondary (D) Tertiary
6. A study that generates information about an enquiry from part of the targeted population is -----.  
(A) Sample survey (B) Census (C) Part population survey (D) Observation
7. The quality scale adopted for scaling kind of information is called -----.  
(A) Ratio (B) Nominal (C) Ordinal (D) Interval
8. Tabular arrangement of data where frequency is associated with corresponding class interval is called ----- distribution.  
(A) Class interval (B) Data (C) Frequency (D) Interval
9. The least value that belongs to a class interval is called -----.  
(A) Smallest class value (B) Least class limit (C) Lower class limit (D) Lower class value
10. The range of a distribution is six times its class interval size. Find the number of data values observed for the distribution. (A) 37 (B) 34 (C) 35 (D) 36
11. Find the number of classes required for proper grouping of sixty set of observations.  
(A) 9 (B) 6 (C) 7 (D) 8
12. The lower class limit equals the number of classes required for grouping a set of distribution. If the upper class limit is twice the number of classes and the range equals thrice the lower class limit, find the range of the distribution. (A) 1 (B) 3 (C) 6 (D) 9
13. A Table giving all possible values of a discrete random variable with their associated probabilities is called (A) Cumulative density (B) Probability density (C) Probability distribution (D) Cumulative probability density
14. A Normal distribution that has zero mean and unit variance is called .... Distribution.  
(A) Gaussian (B) Binomial (C) Normal (D) Standard Normal
15. If the variable Z follows standard normal distribution then  $P(1.50 \leq Z \leq 1.83)$  is  
(A) 0.8996 (B) 0.0332 (C) 0.0228 (D) 0.5124
16. The parameters of the binomial distribution are (A) p, q (B) n, p, q (C) n, q (D) n, p
17. One advantage of the mean is that it utilizes information on all items in a series.  
(A) Seldomly true (B) True (C) False (D) Often time
18. One limitations of the mean is that: (A) it can be calculated for qualitative data (B) it can be calculated when there are open class (C) it can be combined for several classes (D) It is affected by extreme values
19. The probability distribution in which both the mean and variance are equal is .... distribution.  
(A) Uniform (B) Binomial (C) Poisson (D) Normal
20. When is a Bar chart preferred to a Pie chart  
(A) When number of class interval is low (B) When number of classes is small (C) When number of classes is high (D) When there is need to emphasize a significant aspect of the data
21. Which of the following is not an advantage of the Component Bar chart (A) It provides a within category comparison of contributions of the components (B) It provides all the information contained in the (C) It provides a bar of the first component of the categories (D) It provides a bar chart of each common component of the categories



22. Which of the following is not an advantage of Multiple Bar Chart: (A) It provides for between category comparison of the contributions of the first component (B) It enjoys all the advantages of the simple bar chart (C) It has at least two bar charts on the same diagram (D) It provides for within category comparison

**EXHIBIT I**

The weight (measured in KG) of fifty Paw-Paw heads harvested at FUTO farms LTD were classified as follows:

Weight interval	0.1 – 1.49	1.50-2.89	2.90 -4. 29	4.30 – 5.69	5.70 – 7.09	7.10 – 8.49	8.50 – 9.89	9.90 – 11.29
frequency	12	6	$2X_1 + 3$	8	8	$X_1$	$X_1$	1

Use the information contained in EXHIBIT I to answer questions 23 and 24.

23. Find the frequency of the third class. (A) 21 (B) 10 (C) 9 (D) 6  
 24. Calculate the Harmonic mean of the distribution. (A) 2.09 (B) 2.08 Kg (C) 2.08 (D) 2.09 Kg  
 25. Calculate the Geometric mean of the distribution. (A) 3.09 Kg (B) 3.07 (C) 3.07 Kg (D) 3.09  
 26. The representation of the entire data points on the cartesian plane is called ...  
 (A) Data plane (B) Scattergram (C) Area plot (D) Histogram  
 27. The value of the upper and lower class boundaries of a class are  $(X^2 + 2)$  and  $(4X + 1)$  respectively. If the class mark is 1.5, find the value of the lower class boundary. (A) -15 (B) 4 (C) 2 (D) -1  
 28. If A, B, C are any three events, the probability of the union of the three events is:  
 (A)  $P(A) + P(B) + P(C) + P(A \cap B) + P(A \cap C) + P(B \cap C) - P(A \cap B \cap C)$  (B)  $P(A) + P(B) + P(C)$   
 (C)  $P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$  (D)  $P(A)P(B)P(C) - P(A \cap B \cap C)$   
 29. If A, B, C are mutually exclusive events, the probability of the union of the three events is:  
 (A)  $P(A) + P(B) + P(C) + P(A \cap B) + P(A \cap C) + P(B \cap C) - P(A \cap B \cap C)$  (B)  $P(A) + P(B) + P(C)$   
 (C)  $P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$  (D)  $P(A)P(B)P(C) - P(A \cap B \cap C)$

**EXHIBIT II**

Given the distribution

Values (X)	35	45	55	65	75	85	95
Frequency (f)	6	20	30	20	10	8	6

Use the information contained in EXHIBIT II to answer questions 30 and 31.

30. Calculate the mean of the distribution. (A) 32.5 (B) 30.2 (C) 60.6 (D) 61.4  
 31. Calculate the standard deviation of the distribution. (A) 15.51 (B) 10.22 (C) 14.23 (D) 40.63  
 32. The statistic that is not affected by extreme values is: (A) median (B) mean (C) mode (D) median  
 33. The degree of the linear relationship between two variables at a time is called ....  
 (A) Product moment (B) Regression (C) Correlation (D) Skewness  
 34. A die is tossed once. If the number is odd, what is the probability that it is less than 4.  
 (A) 1/3 (B) 1/6 (C) 1/2 (D) 2/3  
 35. The well defined rule by which numbers are assigned to each outcome of an experiment is known as  
 (A) Probability distribution (B) Bayes Theorem (C) Independent events (D) Random variable  
 36. A sample statistic that is used to estimate a population parameter is referred to as .....  
 (A) Estimating (B) Estimate (C) Estimation (D) Estimator  
 37. One of the regimes of kurtosis is ... (A) Leptokurtic (B) Mesokurtic (C) Leptokurtic (D) Mesokurtic  
 38. The scores of ten students in English and Mathematics is shown as:

English (X)	80	75	75	70	65	65	100	75	80	100
Mathematics (Y)	50	47	45	32	32	47	65	45	52	47

- Calculate the correlation between English and Mathematics using the Spearman rank correlation method.  
 (A) 0.64 (B) 0.73 (C) 0.74 (D) 0.63  
 39. The two ways of calculating probabilities of a random variable are:  
 (A) Frequency and Observed (B) Classical and Priori (C) Frequency and Posteriori (D) Classical and Posteriori



### EXHIBIT III

The probability that a man watches Jolntee TV show given that his wife does is  $3(1-X^2)$  while the probability that his wife watches Jolntee TV is  $\frac{2}{3}$ . The probability that the couple watches the TV show is  $\frac{3}{4}-X^2$ .

Use the information that is contained in Exhibit III, to answer questions 40 and 41.

40. Obtain the value of X. (A)  $\frac{3}{4}$  (B)  $\frac{1}{4}$  (C)  $\frac{2}{3}$  (D)  $\frac{1}{2}$
41. Obtain the probability that a man watches Jolntee TV show given that his wife does.  
(A)  $\frac{3}{4}$  (B)  $\frac{1}{4}$  (C)  $\frac{2}{3}$  (D)  $\frac{1}{2}$
42. The first and last observation of a distribution is 10 km and 145 km respectively. The class interval of the third class, given that the distribution is grouped into ten distinct classes, is...:  
(A) 37.00 – 50.50 (B) 23.50 – 36.99 (C) 23.50 – 37.00 (D) 37.00 – 50.49
43. Which of these mathematical statements is true, given that  $X_i$  and  $\bar{X}$  are the  $i$ th value and mean respectively of a distribution. (A)  $\sum(X_i - \bar{X}) < 0$  (B)  $\sum(X_i - \bar{X}) \neq 0$  (C)  $\sum(X_i - \bar{X}) = 0$  (D)  $\sum(X_i - \bar{X}) > 0$
44. Obtain the probability of obtaining at least four girls in a family of five Children.  
(A) 0.15 (B) 0.18 (C) 0.19 (D) 0.17
45. Find the probability of obtaining a sum of 6 in a toss of two fair dice.  
(A) 0.13 (B) 0.14 (C) 0.83 (D) 0.17
46. A Typist makes an average of four errors per page. What is the probability that she makes at least two errors on the next page: (A) 0.91 (B) 0.80 (C) 0.81 (D) 0.90

### EXHIBIT IV

A random variable  $X$  follows the binomial distribution with parameters 5 and 0.4.

Use the information contained in EXHIBIT IV to answer questions 47, 48 and 49.

47. Find the probability that  $X=2$  is (A) 0.44 (B) 0.35 (C) 0.34 (D) 0.45
48. Find the probability that  $X < 2$  is (A) 0.26 (B) 0.68 (C) 0.91 (D) 0.34
49. Find the probability that  $X \geq 2$  is (A) 0.67 (B) 0.34 (C) 0.66 (D) 0.32

### EXHIBIT V

A fair coin is tossed three times

Use the information contained in EXHIBIT V to answer questions 50, 51 and 52.

50. Find the probability of obtaining exactly three heads (A)  $\frac{5}{8}$  (B)  $\frac{1}{8}$  (C)  $\frac{2}{8}$  (D)  $\frac{3}{8}$
51. Find the probability of obtaining at least three heads (A) 1 (B)  $\frac{1}{4}$  (C)  $\frac{1}{8}$  (D)  $\frac{3}{8}$
52. Find the probability of obtaining at most three heads is (A)  $\frac{1}{2}$  (B)  $\frac{1}{16}$  (C)  $\frac{1}{8}$  (D)  $\frac{1}{4}$

### EXHIBIT VI

The class marks of a frequency distribution are 128, 137, 146, 155, 164, 173 and 182

Use the information contained in EXHIBIT VI to answer questions 53, 54 and 55.

53. The class size is (A) 11 (B) 8 (C) 9 (D) 10
54. The class boundaries of the second class is  
(A) (137, 146) (B) (133, 141) (C) (134.5, 141.5) (D) (132.5, 141.5)
55. The class limits of the last class are (A) (178, 186) (B) (173, 183) (C) (169, 177) (D) (178, 182)

### EXHIBIT VII

The following computations were obtained from the number of plants ( $X$ ) in a Farm and it's yield ( $Y$ ).

$$\bar{X} = 12.88, \text{var}(X) = 47.36, \sum_{i=1}^n X_i^2 = 1705, \sum_{i=1}^n Y_i = 1992, \sum_{i=1}^n Y_i^2 = 585808 \text{ and } \sum_{i=1}^n X_i Y_i = 31330.$$

Use this Information contained in Exhibit VII to answer Questions 56, 57, 58 and 59.



Berry Jane

56. Obtain the value of n. (A) 10 (B) 7 (C) 8 (D) 9  
57. The gradient of the line of best fit for the data is .... (A) 15.02 (B) 14.01 (C) 15.01 (D) -14.01  
58. The intercept of the line of best fit for the data is ... (A) 55.67 (B) 45.67 (C) 45.57 (D) -45.57  
59. The coefficient of correlation, Using the product moment correlation method, between X and Y is ....  
(A) 0.97 (B) 0.94 (C) 0.95 (D) 0.96  
60. The Methods of Point Estimation are ..... and ..... Estimation.  
(A) Point and Confidence (B) Point and Internal (C) Point and Interval (D) Point and Internal

#### EXHIBIT VIII

The inter quartile range of a distribution, whose upper and lower quartiles are  $2X^2 + 1$  and  $8X - 9$  respectively, is 12. Use this information contained in Exhibit VIII to answer Questions 61, 62 and 63.

61. Determine the upper quartile of the distribution. (A) 20 (B) 18 (C) 14 (D) 19  
62. Determine the lower quartile of the distribution. (A) 8 (B) 2 (C) 7 (D) 6  
63. Determine the 75<sup>th</sup> Percentile of the distribution. (A) 20 (B) 18 (C) 14 (D) 19  
64. The errors that occur in any hypothesis test about a parameter are ..... errors:  
(A) Types C and D (B) Types A and B (C) Types I and II (D) Types IA and IIB  
65. The probability of rejecting a false hypothesis is:  
(A) Power of testability performance (B) Power of test (C) Power of hypothesis (D) Power of performance  
66. The test in which the alternative hypothesis is non-directional is ... test:  
(A) Type I (B) Right tailed (C) Left tailed (D) two tailed

#### EXHIBIT IX

In a Statistics Examination, the mean grade is 43% with a variance of 6.25. The grades are approximately normally distributed, all students with grades 40 to 47 received grade D and 20 students received grade D. Given that  $\phi(1.6) = 0.9452$  and  $\phi(-1.20) = 0.1151$ ,

Use this information contained in Exhibit IX to answer Questions 67 and 68.

67. Obtain the probability of students with grades 40 to 47. (A) 1.0 (B) 0.95 (C) 0.83 (D) 0.12  
68. Determine the number of students that took the Examination. (A) 20 (B) 24 (C) 21 (D) 167  
69. The act of taking data measurement on a variable of interest using measurement tool is?  
(A) Scaling (B) Data Measurement (C) Scale (D) Scale Measure  
70. If the moment coefficient of kurtosis is  $> 0$ , it means the distribution is -----  
(A) flatkurtic (B) platykurtic (C) leptokurtic (D) mesokurtic