

CENTRAL UNIVERSITY



END OF SECOND SEMESTER EXAMINATIONS 2016

CENTRAL BUSINESS SCHOOL

DEPARTMENT OF BANKING AND FINANCE

SBFW 102 (3 CREDITS)

BUSINESS STATISTICS

LEVEL 100

AUGUST, 2016

DURATION: 3 HOURS

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STUDENT ID No.....

INSTRUCTIONS

ANSWER ALL QUESTIONS IN SECTION A AND ANY TWO IN SECTION B

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THE INVIGILATOR**

F-904

SECTION A. Answer all questions

1. If we wish to draw a sample of size 100 from a population of 2,000 using the systematic random sampling method, what would be the sampling interval?
 - A. 100
 - B. 10
 - C. 20
 - D. 0.05

2. A Type I error is committed if we:
 - A. Accept a true alternate hypothesis
 - B. Accept both the null and alternate hypotheses at the same time
 - C. Reject a true null hypothesis
 - D. None of these is correct.

3. Methods of organizing, summarizing and presenting data in an informative way is known as
 - A. Descriptive Statistics
 - B. Informative Statistics
 - C. Narrative Statistics
 - D. Written Statistics

4. Spearman's rank coefficient of correlation is used when data is in the
 - A. Nominal Scale
 - B. Ratio Scale
 - C. Ordinal Scale
 - D. Interval Scale

5. A portion, or part, of the population of interest is known as

- A. Survey
- B. Statistics
- C. Parameter
- D. Sample

6. Determine the median value in the following data 59 46 55 51 53 54 47 55 54 49
49

- A. 49
- B. 59
- C. 53
- D. 54

7. A survey

- A. is a study of the entire population.
- B. is a portion, or part, of the population of interest.
- C. is a body of facts that are in a format suitable for decision making.
- D. is a study of a portion or part of the population.

8. Each student in the Central University is given an identification number. The personal files are arranged sequentially starting with student number 0001. To sample the students, the number 0153, was first selected. Then numbers 0253, 0353, 0453, and so on became the numbers of the sample. This type of sample is called:

- A. Simple random sampling
- B. Systematic sampling
- C. Stratified sampling
- D. Multi-stage sampling

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9. Stratified sampling scheme can only be used when the population is
- Homogeneous
 - Large
 - Heterogeneous
 - Infinite
10. Which of the following does not determine correct sample size?
- The level of confidence desired.
 - The margin of error the researcher will tolerate
 - The probable error of the variable.
 - The variability in the population being studied.
11. In constructing a good questionnaire which of the following must be avoided?
- The questionnaire should be as brief as possible.
 - Questions should be in logical sequence
 - Questions should be short and ambiguous
 - The questions should be adequate to obtain the information required.
12. The following data relate to the number of sales by a salesperson over a number of weeks:

Weekly sales	up to 10	10 to 19	20 to 29	30 to 39	40 and over
Number of weeks	2	12	22	10	4

What is the probability that the next week the salesperson will make sales of at least 20?

- 0.72
- 0.44
- 0.28
- 0.64

13. Which of these is not an advantage of postal questionnaire?

- A. Saves the researcher time and money.
- B. People are more truthful while responding to the questionnaires regarding controversial issues in particular due to the fact that their responses are anonymous.
- C. Respondents answer questions the way they understand them.
- D. No interviewer-bias

14. Which of the following is an example of a continuous variable?

- A. Number of children in a family.
- B. Gender
- C. Race
- D. Age

15. Data initially collected by someone/institution and use by another person/institution is referred to as

- A. Quantitative Data
- B. Primary Data
- C. Qualitative Data
- D. Secondary Data.

16. Data can be presented in three forms. Which of the forms below is not a way of presenting data?
- A. Stem-and -leaf plot
 - B. Frequency distribution table
 - C. Rectangle.
 - D. Frequency Polygon
17. To convert a frequency distribution to a relative frequency distribution,
- A. each of the class frequencies is divided by the total number of observations.
 - B. the total number of observations is divided by the class frequencies.
 - C. the lower class limit plus the upper class limit divided by two.
 - D. the class frequencies divided by hundred.
18. The study of statistics is usually divided into two categories. Which of the following are the two categories?
- A. Qualitative and Quantitative
 - B. Discrete and Continuous
 - C. Descriptive and Inferential
 - D. Census and Survey
19. "A graph in which the classes are marked on the horizontal axis and the class frequencies on the vertical axis. The class frequencies are represented by the heights of the bars and the bars are drawn adjacent to each other." This graph is called
- A. Line Graph
 - B. Ogive
 - C. Histogram
 - D. Historigram

20. Population can be defined as,

- A. The science of collecting, organizing, presenting, analyzing, and interpreting data to assist in making more effective decisions
- B. An item of interest that can take on many different numerical values.
- C. The collection of all possible observations of a specified characteristic of interest.
- D. The methods of organizing, summarizing, and presenting data in an informative way.

21. Which of the following is not a step in the construction of a frequency distribution table?

- A. Decide on the number of classes.
- B. Determine the class interval or width.
- C. Draw the scatter diagram.
- D. Set the individual class limits.

22. Which of the following would constitute a set of discrete data?

- A. Time taken to travel to work each day over one year.
- B. Weights of a consignment of tins of plum tomatoes.
- C. Number of cars passing a census point each minute over a 3-month period.
- D. Age of applicants applying for catering jobs over a 3-month period in a large hotel chain.

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23. A silkscreen printer purchases plastic cups on which to print logos for sporting events and other special occasions. The printer received a large shipment this morning and would like to estimate the percent defective. A sample of 200 revealed 30 of the cups to be defective. Develop a 95 percent confidence interval for the proportion of defective cups.

- A. 0.15 ± 0.059
- B. 0.15 ± 0.030
- C. 0.15 ± 0.0495
- D. 0.15 ± 0.00125 .

24. Sample size is

- A. the number of items/persons/objects that must be in the sample.
- B. the number of items/persons/objects that must be in the sampling frame
- C. the number of items/persons/objects that must be in the population.
- D. the number of items/persons/objects that must be in the census.

25. The arithmetic mean is the only measure of location where the sum of the deviations of each value from the mean will always be

- A. One
- B. Zero
- C. $n-1$
- D. Minus one

26. Which of the following is not a reason for sampling?

- A. When the population is infinite.
- B. To reduce errors
- C. To present data
- D. To reduce cost

27. Which of the following is a true statement?

- A. The mean is necessarily one of the original values.
- B. The mean is not affected by extreme values.
- C. Median is the value below which half of the values lie and above which the other half of the values lie.
- D. In a grouped frequency distribution, the mean cannot be estimated.

28. In how many ways can a Human Resource Manager of your company fill two vacancies (one senior and the other junior), if 5 people had applied for the positions?

- A. 20
- B. 10
- C. 60
- D. 120

29. The annual dividends, in percent, of four oil shares are: 4.91, 5.75, 8.12, and 21.6. What is the geometric mean dividend?

- A. 10.095
- B. 6.935
- C. 21.60
- D. 8.389

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30. Which of these formulas measures the population variance?

A. $\sigma^2 = \frac{\sum (X - \mu)^2}{N}$

B. $\sigma^2 = \frac{\sum (\mu + X)^2}{N}$

C. $\sigma^2 = \frac{\sum (\bar{X} + \mu)^2}{N}$

D. $\sigma^2 = \frac{\sum (\mu - \bar{X})^2}{N}$

31. The hypotheses are $H_0: \mu = 240$ and $H_1: \mu \neq 240$.

- A. A one-tailed test is being applied.
- B. three-tailed test is being applied.
- C. A two-tailed test is being applied.
- D. None of these is correct.

32. If the mean, median and mode of a distribution are 10, 6, 7 respectively, then the distribution is:

- A. skewed negatively
- B. not skewed
- C. skewed positively
- D. symmetrical

33. In how many ways can a student select 2 questions out of 4 questions to answer in an examination?

- A. 4
- B. 6
- C. 5
- D. 8

34. If the lower and upper quartiles of a frequency distribution were 8 and 15, the quartile deviation of the distribution would be

- A. 3.5
- B. 7
- C. 11.5
- D. 23

35. The endpoints of a confidence interval are called:

- A. Confidence levels.
- B. The confidence limits
- C. Point Estimat
- D. The test statistics.

36. A measure of the strength and nature of the linear relationship between two variables is

- A. Coefficient of Correlation
- B. Coefficient of strength and nature.
- C. Coefficient of Variation
- D. Coefficient of Determination

37. The hourly wages for a sample of part-time employees at Butelli Ltd. are GH¢2, GH¢10, GH¢6, GH¢8 and GH¢9. Determine the sample standard deviation.

- A. GH¢22
- B. GH¢4.9
- C. GH¢10
- D. GH¢3.16

38. In Linear Regression and Correlation an independent variable is
- A. The variable that is being predicted or estimated.
 - B. The Output Variable.
 - C. A variable that provides the basis for estimation.
 - D. Plotted on Vertical axis.
39. A large mass of data can best be summarized pictorially by means of:
- A. the range
 - B. a histogram
 - C. the frequency table
 - D. the mean
40. The coefficient of determination measures,
- A. How close the actual values are to the regression line.
 - B. The strength of the association between two variables.
 - C. The percent of the variation in Y that is explained by the variation in X.
 - D. The difference between a sample statistic and its corresponding population parameter.
41. A sample of 400 voters revealed that 300 would support Candidate A. in the forthcoming election. What is the 99 percent confidence interval for the proportion of voters in the population who would support Candidate A?
- A. 0.7076 to 0.7924
 - B. 0.6942 to 0.8057
 - C. 0.6023 to 0.7623
 - D. 0.75 to 0.82

42. The act of making an estimate of response outside the observed range of the independent variable or outside the observed region of a set of independent variables is known as:

- A. Extrapolation
- B. Intrapolation
- C. Exterpolation
- D. Interpolation

43. The total area under the normal curve is

- A. 0.50
- B. 0.95
- C. 1.00
- D. 0.99

44. Generally, a small standard deviation implies that the measurements are

- A. more spread
- B. big
- C. clustered close to the mean
- D. more dispersed

45. Three defective electric toothbrushes were accidentally shipped to a drugstore by Cleanbrush Products along with 17 non-defective ones. What is the probability that the first two electric toothbrushes sold will be returned to the drugstore because they are defective?

- A. 0.0237
- B. 0.0158
- C. 0.680
- D. 0.0225

46. When the characteristic or variable being studied is non-numeric it is called

- A. Discrete variable
- B. Continuous variable
- C. Quantitative variable
- D. Qualitative variable

47. A sampling technique where the samples are gathered in a process that does **not** give all the individuals in the population equal chances of being selected is known as

- A. Random Sampling
- B. Non Random Sampling
- C. Probability Sampling
- D. Fair Sampling

48. An investment analyst judges that a particular investment has a probability of 0.6 of returning a profit within two years. This is an example of

- A. classical probability
- B. subjective probability
- C. empirical probability
- D. relative frequencies

49. Information collected by the researcher directly through instruments such as surveys, interviews, focus groups or observation are called

- A. Secondary Data
- B. Primary Data
- C. Research
- D. Census

50. Which of the following is not a characteristic of the binomial probability distribution?

- A. An outcome on each trial of experiment is classified into one of two mutually exclusive categories – a success or a failure.
- B. The random variable is the result of counting the number of successes in a fixed number of trials.
- C. The distribution is a continuous, symmetric, bell-shaped distribution of a variable
- D. The probability of a success stays the same for each trial. So does the probability of failure.

51. A brokerage survey reports that 30% of individual investors have used a discount broker; that is, one which does not charge the full commission. In a random sample of six individuals, what is the probability that exactly one of the sampled individuals used a discount broker?

- A. 0.21
- B. 0.3
- C. 0.3025
- D. 0.0504

52. Which of these is not a random sampling scheme?

- A. Systematic Sampling
- B. Judgemental Sampling
- C. Multistage Sampling
- D. Stratified Sampling

53. An experiment involves selecting a random sample of 256 middle managers. One item of interest is annual income. The sample mean is \$45,420, and the sample standard deviation is \$2,050. What is the 95 percent confidence interval for the population mean.

- A. \$41,402 to \$49,438
- B. \$ 45209.2344 to \$ 45,630.7656
- C. \$ 45,089.43 to \$ 45,750.5625
- D. \$ 45,168.875 to \$ 45,671.125

54. The Board of Directors of Etonam Industries consists of eight men and four women. A four member search committee is to be chosen at random to recommend a new company president. What is the probability that all four members of the search committee will be women.?

- A. 0.3333
- B. 0.0833
- C. 0.0020
- D. 0.2500

55. The 0.01 significance is used in an experiment, and a one tailed test with the rejection in the lower tail is applied. Computed z is -1.8. This indicates:

- A. We should reject H_0 and accept H_1 .
- B. We should take a larger sample.
- C. None of these is correct.
- D. H_0 should not be rejected

56. A statement about a population developed for the purpose of testing is:

- A. Test Statistic
- B. Correction Factor
- C. Critical Value
- D. Hypothesis

57. A procedure based on sample evidence and probability theory to determine whether the hypothesis is a reasonable statement is called

- A. Hypothesis
- B. Sampling
- C. Hypothesis Testing
- D. Verification.

58. The value of the coefficient of correlation lies in the range:

- A. $0 \leq r \leq +1$
- B. $0 < r < +1$
- C. $-1 < r < +1$
- D. $-1 \leq r \leq +1$

59. Which of the following statements is not a true statement about the normal distribution?

- A. Any normal distribution can be converted into the "standard normal distribution" by subtracting the mean from each observation and dividing by the standard deviation.
- B. There is a family of normal distributions.
- C. The total area under a normal distribution is equal to 1 or 100%.
- D. The curve of the normal distribution is not continuous, that is, there are gaps or holes.

60. A population is made up of the following:

Stratum	Number
A	50
B	50
C	70
D	80
Total	250

We wish to select a sample of 25 items from this population using the stratified sampling method. What is the correct sampling fraction?

- A. 10
- B. $\frac{1}{10}$
- C. 25
- D. 250

SECTION B. Answer any two questions

1. A normal population has a mean of 80.0 and a standard deviation of 14.0.
- a. Compute the probability of a value between 75.0 and 90.0. (5 Marks)
 - b. Compute the probability of a value 75.0 or less. (5 Marks)
 - c. Compute the probability of a value between 55.0 and 70.0. (5 Marks)
 - d. Determine the value of X above which 80 percent of the values will occur. (5 Marks)
- (Total 20 Marks)

2. The Jampkuoz Pizza Chain claims that the mean waiting time of customers for service is normally distributed, with a mean of 3 minutes and a standard deviation of 1 minute. The quality assurance department found in a sample of 50 customers at the Dansoman Branch conclude that the mean waiting time was 2.75 minutes. The quality assurance wishes to establish whether the difference of .25 minutes is significant at the 5% level.
- (a) Formulate the null and alternate hypothesis for this test. (5 Marks)
 - (b) Compute the test statistics. (10 Marks)
 - (c) State your conclusion. (5 Marks)
- (Total 20 Marks)

3. A biologist assumes that there is a linear relationship between the amount of fertilizer supplied to tomato plants and the subsequent yield of tomatoes obtained. Eight tomato plants, of the same variety, were selected randomly and treated, weekly, with a solution in which x grams of fertilizer was dissolved in a fixed quantity of water. The yield, y kilograms of tomatoes was recorded.

Plant	A	B	C	D	E	F	G	H
x	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
y	3.9	4.4	5.8	6.6	7.0	7.1	7.3	7.7

- Plot a scatter diagram of the yield y , against the amount of fertilizer, x .
(4 marks)
- Calculate the equation of the least squares regression line of y on x .
(10 marks)
- Estimate the yield of plant treated, weekly, with 3.2 grams of fertilizer.
(3 marks)
- Indicate why it might not be appropriate to use your equation to predict the yield of a plant treated, weekly, with 20 grams of fertilizer.
(3 mark)

(Total 20 Marks)

4. The data below is the scores of 48 students in Business Mathematics at the Jampkuoz School of Business in June 2016.

22	29	32	38	39	41	42	43	43	43	44	44
45	45	46	46	46	47	50	51	52	54	54	55
56	57	58	59	60	61	61	63	63	64	64	67
69	70	70	70	71	71	72	73	74	76	78	88n+

Ggh Construct a grouped frequency distribution table, showing the tally marks, of the data above, using seven classes. (Use 20 as the lower class limit of the first class.).

(6 Marks)

- Draw the histogram of the distribution.
(4 Marks)
- Calculate the mean of the distribution.
(7 Marks)
- Comment on the mean of the distribution.
(3 Marks)