ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2016
EXAMINATION CATEGORY: TECHNICAL

PAPER II: GENERAL SUBJECT KNOWLEDGE FOR STATISTICS

Date:	1 October 2016
Total Marks:	100
Examination Time:	1 hour 30 minutes
Reading Time:	15 minutes *(prior to examination time)*

GENERAL INSTRUCTIONS

1. Write your Registration Number clearly and correctly in the Answer Booklet.
2. The first 15 minutes are to check the number of pages, printing errors, clarify doubts and to read the instructions in Question Paper. You are NOT permitted to write during this time.
3. This paper consists of **TWO Parts, namely Part I and Part II**.
   Part I consists of **70 Multiple Choice Questions** of 1 (one) mark each; and
   Part II consists of **10 Short Answer Questions** of 3 (three) marks each.
4. **All questions are compulsory.**
5. All answers must be written in the Answer Booklet provided to you. You will not be given any marks for answers written other than in the Answer Booklet. Ask for additional Answer Booklet if required.
6. All answers should be written with correct numbering of Part, Section and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating any or correct Part, Section and Question Number will NOT be evaluated and no marks would be awarded.
7. Begin each Part in a fresh page of the Answer Booklet.
8. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
9. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. This paper has 12 printed pages, including this Instruction Page.

GOOD LUCK!

PART I: MULTIPLE CHOICE QUESTIONS

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Booklet against the question number. E.g. 71(c). Any doubt writing, smudgy answer or writing more than one choice shall not be evaluated. Each question carries ONE mark.

1. The 5-figure summary of a sample of data is:
   80.1 85.3 87.2 92.1 96.7
   What is the interquartile range (IQR)?
   a. 5.2
   b. 6.8
   c. 7.8
   d. 11.7

2. Summary statistics for two samples of data are
   Sample 1: mean=15 and variance=7
   Sample 2: mean=7 and variance=15

   Which sample has the larger spread of observations?

   a. Sample 1
   b. Sample 2
   c. Neither; they have same spread
   d. There is not enough information to answer the question

3. The correlation coefficient r satisfies $0 \leq r^2 \leq 1$. Which of the following statements is true?

   a. $-1 \leq r \leq 1$
   b. $r \leq -1$
   c. $r \geq 1$
   d. $r \geq 1$ or $r \leq -1$

4. Two fair dice are tossed. How many possible outcomes are there?

   a. 6
   b. 12
   c. 36
   d. None of the above

5. A fair coin is tossed twice. What is the probability of obtaining a head and a tail?
   a. $\frac{1}{2}$
   b. $\frac{1}{3}$
   c. $\frac{1}{4}$
   d. $\frac{1}{5}$

6. What is the value of $\binom{n}{r}$ with n=7 and r=2 ?
   a. 2520
   b. 21
   c. 42
   d. 84

7. An experiment consists of throwing a fair coin until the last two outcomes are both heads. Which of the following statements is true?
   a. The experiment is binomial.
   b. The probability that only two throws are required is $\frac{1}{4}$
   c. The probability that only two throws are required is $\frac{1}{8}$
   d. The probability that only two throws are required is $\frac{1}{16}$

8. The science of statistics includes
   a. organizing data.
   b. presenting data.
   c. interpreting data.
   d. All of the above.

9. Which of the following statements is true regarding a sample?
   a. It is a part of population.
   b. It must contain at least five observations.
   c. It refers to descriptive statistics.
   d. All of the above.

10. A discrete variable
   a. is an example of a qualitative variable.
   b. can assume only whole number values.
   c. can assume only whole number values.
   d. can assume only whole number values.

11. The ratio scale of measurement
   a. usually involves ranking.
   b. cannot assume negative values.
   c. cannot assume negative values.
   d. is usually based on counting.

12. In descriptive statistics, our main objective is to
   a. describe the population.
   b. describe the data we collected.
   c. infer something about the population.
   d. compute an average.

13. The ordinal scale of measurement
    a. has a meaningful zero point.
    b. is based on ranks.
    c. cannot assume negative values.
    d. All of the above.

14. Which of the following is an example of continuous variable?
    a. Birth weight of babies.
    b. Distance between office an residence.
    c. Age of the CEOs of the private companies.
    d. All of the above.

15. Which of the following statement is true regarding a population?
    a. It must be a large number of values.
    b. It must refer to people.
    c. It is a collection individuals, objects, or measurements.
    d. None of the above.

16. A qualitative variable
    a. always refers to a sample.
    b. is not numeric.
    c. has only two possible outcomes.
    d. All of the above.

17. A nominal scale variable is
    a. usually the result of counting something.
    b. has a meaningful zero point.
    c. may assume negative values.
    d. cannot have more than two categories.

18. You are conducting a survey of the students of Bhutan to find out how popular football is. You randomly made 1,000 phone calls to students scattered across the country. In this study
    a. both the students of Bhutan and the students you called are population.
    b. the students of Bhutan are the population and the students you called are the sample.
    c. the students of Bhutan are the sample and the students you called are the population.
    d. Both the students of Bhutan and the people you called are samples.

19. Age is classified as
    a. nominal data.
    b. ordinal data.
    c. interval data.
    d. ratio data.

20. Which of the following defines the mode?
    a. It is the value that has the highest frequency.
    b. It is the average calculated by adding up all the values and dividing by the number of

entries.

c. It is the largest value.
d. It is the value that half of the entries are below and half of the entries are above.

21. Which of the following defines the mean?
    a. It is the largest value.
    b. It is the value that half of the entries are below and half of the entries are above.
    c. It is the value that has the highest frequency.
    d. It is the average calculated by adding up all the values and dividing by the number of entries.

22. Which of the following defines the median?
    a. It is the value that half of the entries are below and half of the entries are above.
    b. It is the value that has the highest frequency.
    c. It is the largest value.
    d. It is the average calculated by adding up all the values and dividing by the number of entries.

23. What is the median of the set of numbers {12,8,13,4,7,6,3,3,15}?
    a. 7
    b. 7.5
    c. 8
    d. 12

24. What is the mode of the set of numbers {4,9,8,2,16,4,4,8,9,6}?
    a. 4
    b. 9
    c. 8
    d. 16

25. In inferential statistics, we study
    a. the methods to make decisions about population based on sample results.
    b. how to make decisions about mean, median, mode.
    c. how a sample is obtained from a population.
    d. None of the above.

26. In descriptive statistics, we study
    a. the description of decision making process.
    b. the methods for organizing, displaying, and describing data.
    c. how to describe the probability distribution.
    d. None of the above.

27. When data are collected in a statistical study for only a portion or subset of all elements of interest, we are using
    a. a sample
    b. a parameter

c. a population
d. both b and c.

28. In statistics, a sample means
    a. a portion of the sample.
    b. a portion of the population.
    c. all the items under investigation.
    d. None of the above.

29. The height of a student is 60 inches. This is an example of
    a. qualitative data.
    b. categorical data.
    c. continuous data.
    d. discrete data.

30. Which of the following is not based on all the observations?
    a. Arithmetic Mean.
    b. Geometric Mean.
    c. Weighted Mean.
    d. Mode.

31. Statistic is a numerical quantity, which is calculated from
    a. population
    b. sample
    c. data
    d. observations

32. Which one of the following measurement does not divide a set of observations into equal parts?
    a. Quartiles
    b. Standard Deviations
    c. Percentiles
    d. Median

33. Which branch of statistics deals with the techniques that are used to organize, summarize, and present the data?
    a. Advanced Statistics
    b. Probability Statistics
    c. Inferential Statistics
    d. Descriptive Statistics

34. You have asked your classmates about their height. On the basis of this information, you stated that the average height of all students in your university or college is 67 inches. This is an example of
    a. Descriptive statistics
    b. Inferential Statistics

c. Parameter
d. Population

35. In statistics, conducting a survey means
    a. collecting information from elements.
    b. making mathematical calculations.
    a. drawing graphs and pictures.
    b. None of the above.

36. The algebraic sum of deviations from mean is
    a. maximum
    b. zero
    c. minimum
    d. undefined

37. In statistics, a population consists of
    a. all People living in a country.
    b. all People living in the area under study.
    c. all subjects or objects whose characteristics are being studied.
    d. None of the above.

38. Which one is not a measure of dispersion?
    a. The Range
    b. 50^{th} Percentile
    c. Inter-Quartile Range
    d. Variance

39. A survey will be given to 40 students randomly selected from the class 10 at Motithang Higher Secondary School. What is the sample?
    a. 40 selected students.
    b. All class 10 students.
    c. All students at Motithang Higher Secondary School.
    d. None of the above.

40. Fifty bottles of water were randomly selected from a large collection of bottles in a company's warehouse. These fifty bottles are referred to as the
    a. parameter
    b. population
    c. sample
    d. None of the above.

41. A mean is known as a statistic if it is computed from the
    a. parameter
    b. population
    c. sample
    d. None of the above.

42. A mean could be a
    a. parameter only.
    b. statistics only.
    c. parameter or a statistic.
    d. None of the above.

43. The difference between s and σ is that
    a. s is for a sample and σ is for a population.
    b. s is for a population and σ is for a sample.
    c. both s and σ are for population.
    d. both s and σ are for sample.

44. The Procedures of descriptive statistics and control charts, which are used to improve process are classified as
    a. Statistical tools
    b. Parallel tools
    c. Serial tools
    d. Behavioral tools

45. Scale used in statistics, which provides difference of proportions as well as magnitude of differences is considered as
    a. Satisfactory scale
    b. Ratio scale
    b. Goodness scale
    a. Exponential scale

46. Sample statistics are denoted by the
    a. upper case Greek letter.
    b. associated Roman alphabets.
    c. Roman alphabets.
    d. lower case Greek letter.

47. The type of central tendency measures, which divides data set into ten equal parts is classified as?
    a. Percentiles
    b. Multiple pile of data
    c. Quartiles
    d. Deciles

48. The normal distribution is also classified as
    a) Gaussian distribution
    b) Poisson distribution
    c) Bernoulli's distribution
    d) Weighted average distribution

49. In cluster sampling, elements of selected clusters are classified as
    a. Elementary units
    b. Primary units
    c. Secondary units
    d. Proportional units

50. Sum of dots when two dice are rolled is
    a. a discrete variable
    b. a continuous variable
    c. a constant
    d. a qualitative variable

51. The first hand unorganized form of data is called
    a. primary data
    b. secondary data
    c. organized data
    d. None of the above.

52. The data which have already been collected by someone are called
    a. raw data
    b. array data
    c. secondary data
    d. fictitious data

53. Which of the following best describes the value of a constant variable?
    a. Zero
    b. Fixed
    c. Not fixed
    d. Nothing

54. Population census is usually conducted through
    a. sample survey.
    b. accounting.
    c. investigation.
    d. complete enumeration.

55. Which of the following divides a group of data into four subgroups?
    a. Percentiles
    b. Deciles
    c. Median
    d. Quartiles

56. If the standard deviation of a population is 5, the population variance is
    a. 5
    b. 10

c. 25
d. 100

57. Census reports used as a source of data is
    a. Primary source
    b. Secondary source
    c. Organized data
    d. None of the above

58. Which of the following measure of averages is affected by extreme values in data set?
    a. Harmonic mean
    b. Geometric mean
    c. Arithmetic mean
    d. Mode

59. Which of the following measure of averages has more than one value?
    a. Median
    b. Geometric mean
    c. Harmonic mean
    d. Mode

60. Which of the following measure of averages is not based on all the values given in the data set?
    a. Median
    b. Geometric mean
    c. Harmonic mean
    d. Mode

61. If any of the value in data set is negative, then it is impossible to compute
    a. Median
    b. Geometric mean
    c. Harmonic mean
    d. Arithmetic mean

62. 2^{nd} Quartile= 5^{th} Decile=50^{th} Percentile=?
    a. Median
    b. Geometric mean
    c. Harmonic mean
    d. Arithmetic mean

63. Data must be arranged either in ascending or descending order to compute
    a. Median
    b. Geometric mean
    c. Harmonic mean
    d. Arithmetic mean

64. Which of the following is a measure of central tendency?
    a. Percentile
    b. Quartile
    c. Standard deviation
    d. Mode

65. Lowest value of variance is
    a. 1
    b. -1
    c. 3
    d. 0

66. If all values are same, then the measure of dispersion will be
    a. 1
    b. 0
    c. Mean
    d. Mode

67. Variance remains unchanged by change of
    a. Origin
    b. Scale
    c. Both Origin & Scale
    d. None of the above

68. Variance is always calculated from
    a. Mode
    b. Median
    c. Mean
    d. Geometric Mean

69. The ordered pair (3,0) is found
    a. on the y-axis.
    b. in the first quadrant.
    c. in the four quadrant.
    d. on the x-axis.

70. What is the x-intercept for the line 5y=4x-20?
    a. (5, 0)
    b. (0, 5)
    c. (-4, 0)
    d. (0, -4)

PART II: SHORT ANSWER QUESTIONS

This part consists of 10 Short Answer Questions. Answer all questions. Each question carries THREE marks.

1. What is data? Explain the difference between qualitative and quantitative data.

2. Find x and y so that the ordered data set {17 , 22 , 26 , 29 , 34 , x , 42 , 67 , 70 , y} has a mean of 42 and a median of 35.

3. Mention two objectives of studying averages.

4. Mention one limitation each for mean, median and mode.

5. Find the median of first ten prime numbers.

6. The following is the distribution of marks obtained by a student. Draw a histogram for the data.

Subject	English	Maths	Science	Geography	Economics
Marks	40	50	60	50	70

7. Mention one advantage and one disadvantage of simple random sampling.

8. Of a sample of 100 deaths of people aged 13 to 19 in a city, 83% were caused by accidents. The statement concludes that 'teenagers' are accident prone and more likely to die of accidents than older people above 19 years or children below 3 years. Do you agree or disagree with the statement? Support your answer.

9. Dorji wanted a random sample of 50 students. He decided to choose the first 50 students entering one of the dining halls at a randomly selected time during the dinner hour. Is his sample random? Justify your answer.

10. Suppose that a survey shows that 99% of urban households and 97% rural households have electricity connection. Can you say that urban households have significantly higher electricity connectivity than rural households? Explain.