ROYAL CIVIL SERVICE COMMISSION
CIVIL SERVICE COMMON EXAMINATION (CSCE) 2008
EXAMINATION CATEGORY: TECHNICAL

PAPER II: GENERAL SUBJECT KNOWLEDGE for STATISTICS GROUP

Date   : 19/12/08
Total Marks   : 100
Examination Time : $1\frac{1}{2}$ hours
Reading Time   : 10 minutes

Read the following instructions carefully before answering the questions.

The general subject knowledge paper is set to test your basic scientific and technical/professional subjects. Marks will be given based on the knowledge of the subject as well as clarity and preciseness of the response.

The paper consists of two parts:

Part a: *70 multiple-choice questions of one mark each (70 marks)*
Part b: *10 short answer questions of 3 marks each (30 marks).*

All questions are compulsory. All answers are to be written in the answer sheet.

Paper II consists of 13 pages including this page.

Part a. Multiple-choice questions of one mark each (70 marks).
(In this part four choices (a,b,c & d) are provided against each question. Write the question number on the answer sheet with the corresponding answer choice. No need to copy the whole question on the answer sheet.)

1. The science of statistics includes which of the following?
 Organizing data
   a) Presenting data
   b) Interpreting data
   c) All of the above

2. 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

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

4. Which of the following statements is true regarding a sample?
   a) It must contain at least 5 observations
   b) It refers to descriptive statistics
   c) It is a part of population
   d) All of the above are correct

5. A qualitative variable
   a) Always refers to a sample
   b) Is not numeric
   c) Has only two possible outcomes
   d) All of the above are correct

6. 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

7. The ratio scale of measurement
   a) Usually involves ranking
   b) Cannot assume negative values
   c) Has a meaningful zero point
   d) Is usually based on counting

8. 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

9. To convert a frequency distribution to a relative frequency distribution
   a) Find the difference between consecutive lower class limits
   b) Divide the class frequency by the total number of observations
   c) Divide the lower limit of the first class by the class interval
   d) Multiply the class frequency by 100

10. In a line chart the horizontal axis:
   a) Is usually in dollars
   b) Usually involves time, such as hours or months
   c) Is usually shown with a dotted line
   d) Is usually reported as a percentage

11. Which of the following measures of central location is affected most by extreme values?
   a) Median
   b) Mean
   c) Mode
   d) Geometric mean

12. Which level of measurement is required for the mode?
   a) Nominal
   b) Ordinal
   c) Interval
   d) Ratio

13. In a set of observations, which measure of central tendency reports the value that occurs most often?
   a) Mean
   b) Median
   c) Mode
   d) Geometric mean

14. The weighted mean is a special case of the
   a) Mean
   b) Median
   c) Mode
   d) Geometric mean

15. In a set of 10 observations the mean is 20 and the median is 15. There are two values that are 6, and all other values are different. What is the mode?
    a) 15
    b) 20
    c) 6
    d) None of the above

16. Which of the measures of central tendency is the largest in a positively skewed distribution?
    a) Mean
    b) Median
    c) Mode
    d) Cannot tell from the information given

17. A disadvantage of the range is?
    a) Only two values are used in its calculation
    b) It is in different units than the mean
    c) It does not exists for some data sets
    d) All of the above

18. The standard deviation is
    a) Based on squared deviations from the mean
    b) In the same units as the mean
    c) Uses all the observations in its calculations
    d) All of the above

19. The variance is
    a) Found by dividing N by the mean
    b) In the same units as the original data
    c) Found by squaring the standard deviation
    d) All of the above

20. In a positively skewed distribution
    a) The mean, median, and the mode are all equal
    b) The mean is larger than the median
    c) The median is larger than the mean
    d) The standard deviation must be larger than the mean or the median

21. Which of the following statements is true regarding the standard deviation?
    a) It cannot assume a negative value
    b) If it is zero, then all the data values are the same
    c) It is in the same units as the mean
    d) All of the above are correct

22. Under which of the following conditions would the standard deviation assume a negative value?
   a) When all the data values are negative
   b) When more than half of the data values are negative
   c) If all the data values are the same
   d) The standard deviation cannot be negative

23. In a symmetric distribution
   a) The mean, median and the mode are equal
   b) The mean is the largest measure of location
   c) The median is the largest measure of location
   d) The standard deviation is the largest value

24. An experiment is
   a) Collection of events
   b) Collection of outcomes
   c) Always greater than 1
   d) The act of taking a measurement or the observation of some activity

25. Which of the following is not a type of probability?
   a) Subjective
   b) Independent
   c) Relative frequency
   d) Classical

26. Events are independent if
   a) By virtue of one event occurring another cannot
   b) The probability of their occurrence is greater than 1
   c) We can count the possible outcomes
   d) The probability of one event happening does not affect the probability of another event happening

27. When we find the probability of an event happening by subtracting the probability of the event not happening from 1, we are using
   a) Subjective probability
   b) The complement rule
   c) The general rule of addition
   d) The special rule of multiplication

28. Bayes' Theorem
   a) Is an example of subjective probability
   b) Can assume values less than 1
   c) Is used to revise a probability based on new or additional information
   d) Is found by applying the compliment rule

29. The mean and the variance are equal in
    a) All probability distributions
    b) The binomial distribution
    c) The Poisson distribution
    d) The hypergeometric distribution

30. In which of the following distributions is the probability of a success usually small?
    a) Binomial
    b) Poisson
    c) Hypergeometric
    d) All distributions

31. In a continuous probability distribution
    a) Only certain outcomes are possible
    b) All the values within a certain range are possible
    c) The sum of the outcomes is greater than 1
    d) None of the above

32. Which of the following are characteristics of the normal distribution?
    a) It is a symmetric distribution
    b) It is bell-shaped
    c) It is asymptotic
    d) All of the above

33. Which of the following statements is correct regarding the standard normal distribution?
    a) It is also called the z distribution
    b) Any normal distribution can be converted to the standard normal distribution
    c) The mean is 0 and the standard deviation is 1
    d) All of the above are correct

34. Which of the following is *not* a reason for sampling?
    a) The destructive nature of certain tests
    b) The physical impossibility of checking all the items in the population
    c) The adequacy of sample results
    d) All of the above are reasons for sampling

35. The difference between the sample mean and the population mean is called the
    a) Sampling error
    b) Standard error of the mean
    c) Population standard deviation
    d) Population mean

36. Suppose we have a population that does not follow the normal distribution. If we select sample of what size will the distribution approximate the normal distribution?
   a) 3
   b) 6
   c) 20
   d) 30

37. The standard error of the mean is
   a) Always normally distributed
   b) The standard deviation of the sampling distribution of sample means
   c) Sometimes less than 0
   d) None of the above

38. A point estimate is
   a) Always an estimate of the population mean
   b) Always equal to the population value
   c) An estimate of the population parameter
   d) None of the above

39. The fraction or ratio of a sample possessing a certain trait is called a
   a) Population
   b) Mean
   c) Confidence interval
   d) Porportion

40. For an index number the base period
   a) Appears in the numerator
   b) Cannot be less than 100
   c) Appears in the denominator
   d) Must be after the year 2000

41. The Director of Purchasing reported that the industrial production index was 135. This means production
   a) Increased by 35 units
   b) Increased by 35 percent
   c) Decreased by 35 percent
   d) None of the above

42. What is the variation within a year called?
   a) Secular trend
   b) Seasonal variation
   c) Cyclical variation
   d) Irregular variation

43. For the linear trend equation $Y' = a + bt$, which symbol represents the average change in the dependent variable for each unit change in time?
   a) a
   b) b
   c) X
   d) Y'

44. You can describe the moving average method as:
   a) Useful in smoothing a times series
   b) Used in measuring seasonal fluctuations
   c) A technique which doesnot result in an equation
   d) All of the above

45. A logarithmic trend equation should be used for forecasts when the time series is increasing by:
   a) Equal amounts
   b) Increasing percents
   c) Increasing amounts
   d) Decreasing percents

46. Which of the following is an annual publication of the National Statistics Bureau?
   a) Bhutan Living Standard Survey (BLSS)
   b) Statistical Yearbook
   c) Poverty Analysis Report
   d) All of the above

47. When was the first statistical cell established in Bhutan and under which Department/Ministry?
   a) 1971, Ministry of Development
   b) 1980, Ministry of Finance
   c) 2003, Department of Planning
   d) None of the above

48. What is the installed capacity (MW) of the Tala Hydro Power Authority (THPA)?
   a) 360 MW
   b) 1020 MW
   c) 1420 MW
   d) 1040 MW

49. An imaginary line on the earth surface which runs parallel in the east-west direction are called
   a) Longitude
   b) Latitude
   c) Isotherm
   d) Equator

50. Where and when was the first King, Gongsar Ugyen Wangchuck coronated?
   a) Thimphu, 1907
   b) Trongsa, 1907
   c) Punakha, 1907
   d) Paro, 1907

51. Which of the following is not a member of Dratshang Lhentshog?
   a) Jekhenpo
   b) Four Lopens of Zhung Dratshang
   c) Chief Justice
   d) Secretary of Dratshang lhentshog

52. What is the projected population of Bhutan in 2008?
   a) 634,982
   b) 646,851
   c) 658,888
   d) 671,083

53. Which Dzongkhag has the highest poverty incidence as per the Poverty Analysis Report, Bhutan 2007?
   a) Samtse
   b) Pemagatshel
   c) Zhemgang
   d) Trashiyangtse

54. When was the first population and housing census of Bhutan (PHCB) conducted?
   a) 2000
   b) 2005
   c) 2003
   d) 2007

55. What is the poverty rate of Bhutan as per Poverty Analysis Report, 2007?
   a) 23.2 %
   b) 31.7 %
   c) 30.9%
   d) 24.7 %

56. As we travel along the lateral highway from Thimphu to Trashigang we pass over the following passes except
   a) Chelela
   b) Yotongla
   c) Pelela
   d) Dochula

57. Ratio of map distance to ground distance is called
    Ground scale
    Map scale
    Ground distance
    Map distance

58. The number of degrees of arc in a circle is.
    a) 180
    b) 90
    c) 360
    d) None of the above

59. The sum of the measures in degrees of the angles of a triangle is
    a) 180
    b) 90
    c) 360
    d) None of the above

60. If x + y = 12 and x is a positive integer, what is the value of 4x + 4y?
    a) 4
    b) 12
    c) 48
    d) It cannot be determined from the information given.

61. Area of a sphere with radius r equals
    a) πr^2
    b) $2\pi r^2$
    c) $3\pi r^2$
    d) $4\pi r^2$

62. Tenzin draws this figure
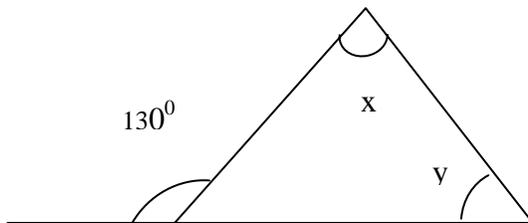
From the above figure, what is the relationship between the angels in the diagram?
    a) y = x
    b) y = x + 50
    c) x + y = 50
    d) x + y = 130

63. The sampling error is:

    a) The difference between the sample statistic and the population parameter
    b) Equal to the population mean
    c) A population parameter
    d) Always positive

64. Which of the following are correct statements about confidence intervals?
    a) They cannot contain negative numbers
    b) They are always based on the z distribution
    c) They must always include the population parameter
    d) None of the above are always correct

65. As the number of degrees of freedom increases in the t distribution:
    a) The level of confidence increases
    b) It approaches the standard normal distribution
    c) It becomes a continuous distribution
    d) It becomes flatter

66. Which part of Bhutan are most of the mines located?
    a) Southern Bhutan
    b) Eastern Bhutan
    c) Northern Bhutan
    d) Central Bhutan

67. In which year was the J Paul Getty award for conservation leadership was awarded to our fourth King, His Majesty Jigme Singey Wangchuk?
    a) 2007
    b) 2006
    c) 2005
    d) 2004

68. The smallest Dzongkhag in terms of area is
    a) Gasa
    b) Tsirang
    c) Sarpang
    d) Bumatng

69. 13 is what percent of 20?
    a) 53
    b) 55
    c) 60
    d) 65

70. What does SPSS stand for?
   a) Statistical Processing for Social Sciences
   b) Statistical Processing for Social Studies
   c) Statistical Package for Social Sciences
   d) Statistical Package for Social Studies

Part b. Ten short answer questions of three marks each (30 marks)
(Attempt all questions. Write the answers in the answer sheet provided)

1. Suppose a population consisted of 20 items. How many different sample of $n = 3$ are possible?

2. A linear trend for time series data beginning in 1995 and extending up through 2001 is $Y' = 5.2 + 3.1X$. The forecast for 2002 is?

3. If $x > 1$ and $\dfrac{\sqrt{x}}{x^3} = x^m$, what is the value of m?

4. What is vital statistics? State its uses and methods of collection.

5. A set of data consists of 38 observations. How many classes would you recommend for the frequency distribution?

6. The following list indicates the number of minutes needed to install a sample of 10 door openers;
   28   32   24   46   44   40   54   38   32   42
   Calcuate Range and arithmetic mean.

7. Using the data in question 6, calculate the mean deviation.

8. The events X and Y are mutually exclusive. Suppose P(X) = 0.05, and P(Y) = 0.02. What is the probability of either X or Y occurring?

9. Why is official statistics important?

10. The focus of the 10th five year plan is poverty. Describe briefly how statistics is relevant for solving poverty issues.