

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2012
EXAMINATION CATEGORY: TECHNICAL**

PAPER II: GENERAL SUBJECT KNOWLEDGE for STATISTICS

Date	: 13 October 2012
Total Marks	: 100
Examination Time	: 90 minutes (1.5 hours)
Reading Time	: 15 minutes (prior to examination time)

READ THE FOLLOWING INSTRUCTIONS CAREFULLY:

- You have 15 minutes (prior to writing time) to read the instructions, clarify doubts, make sure that you have all the pages, and check for any printing errors. DO NOT write during this time.
- This paper consists of **TWO Parts – Part I and Part II. All questions are compulsory.**
 - ✓ **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.
- While answering the multiple choice questions, write only the letter of the correct answer chosen against the question number, clearly and legibly. E.g. 71(c). Any double writing or smudgy answers shall not be evaluated.
- 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 booklets if required.
- Ensure that you write your roll number in the space provided in the answer booklet. In case you take additional answer booklet, make sure that you write your roll number in the additional answer booklet as well.
- This paper has 13 (thirteen) printed pages including this cover page.

PART-I: MULTIPLE CHOICE QUESTIONS

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Sheet against the question number. E.g. 71 (c). Each question carries ONE mark.

1. The sequence of numbers 5,9,13,17,.....is an example of
 - a) Arithmetic Progression
 - b) Geometric Progression
 - c) Harmonic Progression
 - d) None of the above

2. The SAARC leaders during the Thirteenth Summit endorsed the SAARC development goals. How many Goals have been agreed on?
 - a) 8
 - b) 10
 - c) 22
 - d) 25

3. In Results Based Management, the long term result is
 - a) Impact
 - b) Outcome
 - c) Output
 - d) None of the above

4. The first Population and Housing Census of Bhutan following international methodology was conducted in
 - a) 1907
 - b) 1968
 - c) 2000
 - d) 2005

5. The highest level of measurement scale is
 - a) Interval Scale
 - b) Ordinal Scale
 - c) Ratio Scale
 - d) Nominal Scale

6. S^2 stands for
 - a) Population variance
 - b) Standard deviation
 - c) Sample variance
 - d) None of the above

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7. Which of the following statement is true regarding education enrolment?
- a) Net Enrolment is always greater than Gross Enrolment
 - b) Gross Enrolment is always greater than Net Enrolment
 - c) Net Enrolment is greater or equal to Gross Enrolment
 - d) Gross Enrolment is greater or equal to Net Enrolment
8. Population Census in most developing countries including Bhutan are conducted every
- a) 5 years
 - b) 10 Years
 - c) 15 years
 - d) None of the above
9. The Gross National Happiness Commission is in the process of formulating the 11th Five Year Plan based on the four pillars of GNH. How many National Key Results Areas is it based on?
- a) 4
 - b) 10
 - c) 16
 - d) 20
10. DrukInfo is a software platform that is used for which purpose in Bhutan?
- a) Data entry
 - b) Data analysis
 - c) Data dissemination
 - d) None of the above
11. The total area under the normal distribution curve is
- a) Equal to 1
 - b) Greater than 1
 - c) Less than 1
 - d) Cannot determine without data
12. The following is true about nonparamatic tests
- a) Nonparamatic tests are tests that do not require a normal distribution
 - b) Nonparamatic tests utilize both nominal and ordinal data
 - c) Bothe of the above statements are correct
 - d) None of the above two statements are correct
13. The probability $P(A) = \frac{\text{Number of times event A occurred}}{\text{Number of times experiment was run}}$ is an example of
- a) Classical approach
 - b) Personal approach
 - c) Relative frequency approach
 - d) None of the above

14. Permutation is

- a) An arrangement of objects in a definite order
- b) A selection of objects without regard to order
- c) None of the above is true
- d) Both of the above statements are true

15. $0!$ is equal to

- a) 0
- b) 1
- c) None of the above
- d) Both of the above statements are true

16. The solution to $\binom{8}{5}$ is

- a) 48
- b) 32
- c) 55
- d) 56

17. $P(A \cup B \cup C) = P(A) + P(B) + P(C)$ if

- a) A, B and C are independent of each other
- b) A, B and C are mutually exclusive
- c) None of the above statements are true
- d) Both of the above statements are true

18. Let $\sum_{k=1}^{\infty} ar^{k-1}$ be a geometric series. The series converges to $\frac{a}{1-r}$ if

- a) $|r| > 1$
- b) $|r| < 1$
- c) None of the above statements are true
- d) Both of the above statements are true

19. The expected value of a constant is

- a) $E(c) = 0$
- b) $E(c) = c$
- c) None of the statements above are true
- d) Both the statements above are true

20. $f(x) \geq 0$ and $\sum_{all\ x} f(x) = 1$ are necessary and sufficient conditions for a function to be
- Discrete Density
 - Continuous Density
 - None of the above statements are true
 - Both of the above statements are true
21. CsPro software is mainly used for
- Data analysis
 - Mapping
 - Data entry
 - Meta data storage
22. Redatam software is advantageous as an analysis tool because
- Individual data is not visible to the user
 - Individual data is visible to the user
 - None of the above statements are true
 - Both the statements above are true
23. Metadata is
- Data stored in software
 - Data stored in hard copies
 - Data about data
 - None of the above
24. ArcGIS is a software mainly used for
- Data analysis
 - Data entry
 - Mapping
 - None of the above
25. With declaration of the United Nations, World Statistics Day is celebrated on which date every three years?
- June 21
 - November 11
 - October 21
 - October 20
26. How many Fundamental Principles of Official Statistics have been adopted by the Statistical Commission of the United Nations?
- 8
 - 10
 - 12
 - 15

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27. International standard classifications on occupation, industry, National accounts etc are created mainly for
- Easy reference on standards
 - To compel Statistical offices to follow the standards
 - For comparability of data among nations
 - None of the above
28. The poverty rate of Bhutan as per Bhutan Living Standard Survey 2007 was
- 36.4
 - 23.2
 - 25.8
 - None of the above
29. EViews is a software used mainly for
- Data entry
 - Poverty analysis
 - Forecasting
 - None of the above
30. The Millennium Development Goals are
- 12 in numbers
 - 10 in numbers
 - 8 in numbers
 - None of the above
31. In the Millennium Development Goals there are
- 20 time bound targets
 - 18 time bound targets
 - 15 time bound targets
 - None of the above
32. When we find the probability of an event happening by subtracting the probability of the event not happening from 1, we are using
- Subjective probability
 - The complement rule
 - The general rule of addition
 - The special rule of multiplication
33. Which of the following is *not* a reason for sampling?
- The destructive nature of certain tests
 - The physical impossibility of checking all the items in the population
 - The adequacy of sample results
 - All of the above are reasons for sampling

34. For nominal variables distinct levels differ in
- a) Quality
 - b) Quantity
 - c) Both the above statements are true
 - d) None of the above statements are true
35. The odds ratio can equal any
- a) Non negative number
 - b) Negative number
 - c) Any number, either positive or negative
 - d) None of the above
36. Comparison of two subjects on an ordinal scale can answer
- a) What is the numerical difference between their responses
 - b) Which subject makes the higher response
 - c) Both the above statements are true
 - d) None of the above statements are true
37. In the design of a nationwide survey, to reduce cost, the best sampling method is
- a) Simple Random Sampling
 - b) Two Stage Stratified Cluster Sampling
 - c) Judgment sampling
 - d) Quota sampling
38. Which of the following statement is true?
- a) $\binom{n}{n} \binom{n}{n} = 2^{n+n}$
 - b) $\binom{n}{n} \binom{n}{n} = 2^{n*n}$
 - c) None of the above statements
 - d) Both the above statements
39. Which of the following statement is true?
- a) $\frac{1}{\sqrt[4]{2^3}} = 2^{\frac{3}{4}}$
 - b) $\frac{1}{\sqrt[4]{2^3}} = 2^{-\frac{3}{4}}$
 - c) $\frac{1}{\sqrt[4]{2^3}} = 2^{\frac{4}{3}}$
 - d) None of the above

40. The second-order determinant of the matrix $\begin{vmatrix} 1 & 2 \\ 3 & 1 \end{vmatrix}$ is
- a) 15
 - b) -15
 - c) 10
 - d) None of the above
41. Three quantities are given as a, b and c . If $2b = a + c$ the three quantities represents
- a) Arithmetic Progression
 - b) Geometric Progression
 - c) Harmonic Progression
 - d) None of the above
42. Let $f(x) = x^2$ if $x \neq 2$. The domain of the function is
- a) $(-\infty, +\infty)$
 - b) $(0, +\infty)$
 - c) $(-\infty, +\infty)$
 - d) None of the above
43. When the functions graph is symmetric with respect to the y axis, the function is
- a) An odd function
 - b) An even function
 - c) Non of the above
 - d) Both the above
44. $a^m = a^n \Rightarrow m = n$ provided the following
- a) $a > 0$
 - b) $a \neq 1$
 - c) Both the above
 - d) None of the above
45. A quadratic equation has
- a) One root
 - b) Two roots
 - c) Three roots
 - d) Four roots
46. Which of the following is true?
- a) $\sqrt{-1} = i$
 - b) $\sqrt{-1} = -1$
 - c) Both the above
 - d) None of the above

47. $b^2 - 4ac$ is negative in a quadratic equation, then the roots of the equation is
- a) Real
 - b) Imaginary
 - c) Both the above
 - d) None of the above
48. When the degree of the numerator is less than the degree of the denominator, the fraction is
- a) Proper fraction
 - b) Improper fraction
 - c) Both the above
 - d) None of the above
49. The ratio of circumference of a circle to its diameter is equal to
- a) π
 - b) 2π
 - c) $\frac{\pi}{2}$
 - d) None of the above
50. Which of the following statement is true?
- a) π radians = 180 degrees
 - b) π radians = 90 degrees
 - c) π radians = 360 degrees
 - d) None of the above
51. $\sin^2 \theta + \cos^2 \theta = 1$ if
- a) $\theta = 60^\circ$
 - b) $\theta = 30^\circ$
 - c) $\theta = 90^\circ$
 - d) None of the above
52. Given the function $f(x)$, the following is true
- a) $f(x)$ is the image
 - b) x is the image
 - c) Both of the above are true
 - d) None of the above are true

53. A function has an inverse if and only if
- a) It has one to many correspondence between its domain and range
 - b) It has one to one correspondence between its domain and range
 - c) Both the above
 - d) None of the above
54. A function of the form $\sqrt{x^2 - 1}$ is an example of a
- a) Rational function
 - b) Irrational function
 - c) Exponential function
 - d) Logarithmic function
55. $y = 8x$ is an example of a
- a) Continuous function
 - b) Discontinuous function
 - c) Both of above
 - d) None of the above
56. A given function is not derivable if either of the left handed or right handed limits
- a) Does not exist
 - b) Both exist but have different values
 - c) Both of the above
 - d) None of the above
57. $\frac{d}{dx}\left(\frac{1}{x^4}\right)$ is equal to
- a) $\frac{-4}{x^5}$
 - b) $\frac{4}{x^5}$
 - c) $\frac{4}{x^{-5}}$
 - d) None of the above
58. The solution of $\frac{d}{dx}(x^3)$ is
- a) 6
 - b) 8
 - c) 10
 - d) 12

59. The solution of $\frac{d}{dx} \left(\frac{1}{x^8} \right)$ is

- a) 8
- b) 0
- c) -8
- d) 4

60. The solution of $\int \frac{1}{x^8} dx$ is

- a) $-\frac{1}{7x^7} + c$
- b) $\frac{1}{7x^7} + c$
- c) $-\frac{1}{8x^8} + c$
- d) $\frac{1}{8x^8} + c$

61. The coordinates of any point on the x-axis would be

- a) (x,0)
- b) (0,y)
- c) None of the above
- d) Both the above

62. If the slopes of the two lines are equal then they are

- a) Parallel
- b) Perpendicular
- c) None of the above
- d) Both the above

63. The mode of the following data (2,5,6,8,6,4) is

- a) 7
- b) 5
- c) 6
- d) 8

64. Range can be used as a measure of variability when

- a) Data are too scant or too scattered
- b) Knowledge of the extreme scores is all that is required
- c) Both the above
- d) None of the above

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65. If P denotes the principal, R the rate of interest percent per annum, T the Number of years, I the total interest and A the amount, $A = P\left(1 + \frac{r}{100}\right)^n$ is the formula for determining amount for

- a) Simple interest
- b) Compound interest
- c) Both the above
- d) None of the above

66. The fifth King, Jigme Khesar Namgyel Wangchuk was born on

- a) 20 February, 1980
- b) 21 February, 1980
- c) 22 February, 1980
- d) 23 February, 1980

67. Our fifth king was officially crowned in

- a) September, 2008
- b) October, 2008
- c) November, 2008
- d) December, 2008

68. The post of the Prime Minister as per the constitution is limited to

- a) One term
- b) Two terms
- c) Three terms
- d) Not specified

69. The parliament of Bhutan consists of

- a) National Assembly
- b) National Council and National Assembly
- c) The King, National Council and National Assembly
- d) Cabinet

70. In accordance to our constitution, the National Assembly can have a maximum of

- a) 20 members
- b) 47 members
- c) 50 members
- d) 55 members

PART II : SHORT ANSWER QUESTIONS

Answer all questions. Each question carries THREE marks.

1. Simplify $(3a^3x^2)^4$

2. Simplify $\sqrt{\frac{5}{9}}$

3. Find the two roots of the equation $x^2 = 68 - 8$

4. If $\log_a \sqrt{2} = \frac{1}{6}$, find a

5. Let M be the mean of x_1, x_2, x_3, x_4, x_5 and x_6 . Find the value of $\sum_{i=1}^6 (x_i - M)$

6. Given the equation $y = x + 5$. Determine the slope and y intercept

7. Differentiate the function $\frac{1}{x^3}$ with respect to x

8. The grades of 5 male students and 5 female students are given below. Find the Variance

Male: 65, 75, 85, 95 and 100

Female: 82, 83, 84, 85 and 86.

9. Write the difference between point estimate and interval estimate

10. Find the number of permutations of the seven letters of the word “algebra”