JEMAS(PG)-2024 **QB No: 4101200001**

Subject: Diploma in Health Statistics (DHS)

Duration: 90 minutes **No of MCQ: 100** **Full Marks: 100**

INSTRUCTIONS

1. All questions are of objective type having four answer options for each.
2. **Category-1**: Carries **1** mark each and only one option is correct. In case of incorrect answer or any combination of more than one answer, ¼ mark will be deducted.
3. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
4. Use only **Black/Blue ink ball point pen** to mark the answer by filling up of the respective bubbles completely.
5. Write Question Booklet number and your roll number carefully in the specified locations of the **OMR** sheet. Also fill appropriate bubbles.
6. Write your name (in block letter), name of the examination center and put your signature (as is appeared in Admit Card) in appropriate boxes in the **OMR sheet**.
7. The OMR sheet is liable to become invalid if there is any mistake in filling the correct bubbles for Question Booklet number/roll number or if there is any discrepancy in the name/ signature of the candidate, name of the examination center. The OMR sheet may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
8. Candidates are not allowed to carry any written or printed material, calculator, pen, log-table, wristwatch, any communication device like mobile phones, bluetooth devices etc. inside the examination hall. Any candidate found with such prohibited items will be **reported against** and his/her candidature will be summarily cancelled.
9. Rough work must be done on the Question Booklet itself. Additional blank pages are given in the Question Booklet for rough work.
10. Hand over the OMR sheet to the invigilator before leaving the Examination Hall.
11. Candidates are allowed to take the Question Booklet after examination is over.

Signature of the Candidate: _____

(As in Admit Card)

Signature of the Invigilator: _____

ROUGH WORK ONLY

DHS

1. The algebraic sum of the deviations of a frequency distribution from its mean is always:
   (A) Greater than zero.
   (B) Less than zero.
   (C) Zero
   (D) A non-zero number

2. Which of the following cannot be determined graphically?
   (A) Mean.
   (B) Median.
   (C) Mode.
   (D) None of these.

3. Mean of 100 items is 49. It was discovered that three items which should have been 60, 70, 80 were wrongly read as 40, 20, 50 respectively. The correct mean is:
   (A) 48.
   (B) 49.
   (C) 50.
   (D) 60.

4. Find the value of x, if the mode of the following data is 25: 15, 20, 25, 18, 14, 15, 25, 15, 18, 16, 20, 25, 20, x, 18
   (A) 18.
   (B) 25.
   (C) 20.
   (D) 15.

5. A cylinder and a cone are of same base radius and of same height. The ratio of the volume of the cylinder to that of the cone is:
   (A) 2:1.
   (B) 3:1.
   (C) 2:3.
   (D) 3:2.

6. The volume of a sphere is 4851 cm^3. Its diameter is:
   (A) 3.5 cm.
   (B) 7 cm.
   (C) 14 cm.
   (D) 21 cm.

7. The total number of events of throwing 10 coins simultaneously is:
   (A) 1024.
   (B) 512.
   (C) 100.
   (D) 10.

8. The letters of the word SOCIETY are placed at random in a row. The probability of getting a vowel is:
   (A) $\frac{1}{7}$.
   (B) $\frac{2}{7}$.
   (C) $\frac{3}{7}$.
   (D) $\frac{4}{7}$.

9. A girl calculates that the probability of her winning the first prize in a lottery is $\frac{8}{100}$. If 6,000 tickets are sold, how many tickets has she bought?
   (A) 400.
   (B) 750.
   (C) 480.
   (D) 240.

10. The distance between two parallel tangents of a circle of radius 4 cm is:
   (A) 2 cm.
   (B) 4 cm.
   (C) 6 cm.
   (D) 8 cm.

11. Pictorial representation of data using symbols is known as:
   (A) Bargraph.
   (B) Pictograph.
   (C) Piechart.
   (D) None of these.

12. The difference between the upper class limit and lower class limit of a class interval is called:
   (A) Frequency.
   (B) Width.
   (C) Grouped data.
   (D) Ungrouped data.

13. The factors of $6xy - 4y + 6 - 9x$ are:
   (A) $(3x + 2)(2y + 3)$.
   (B) $(3x - 2)(2y - 3)$.
   (C) $(3x - 2)(2y + 3)$.
   (D) $(3x - +2)(2y - 3)$.

14. The pair of equations $3x - 5y = 7$ and $-6x + 10y = 7$ have:
   (A) A unique solution.
   (B) Infinitely many solutions.
   (C) No solution.
   (D) Two solutions.

15. Five years ago, A was thrice as old as B and ten years later, A shall be twice as old as B. What is the present age of A?
    (A) 20.
    (B) 50.
    (C) 60.
    (D) 40.

16. What will be the solution of these equations ax+by=a-b, bx-ay=a+b?
    (A) x=1, y=2.
    (B) x=2, y=-1.
    (C) x=-2, y=-2.
    (D) x=1, y=-1.

17. Rozly can row downstream 20km in 2 hours, and the upstream 4km in 2 hours. What will be the speed of rowing in still water?
    (A) 6km/hr.
    (B) 4km/hr.
    (C) 3km/hr.
    (D) 7km/hr.

18. The probability that a prime number selected at random from the numbers (1,2,3, ...35) is:
    (A) 12/35.
    (B) 11/35.
    (C) 13/35.
    (D) None of these.

19. The following probabilities are given; choose the correct answer for that which is not possible?
    (A) 0.15.
    (B) 2/7.
    (C) 7/5.
    (D) 3/4.

20. If A = 2n + 13, B = n + 7, where n is a natural number then HCF of A and B is:
    (A) 2.
    (B) 1.
    (C) 3.
    (D) 4.

21. Two natural numbers whose sum is 85 and the least common multiple is 102 are:
    (A) 30 and 55.
    (B) 17 and 68.
    (C) 35 and 55.
    (D) 51 and 34.

22. The largest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is:
    (A) 13.
    (B) 65.
    (C) 875.
    (D) 1750.

23. What should be the frequency of 30-40 in this case?

Marks obtained	Number of students
More than or equal to 0	63
More than or equal to 10	58
More than or equal to 20	55
More than or equal to 30	51
More than or equal to 40	48
More than or equal to 50	42

(A) 51.
(B) 48.
(C) 4.
(D) 3.

24. A pharmacist needs to strengthen a 15% alcohol to one of 32% alcohol. How much pure alcohol should be added to 400 ml of the 15% solution?
(A) 90.
(B) 100.
(C) 200.
(D) 125.

25. The mean of 30 numbers is 18. What will be the new mean, if each observation is increased by 2?
(A) 18.
(B) 20.
(C) 36.
(D) 15.

26. Which of the following property of matrix multiplication is correct?
(A) Multiplication is not commutative in general.
(B) Multiplication is associative.
(C) Multiplication is distributive over addition.
(D) All of the mentioned.

27. If A and B are square matrices of equal degree, then which one is correct among the following?
(A) A + B = B +A.
(B) A + B = A – B.
(C) A – B = B – A.
(D) AB = BA.

28. $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sin x}$ equals to:
(A) 0.
(B) 1/2.
(C) 1.
(D) 3/2.

29. The degree of the differential equation $(1+\frac{dy}{dx})^3 = (\frac{dy}{dx})^2$ is:

(A) 1.
(B) 2.
(C) 3.
(D) 4.

30. The diagonal elements of a skew symmetric matrix are:

(A) All zeroes.
(B) Are all equal to some scalar k($\neq 0$).
(C) Can be any number.
(D) None of these.

31. If a matrix has 6 elements, then number of possible orders of the matrix can be:

(A) 2.
(B) 4.
(C) 3.
(D) 6.

32. The probability distribution of the discrete variable X is given as:

X	2	3	4	5
$P(X)$	$\frac{5}{k}$	$\frac{7}{k}$	$\frac{9}{k}$	$\frac{11}{k}$

The value of k is:

(A) 8.
(B) 16.
(C) 32.
(D) 48.

33. Let A and B be two given mutually exclusive events. Then P(A/B) is:

(A) 1.
(B) 0.
(C) 1/2.
(D) Can't be determined.

34. The equations of y-axis in space are:

(A) x = 0, y = 0.
(B) x = 0, z = 0.
(C) y = 0, z = 0.
(D) y = 0.

35. Principal value of $\sin^{-1}(-\frac{1}{2})$ is:

(A) $\frac{\pi}{3}$.
(B) $-\frac{\pi}{3}$.
(C) $\frac{\pi}{6}$.
(D) $-\frac{\pi}{6}$.

36. What is the difference of the focal distances of any point on a hyperbola?
    (A) Eccentricity.
    (B) Length of transverse axis.
    (C) Distance between the foci.
    (D) Length of semi-transverse axis.

37. How many 3-digit numbers can be formed by using the digits 1 to 9, if no digit is repeated?
    (A) 729.
    (B) 648.
    (C) 576.
    (D) 504.

38. In how many ways can 5 girls and 3 boys be seated in a row so that no two boys are together?
    (A) 256.
    (B) 8500.
    (C) 10800.
    (D) 14400.

39. If a, b, c are in A.P., then : (a + 2b – c) (2b + c – a) (c + a – b) equals:
    (A) abc/2.
    (B) abc.
    (C) 2 abc.
    (D) 4 abc.

40. The derivative of x^6 w.r.t. x^3 is:
    (A) $6x^6$.
    (B) $3x^2$.
    (C) $2x^3$.
    (D) x^2.

41. The population of a country increased by an average of 2% per year from 2000 to 2003. If the population of this country was 2 000 000 on December 31, 2003, then the population of this country on January 1, 2000, to the nearest thousand would have been:
    (A) 1846 000.
    (B) 1852 000.
    (C) 1000 000.
    (D) 1500 000.

42. If f(x) is an odd function, then | f(x) | is:
    (A) An odd function.
    (B) An even function.
    (C) Neither odd nor even.
    (D) Even and odd.

43. What number must be added to each of the four numbers 10, 18, 22, 38 to make them in proportion?
    (A) 8.
    (B) 7.
    (C) 2.
    (D) 1.

44. The AM of 1, 3, 5, …… , 29 is:
    (A) 11.
    (B) 13.
    (C) 15.
    (D) 17.

45. The number of terms in the expansion of $(x + y + z)^n$ is:
    (A) $\frac{n(n+1)}{2}$.
    (B) $\frac{(n+1)(n+2)}{2!}$.
    (C) $\frac{n(n+3)}{2}$.
    (D) $\frac{(n+1)(n+3)}{2}$.

46. In a batch of 15 students, 5 students failed in a test where the pass mark was 35. The marks of 10 students who passed were 90, 60, 70, 80, 80, 90, 60, 50, 40, 70. Find the median of the marks of all the 15 students.
    (A) 70.
    (B) 60.
    (C) 80.
    (D) 50.

47. If $P(A \cap B) = 70\%$ and $P(B) = 85\%$, then $P(A/B)$ is equal to:
    (A) 14/17.
    (B) 17/20.
    (C) 7/8.
    (D) 1/8.

48. The lengths of the diagonals of a rhombus are 16 cm and 12cm. Then, the length of the side of the rhombus is:
    (A) 9 cm.
    (B) 8 cm.
    (C) 20 cm.
    (D) 10 cm

49. The abscissa of the point of intersection of the less than type and of the more than type cumulative frequency of a grouped data gives its:
    (A) Mean.
    (B) Median.
    (C) Mode.
    (D) All of these.

50. If the arithmetic mean of x, x + 3, x + 6, x + 9 and x + 12 is 10, then x = ?
    (A) 1.
    (B) 2.
    (C) 6.
    (D) 4.

51. By solving the equation $2x - (3x - 4) = 3x - 5$, the value of x will be:
    (A) 9/4.
    (B) 1/2.
    (C) 7/3.
    (D) 1/3.

52. By solving the equation $3:5x = 9:5,\ x \neq 0$, the value of x will be:
    (A) 1/2.
    (B) 1/3.
    (C) 1/4.
    (D) 1.

53. How many straight lines can pass through a given points?
    (A) 0.
    (B) 1.
    (C) 2.
    (D) Infinite.

54. In how many points can two distinct straight lines at the most intersect?
    (A) 0.
    (B) 1.
    (C) 2.
    (D) 3.

55. Every real number is:
    (A) Rational number only.
    (B) Irrational number only.
    (C) Either rational or irrational number.
    (D) None of the above.

56. Which of the following describe the middle part of a group of numbers?
    (A) Measures of variability.
    (B) Measures of central tendency.
    (C) Measures of association.
    (D) Measures of shape.

57. Which of the following divides a group of data into four subgroups?
    (A) Median.
    (B) Quartiles.
    (C) Standard Deviation.
    (D) Percentiles.

58. Sum of dots when two dice are rolled is:
(A) A discrete variable.
(B) A continuous variable.
(C) A constant.
(D) A qualitative variable.

59. The data which have already been collected by someone are called:
(A) Raw data.
(B) Array data.
(C) Secondary data.
(D) Fictitious data.

60. Given $X_1 = 12, X_2 = 19, X_3 = 10, X_4 = 7$, then $\sum_{i=1}^{4} X$ equals:
(A) 36.
(B) 48.
(C) 41.
(D) 29.

61. A constant variable can take values:
(A) Zero.
(B) Fixed.
(C) Not fixed
(D) Nothing.

62. 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.

63. Find the mean of $x + 77, x + 7, x + 5, x + 3$ and $x - 2$.
(A) $x + 8$.
(B) $x + 18$.
(C) $x - 8$.
(D) $x - 18$.

64. If the mean of n observations $x_1, x_2, x_3, \ldots x_n$ is $\bar{x}$, then what is the value of $\sum_{i=1}^{n}(x_i - \bar{x})$?
(A) 0.
(B) 1.
(C) 2.
(D) 3.

65. The value of ${}^5C_2 + {}^{12}C_2 + {}^7C_3$ is:
(A) 111.
(B) 124.
(C) 320.
(D) 830.

66. Two unbiased dice are rolled together. Find the probability of getting 2 digits, the sum of which is 7.
(A) $\frac{3}{2}$.
(B) $\frac{5}{12}$.
(C) $\frac{1}{6}$.
(D) $\frac{1}{36}$.

67. Find the value of $\frac{1}{1+ tan^2\theta} + \frac{1}{1+cot^2\theta}$.
(A) 0.
(B) 1.
(C) 2.
(D) Not possible.

68. Find the area of a trapezium when the height of the trapezium is 6 cm and parallel sides are 2 cm and 10 cm long.
(A) 12 cm^2.
(B) 5 cm^2.
(C) 36 cm^2.
(D) 72 cm^2.

69. If ${}^{25}C_r = {}^{25}C_{2r+1}$, find the value of r.
(A) 7.
(B) 8.
(C) 14.
(D) 16.

70. In how many ways 6 boys can form a ring?
(A) 24.
(B) 60.
(C) 120.
(D) 600.

71. In a right-angled triangle, the base of the triangle is 12 cm and the height is 5 cm. Calculate the hypotenuse.
(A) 12.
(B) 13.
(C) 14.
(D) 15.

72. For the inequality $2\ (1 - x\ ) + 5 \leq 3\ (\ 2x - 1\ ),$ find the range of values for x.
(A) $x \geq \frac{4}{5}$.
(B) $x \leq \frac{4}{5}$.
(C) $x \leq \frac{5}{4}$.
(D) $x \geq \frac{5}{4}$.

73. If $3x^2 + 25x - 18 = 0$, then x =?
    (A) $-\frac{2}{3}$, –9.
    (B) $\frac{2}{3}$, 9.
    (C) $\frac{2}{3}$, –9.
    (D) 9.

74. The volume of a cylinder is 87.92 m^3. If the radius of the cylinder is 2 m, find the height of the cylinder, given $\pi = 3.14$.
    (A) 3.5 m.
    (B) 7 m.
    (C) 21 m.
    (D) 1.75 m.

75. For $y = 2x^3 - 15x^2 + 36x + 8$, solve the equation $\frac{dy}{dx} = 12$.
    (A) 1.
    (B) 4.
    (C) 4,1.
    (D) -4,-1.

76. If $a = \log_3 5$ and $b = \log_{17} 25$, then:
    (A) a < b.
    (B) a = b.
    (C) a > b.
    (D) a > 2b.

77. In a triangle ABC, if AB = 5, BC = 12 and AC = 13, what type of triangle is it?
    (A) Scalene.
    (B) Isosceles.
    (C) Equilateral.
    (D) Right-angled.

78. The area of a circle is 25π. What is the circumference?
    (A) 10π.
    (B) 20π.
    (C) 30π.
    (D) 40π.

79. If $\sin\theta = \frac{3}{5}$, what is $\cos\theta$?
    (A) $\frac{4}{5}$.
    (B) $\frac{3}{4}$.
    (C) $\frac{5}{3}$.
    (D) $\frac{5}{4}$.

80. Simplify the expression $\frac{x^2+3x+2}{x+2}$.
(A) $x + 1$.
(B) $x + 2$.
(C) $x + 3$.
(D) $x + 4$.

81. Evaluate $\int_0^1 (x^2 + 3x + 2)dx$.
(A) 5.
(B) 6.
(C) 7.
(D) 8.

82. Sample is the:
(A) Subset of population.
(B) Not related with population.
(C) Population.
(D) None.

83. Frequency is the:
(A) No. of repetition.
(B) Average.
(C) Mode.
(D) None.

84. Census reports used as a source of data is:
(A) Primary.
(B) Secondary.
(C) Both A & B.
(D) None.

85. Population refers to:
(A) A part of group.
(B) Entire Group.
(C) Both A & B.
(D) None.

86. Stages of cancer is an example of:
(A) Nominal data.
(B) Ordinal Data.
(C) Discrete Data.
(D) None.

87. Normal curve is:
(A) Bell.
(B) Square.
(C) Column.
(D) Round.

88. Bar diagram is the:
(A) Column.
(B) Circle.
(C) Square.
(D) None.

89. Which language is commonly used with Statistics?
(A) C.
(B) C++.
(C) Ruby.
(D) R.

90. Chi square test is:
(A) Non parametric test.
(B) Parametric test.
(C) Traditional test.
(D) None.

91. The addition of a rational number and an irrational number is equal to:
(A) Rational number.
(B) Irrational number.
(C) Both A & B.
(D) None.

92. Skewness is:
(A) Rightward.
(B) Leftward.
(C) Peak.
(D) A & B.

93. Kurtosis is:
(A) Peakedness.
(B) Bell Shaped.
(C) Both.
(D) None.

94. The middle value of an ordered array of numbers is the:
(A) Mean.
(B) Median.
(C) Mode.
(D) Mid point.

95. For some integer m, every even integer is of the form:
(A) m.
(B) m+1.
(C) 2m.
(D) 2m+1.

96. P(A ∩ B) is equal to:
    (A) P(A) . P(B|A).
    (B) P(B) . P(A|B).
    (C) Both A and B.
    (D) None.

97. The decimal expansion of 22/7 is:
    (A) Terminating.
    (B) Non-terminating and repeating.
    (C) Non-terminating and Non-repeating.
    (D) None of the above.

98. Histogram is:
    (A) Area Diagram.
    (B) Column.
    (C) Circle.
    (D) B & C.

99. Which of the following statements is true about the arithmetic mean of two regression coefficients?
    (A) It is less than the correlation coefficient.
    (B) It is equal to the correlation coefficient.
    (C) It is greater than or equal to the correlation coefficient.
    (D) It is greater than the correlation coefficient.

100. If the first term of an AP series is 2 and common difference is 4, then the sum of its first 40 numbers is:
    (A) 1600.
    (B) 3200.
    (C) 1800.
    (D) 1500.