(GCF-1, 3, 4, 5, 6, 7+7A, 8+8A, 9, 12, 13 & 14, VCF-1,2 & 4, ACF-1,2 & 5, JCF-1 & 3, DCF-5,6,7 & 8, Drive-2)

DATE: 08.11.2023   MAXIMUM MARKS: 100   TIMING: 2 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. In the line $y = 19 - \dfrac{5x}{2}$, byx is equal to
   (a) 19/2
   (b) 5/2
   (c) -5/2
   (d) None

2. Five boys A, B, C, D, E, are sitting in a park in a circle. A is facing South-West, D is facing South-East, B and E are right opposite A and D respectively and C is equidistant between D and B. Which direction is C facing ?
   (a) West
   (b) South
   (c) North
   (d) East

3. What is the number of ways that 4 boys and 3 girls can be seated so that boys and girls alternate?
   (a) 12
   (b) 72
   (c) 120
   (d) 144

4. If 20% of (P + Q) = 50% of (P – Q) Then, P:Q =
   (a) 5 : 7
   (b) 3 : 7
   (c) 7 : 3
   (d) 7 : 8

5. The number of straight lines can be formed out of 10 point of which 7 are collinear
   (a) 24
   (b) 21
   (c) 25
   (d) 26

6. Find the value of $\dfrac{(243)^{\frac{n}{5}} \cdot 3^{2n+1}}{9^{n} \times 3^{n-1}}$
   (a) 4
   (b) 5
   (c) 9
   (d) 10

7. A, B, C, D are four numbers so that A:B=2:3, B:C=4:5, C:D=5:8 then A:D is :-
   (a) 2:3
   (b) 3:2
   (c) 1:3
   (d) 3:1

8. The third proportional to $(x^2 - y^2)$ and $(x - y)$ is

    (a) $\dfrac{x + y}{x - y}$

    (b) $\dfrac{x - y}{x + y}$

    (c) $x + y$
    (d) $x - y$

9. If $a:b = b:c$ then $a^4:b^4 =$
    (a) $b^2:ac$
    (b) $c^2:a^2$
    (c) $a^2:c^2$
    (d) $ac:b^2$

10. If $^{n+2}C_r = {}^{n+2}C_{10-r}$ then $^nC_6$ equals to

    (a) 8
    (b) 28
    (c) 56
    (d) None of these

11. In a city, three daily news paper A, B and C are published, 42% read A, 51% read B, 68% read C, 30% read A and B, 28% read B and C, 36% read A and C, 8% do not read any of the three newspapers. What is the percentage of person who read only one paper ?
    (a) 38%
    (b) 48%
    (c) 51%
    (d) None

12. If $f(x) = \sqrt{x + \sqrt{x + \sqrt{x + \ldots\infty}}}$, then what is f'(x) equal to ?

    (a) $\dfrac{1}{1 - 2f(x)}$

    (b) $\dfrac{1}{2f(x) - 1}$

    (c) $\dfrac{1}{1 + 2f(x)}$

    (d) $\dfrac{1}{2 + f(x)}$

13. If A = {a, b, c} and R = {(a, a), (a, b), (b, c), (b, b), (c, c), (c, a)} is a relation on A, then which one of the following is correct?
    (a) R is reflexive, symmetric and transitive
    (b) R is reflexive and symmetric, but not transitive
    (c) R is reflexive and transitive, but not symmetric
    (d) R is reflexive, but neither symmetric nor transitive

14. If n(A) = 115, n(B) = 326 and n(A - B) = 47 then what is n(A $\cup$ B) equal to?
     (a) 373
     (b) 165
     (c) 370
     (d) 394

15. Given the prices of 2 commodities are increased by 10% and 20% respectively and the price of another commodity is decreased by 30%. The relative importance of 3 commodities are in the ratio 3:3:1. Find weighted price index number.
     (a) 80
     (b) 109
     (c) 108.5
     (d) 110

16. The odds are 9:5 against a person who is 50 years living till he is 70 and 8:6 against a person who is 60 living till he is 80. Find the probability that at least one of them will be alive after 20 years:
     (a) $\dfrac{11}{14}$

     (b) $\dfrac{22}{49}$

     (c) $\dfrac{31}{49}$

     (d) $\dfrac{35}{49}$

17. The area of a normal Curve is
     (a) 90%
     (b) 95%
     (c) Unity
     (d) Infinity

18. If the difference between the mean and the variance of binomial distribution for 5 trials is 5/9, the distribution is of the form
     (a) $\left(\dfrac{1}{4}+\dfrac{3}{4}\right)^5$

     (b) $\left(\dfrac{1}{9}+\dfrac{8}{9}\right)^5$

     (c) $\left(\dfrac{2}{3}+\dfrac{1}{3}\right)^5$

     (d) None of these

19. When the two curves of ogive intersect, the point of intersection provides:
     (a) First Quartile
     (b) Second Quartile
     (c) Third Quartile
     (d) Mode

20.   Coefficient of Variation if Median = 23, Mode = 29 and Variance = 100 is
       (a)   10%
       (b)   50%
       (c)   20%
       (d)   None of these

21.   If the standard deviation of 0, 1, 2, 3... 9 is k, than standard deviation of 10, 11, 12, 13,.... 19 is
       (a)   10k
       (b)   k+10
       (c)   k
       (d) $k + \sqrt{10}$

22.   Laspeyre's index is based on
       (a)   Base Year Quantities
       (b)   Current Year Quantities
       (c)   Average of base and current year Quantity
       (d)   None of these

23.   If set A = {1,2,3}, then what is the power set of A ?
       (a)   { {1}, {2}, {3}, {1,2}, {1,3}, {2,3}, {1,2,3} }
       (b)   { ϕ, {1}, {2}, {3}, {1,2}, {1,3}, {2,3} }
       (c)   { ϕ, {1}, {2}, {3}, {1,2}, {1,3}, {2,3}, {1,2,3} }
       (d)   None

24.   How many different words can be formed with the letters of the word 'MISSISSIPPI'?
       (a)   36450
       (b)   35460
       (c)   34560
       (d)   34650

25.   A sum of money lent out at simple interest amounts to Rs.720 after 2 years and Rs. 1020 after a further period of 5 years. Find the principal.
       (a)   Rs. 520
       (b)   Rs. 6000
       (c)   Rs. 600
       (d)   Rs. 1740

26.   Which Statement is correct in the following?
       Linear system of equation
       $2x + 3y = 4$ and $4x + 6y = 7$ has
       (a)   No solution
       (b)   Unique solution
       (c)   Exactly 2 solution
       (d)   Infinite solution

27.   A Polygon has 27 diagonals. Number of sides of this polygon is:
       (a)   12
       (b)   15
       (c)   16
       (d)   9

28. In an organization Employer required maximum ten employees. X and Y are numbers of male and female respectively then which inequality shows right relation.
    (a) x + y = 10
    (b) x + y $\leq$ 10
    (c) x + y $\geq$ 10
    (d) x $\geq$ 10

29. $X^y = e^{x+y}$ then $\dfrac{dy}{dx} =$

    (a) $\dfrac{2\log x}{(\log x - 1)^2}$

    (b) $\dfrac{-\log x - 2}{(\log x - 1)}$

    (c) $\dfrac{\log x}{(\log x - 1)}$

    (d) $\dfrac{\log x - 2}{(\log x - 1)^2}$

Directions (Q.30 - Q.32) : Read the following information carefully and answer the questions, given below :-
(i) **'P ÷ Q' means P, is Son of Q**
(ii) **'P x Q' means P, is Sister of Q**
(iii) **'P + Q' means P, is Brother of Q**
(iv) **'P - Q' means P, is Mother of Q**

30. How is T related to S in the expression?
    'T x R + V ÷ S' ?
    (a) Sister
    (b) Mother
    (c) Aunt
    (d) Daughter

31. How is T related to S in the expression?
    'T x R ÷ V - S' ?
    (a) Father
    (b) Sister
    (c) Daughter
    (d) Aunt

32. How is V related to T in the expression?
    'T ÷ R + V x S' ?
    (a) Aunt
    (b) Nephew
    (c) Niece
    (d) Uncle

33.   The most appropriate diagram to represent 5 year plan outlay of India in different economic sectors is:
      (a)   Pie diagram
      (b)   Histogram
      (c)   Line diagram
      (d)   Frequency polygon

34.   The age of a man is three times the sum of the ages of his two sons and 5 years hence his age will be double the sum of their ages. Find the present age of the man?
      (a)   35
      (b)   40
      (c)   45
      (d)   50

35.   I am three times as old as my son. Five years later, I shall be two and a half times as old as my son. How old am I?
      (a)   40 years
      (b)   45 years
      (c)   50 years
      (d)   none of these

Directions: Find odd One out of the following (36 - 38):
36.   4, 5, 7, 10, 14, 18, 25, 32
      (a)   7
      (b)   14
      (c)   18
      (d)   33

37.   156, 468, 780, 1094, 1404, 1716
      (a)   468
      (b)   780
      (c)   1094
      (d)   1716

38.   8, 14, 26, 48, 98, 194, 386
      (a)   14
      (b)   48
      (c)   98
      (d)   194

39.   A driver left his village and drove North for 20 km, after which he stopped for breakfast. Then he turned left and drove another 30 km, when he stopped for lunch. After some rest, he again turned left and drove 20 kms before stopping for evening tea. Once more he turned left and drove 30 kms to reach the town where he had supper. After evening tea in which direction did he drive ?
      (a)   West
      (b)   East
      (c)   North
      (d)   South

40. Six persons M, N, O, P, Q and R are sitting in two row with three persons in each row, Both the row are in front of each other. Q is not at the end of any row. P is second the left of R. O is the neigbbour of Q and diagonally opposite to P. N is the neigbour of R. Who is in front N ?
    (a) R
    (b) Q
    (c) P
    (d) M

41. In a college party, 5 girls are sitting in a row. P is to the left of M and to the right of O. R is sitting to the right of N but to the left of O. Who is sitting in the middle?
    (a) O
    (b) R
    (c) P
    (d) M

     Seven friends T, U, V, W, X, Y and Z are sitting in a straight line facing north. W sits fifth to the right of T. W does not sit at any of extreme ends. Two people sit between Z and X. Y sits third to the left of U. Y sits exactly in the middle. Z is not an immediate neighbour of Y.

42. What is Z's position with respect to W ?
    (a) Second to the left
    (b) Third to the right
    (c) Fourth to the left
    (d) Third to the left

43. If P is the husband of Q and R is the mother of S and Q. What is R to P ?
    (a) Mother
    (b) Sister
    (c) Aunt
    (d) Mother-in-law

44. X and Y are the children of A. A is the father of X but Y is not his son. How is Y related to A?
    (a) Sister
    (b) Brother
    (c) Son
    (d) Daughter

45. If Fisher's index = 150 and Paasche's index = 144, then Laspeyre's index is_____
    (a) 147
    (b) 156.25
    (c) 160.17
    (d) 138

46. During a certain period the cost of living Index number goes up from 110 to 200 and the salary of the worker is also raised form Rs. 325 to Rs. 500. Does the worker :
    (a) gain
    (b) looses
    (c) fully compensated
    (d) gain lay 10%

47. For Finding correlation between two attributes, we consider
    (a) Pearson's correlation coefficient
    (b) Scatter diagram
    (c) Spearman's rank correlation coefficient
    (d) Coefficient of document deviations

48. Cost of paper for a week under the heads raw material, labour, direct production and others were Rs. 23, Rs. 18, Rs. 32, Rs. 17 respectively. What is the difference between the central angles for the largest and smallest components of cost of the paper?
    (a) 60
    (b) 68
    (c) 72
    (d) 56

49. In a certain code 'AMNESTY' is written as 'NMAEYTS'. How will 'BRIGADE' written in that code?
    (a) IRBGEDA
    (b) EDAGBRI
    (c) ADEGBRI
    (d) EDAGIRB

50. A is B's daughter, B is C's Mother. D is C'r brother. How is D related to A ?
    (a) Father
    (b) Grand Father
    (c) Brother
    (d) Son

51. For the data given calculate Fisher's index
    $\Sigma P_1 Q_0 = 3365$, $\Sigma P_0 Q_0 = 3530$,
    $\Sigma P_1 Q_1 = 3400$, $\Sigma P_0 Q_1 = 3600$
    (a) 99
    (b) 90
    (c) 90.25
    (d) 94.88

52. The consumer price index over a certain period increased from 120 to 215 and the wages of worker increased from Rs. 1,680 to Rs. 3000. What is the loss of the worker?
    (a) 5.58
    (b) 6.58
    (c) 7.58
    (d) None of these

53. If + Means X, - Means + and X Means ÷, then the value of 5+4-18X3 is :-
    (a) -45
    (b) $12\dfrac{2}{3}$
    (c) 26
    (d) 15

54.   If an observation in the data set in negative, while the others are positive, then its
       geometric mean is:
       (a)   Positive
       (b)   Negative
       (c)   Zero
       (d)   Indeterminant

55.   If the standard deviation of x is 3, what is the variance of (5-2x)?
       (a)   36
       (b)   6
       (c)   1
       (d)   9

56.   The sum of the squares of deviations for 10 items from the mean is 250, mean is 50.
       The coefficient of variation is:
       (a)   25
       (b)   50
       (c)   10
       (d)   100

57.   Two lines of regression are given by 5x+7y-22=0 and 6x+2y-22=0. If the variance
       of y is 15 find the standard deviation of x.
       (a)   2.646
       (b)   6.246
       (c)   7.612
       (d)   3.646

58.   What is the no. of trials of a binomial distribution having mean and SD as 3 and 1.5
       respectively?
       (a)   2
       (b)   4
       (c)   8
       (d)   12

59. $\int \dfrac{dx}{x^2+2x-3}$

       (a) $\dfrac{1}{2}\log\left(\dfrac{x-1}{x+3}\right)+c$

       (b) $\dfrac{1}{3}\log\left(\dfrac{1-x}{3+x}\right)+c$

       (c) $\dfrac{1}{4}\log\left(\dfrac{x-1}{x+3}\right)+c$

       (d) $\dfrac{1}{4}\log\left(\dfrac{x-1}{x+2}\right)+c$

60.   If 5th and 12th terms of an AP are 14 and 35 respectively, find the first term of AP.
    (a)   4
    (b)   2
    (c)   1
    (d)   3

61.   Find the sum of n terms of the series whose nth terms is n (n+1).
    (a)   n(n+1)(n+2)

    (b)   n(3n-1)

    (c) $\dfrac{n(n+1)(2n+1)}{3}$

    (d) $\dfrac{n(n+1)(n+2)}{3}$

62.   How much amount is required to be invested every years as to accumulate Rs. 7,96,870 at the end of 10 years, if interest compounded annually at 10% given that A (10,0.1) = 15.9374 ?
    (a)   Rs. 40,000
    (b)   Rs. 45,000
    (c)   Rs. 48,000
    (d)   Rs. 50,000

63.   If Rs. 510 be divided among A, B, C in such a way that A gets $\dfrac{2}{3}$ of what B gets and B gets $\dfrac{1}{4}$ of what C gets, then the share of A ?
    (a)   Rs. 60
    (b)   Rs. 50
    (c)   Rs. 150
    (d)   Rs. 200

64.   An annuity consisting of equal payments at the end of each month for 2 years is to be purchased for Rs. 2000. If the interest rate is 6% compounded monthly, how much is each payment?
    (a)   78.61
    (b)   76.80
    (c)   68.70
    (d)   68.50

65.   On a certain sum, the simple interest at the end of $6\dfrac{1}{4}$ year becomes $\dfrac{3}{8}$ of the sum. The rate of Percentage is:
    (a)   7%
    (b)   6%
    (c)   5%
    (d) $5\dfrac{1}{2}$%

66. Which of the equation roots are -3, 1, 2
    (a) $x^3 - 6x^2 + 11x - 6 = 0$
    (b) $x^3 - 7x + 6 = 0$
    (c) $x^3 - 3x^2 + 2x = 0$
    (d) None of these

67. A man invested $\frac{1}{3}$ of his capital at 7% , $\frac{1}{4}$ at 8% and the remainder at 10% Simple interest. If his annual income is Rs. 561, the capital is:
    (a) Rs. 5400
    (b) Rs. 6000
    (c) Rs. 6600
    (d) Rs. 7200

68. The future value of an annuity of Rs. 6000 is made annually for 8 years at interest rate of 9% compounded annually is :
    (a) Rs. 66170.84
    (b) Rs. 62195.93
    (c) Rs. 58125.24
    (d) None of these

69. If a sum triple itself in 6 years at C.I. In how many years it will be 27 times itself at the same rate?
    (a) 18
    (b) 54
    (c) 12
    (d) 27

70. The useful life of a machine is estimated to be 10 years and cost Rs. 10,000. Rate of depreciation is 10% p.a. The scrap value at the end of its life is
    (a) Rs. 3,486.78
    (b) Rs. 4,383
    (c) Rs. 3,400
    (d) None of these

71. If a,b,c are in A.P. then (b+c), (c+a), (a+b) are in _____
    (a) AP
    (b) GP
    (c) HP
    (d) None

72. If u = 2x+5, v=−3y +1, and the regression coefficient of y on x is − 1.2, the regression coefficient of v on u is :
    (a) 1.8
    (b) −1.8
    (c) 3.26
    (d) 0.8

73. If the correlation coefficient r = $\pm$ 1 for the random variables X and Y, then the lines of regressions of Y on X and Y on Y
    (a) are perpendicular to each other
    (b) coincide
    (c) intersect with acute angle $\pi/4$
    (d) are parallel to each other

74. If byx = 1.24, bxy = 0.36, $\bar{x}$ = 5.5, $\bar{y}$ = 8.8, then regression equation of y on x is given by
    (a) y = 1.24 x + 1.98
    (b) y = −1.24 x + 1.98
    (c) x = 0.3 y + 2.86
    (d) None of these

75. A man started walking from his house towards south. After walking 6 km, he turned to his left and walked 5 km. Then he walked further 3 km after turning left. He then turned to his left and continued his walk for 9 km. How far is he away from his house?
    (a) 3 km
    (b) 4 km
    (c) 5 km
    (d) 6 km

76. Prakash is moving toward East. He turn first left, then right, then left then right. Now in which direction he is moving?
    (a) North
    (b) South
    (c) East
    (d) West

77. The colour of a flower is an example of
    (a) An attribute
    (b) A variable
    (c) A discrete variable
    (d) A Continuous variable

78. The data are known to be_____if the data, as being already collected, are used by a different person or agency.
    (a) Primary
    (b) Secondary
    (c) Specialized
    (d) Subsidiary

79. Mutually exclusive classification is usually meant for
    (a) A discrete variable
    (b) A continuous variable
    (c) An attribute
    (d) None of these

80.   The following data relate to the marks of a group of students :

Marks	No. of Students
Below 10	15
Below 20	38
Below 30	65
Below 40	84
Below 50	100

How many students got marks more than 30?
(a)   65
(b)   50
(c)   35
(d)   43

81.   Which of the following is correct?
(a)   AM = Assumed Mean + Arithmetic Mean of deviations of terms.
(b)   GM = Assumed Mean + Arithmetic Mean of deviations of terms.
(c)   Both
(d)   None

82.   The mean of set of observation is $\bar{x}$. If each observation is divided by α , $\alpha \neq 0$ and then is increased by 10, then the mean of the new set is
(a) $\bar{x} / \alpha$

(b) $(\bar{x} + 10)/\alpha$

(c) $\dfrac{\bar{x}}{\alpha} + 10$

(d) $\alpha \bar{x} + 10$

83.   The mean annual salary of all employees in a company is Rs. 25,000. The mean salary of male and female employees is Rs. 27,000 and Rs. 17,000 respectively. Find the percentage of males and females employed by the company.
(a)   60% and 40%
(b)   75% and 25%
(c)   70% and 30%
(d)   80% and 20%

84.   The average of 2 number is 20 and their standard deviation 5. Find the two numbers?
(a)   15, 25
(b)   30, 40
(c)   10, 15
(d)   None of these

85.   Find mean deviations about median and also the corresponding coefficient for the following points ('000 Rs.) of a firm during a week.
      82, 56, 75, 70, 52, 80, 68.
      (a)   Rs. 8.714.28, 12.45
      (b)   Rs. 9.253.26, 15.23
      (c)   Rs. 8.263.50, 11.36
      (d)   Rs. 8.529.41, 13.24

86.   The mean and Standard deviation of a sample of 100 observations were calculated as 40 and 5.1 respectively by a CA student who took one observation as 50 instead of 40 by mistake. The correct value of Standard deviation would be
      (a)   4.90
      (b)   5.00
      (c)   5.88
      (d)   4.85

87.   The odds in favour of an event is 2 : 3 and odds against another event is 3 : 7. Find the probability that only one of the two events occurs.
      (a) $\dfrac{27}{50}$

      (b) $\dfrac{17}{50}$

      (c) $\dfrac{37}{50}$

      (d) $\dfrac{47}{50}$

88.   A card is drawn from a pack of playing cards and then another card is drawn without the first being replaced. What is the probability of getting two hearts?
      (a)   1/17
      (b)   1/4
      (c)   2/17
      (d)   None of these

89.   A bag contains 2 Red, 3 Green, and 2 Blue bails. If 2 balls are drawn at random from the bag find the Probability that none of them will be Blue.
      (a)   11/21
      (b)   5/7
      (c)   10/21
      (d)   2/7

90.   An experiment succeeds twice as often as it fails. What is the probability that in next five trials there will be three success.
      (a)   192/243
      (b)   19/243
      (c)   80/243
      (d)   50/243

91. A man can kill a bird once in five shots. The probabilities that a bird is not killed is
     (a)   4/5
     (b)   1/5
     (c)   3/5
     (d)   2/5

92. If in a binomial distribution n = 4, P(X = 0) = 16/81, then P(X = 4) is
     (a)   1/16
     (b)   1/81
     (c)   1/27
     (d)   1/8

93. If 2 per cent of electric bulbs manufactured by a company are known to be defectives, what is the probability that a sample of 150 electric bulbs taken from the production process of the company would contain more than two defective bulbs?
     (a)   0.46
     (b)   0.43
     (c)   0.77
     (d)   0.58

94. The income of a person is Rs. 3,00,000 in the first year and he receives an increment of Rs. 10,000 to his income per year for the next 19 years. Find the total amount, he received in 20 years?
     (a)   Rs. 80,00,000
     (b)   Rs. 79,00,000
     (c)   Rs. 89,00,000
     (d)   Rs. 90,00,000

95. How many terms of $3+\dfrac{3}{2}+\dfrac{3}{4}+$………are needed to give the sum $\dfrac{3069}{512}$?
     (a)   9
     (b)   10
     (c)   11
     (d)   12

96. A sum compounded annually become $\dfrac{25}{16}$ times of itself in 2 years, the rate of interest per annum is-
     (a)   5%
     (b)   12.5%
     (c)   25%
     (d)   50%

97. Rs. 2,600 were given on interest in two parts. If simple interest of first part in 3 years with 5% interest rate is equal to simple interest of second part in 6 years with 4% interest rate. What is the second part?
     (a)   Rs. 1,600
     (b)   Rs. 1,300
     (c)   Rs. 900
     (d)   Rs. 1,000

98. At rate of interest 5% per annum compounded annually, what will be the ratio of principal amount and total amount after n years?
    (a) $(22)^n : (21)^n$
    (b) $(21)^n : (20)^n$
    (c) $(20)^n : (21)^n$
    (d) $(22)^n : (20)^n$

99. If $\dfrac{1}{\log_a^t} + \dfrac{1}{\log_b^t} + \dfrac{1}{\log_c^t} = \dfrac{1}{\log_z^t}$ then the value of Z.
    (a) abc
    (b) a+b+c
    (c) a(b+c)
    (d) (a+b)c

100. Assuming that the discount rate is 7% per annum, how much would you pay to receive Rs. 60 growing at 5%, annually , forever?
    (a) 3000
    (b) 2500
    (c) 4000
    (d) 5000

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