
BUSINESS MATHEMATICS AND LOGICAL REASONING & STATISTICS
(DECEMBER 2020)

1. The average cost function of a good is $2Q + 6 + \frac{13}{Q}$, where Q is the quantity produced. The approx cost at Q = 15 is_____.
- (a) 36
(b) 42
(c) 66
(d) 130

ANSWER : A

2. Find the missing value in the series 0, 2, 3, 6, 10, 17, 28, ____, 75,
- (a) 46
(a) 58
(c) 48
(d) 54

ANSWER : B

3. On what sum will the compound interest at 5% per annum for 2 years compounded annually be Rs. 3,280?
- (a) Rs. 32,000
(b) Rs. 16,000
(c) Rs. 48,000
(d) Rs. 64,000

ANSWER : A

4. What sum of money will produce Rs. 42,800 as an interest in 3 years and 3 months at 2.5% p.a. simple interest?
- (a) Rs. 5,26,769
(b) Rs. 3,78,000
(c) Rs. 4,22,000
(d) Rs. 2,24,000

ANSWER : A

5. Two finite sets respectively have x and y number of elements. The total number of subsets of the first is 56 more than the total number of subsets of the second. The values of x and y are respectively:
- (a) 6 and 3
(b) 4 and 2
(c) 2 and 4
(d) 3 and 6

ANSWER : A

6. The number of items in the set A is 40; in the Set B is 32; in the Set C is 50; in both A and B is 4; in both A and C is 5; in both B and C is 7; in all the sets is 2. How many are in only one set ?
- (a) 110
 - (b) 65
 - (c) 106
 - (d) 84

ANSWER : 96

7. A fruit basket contains 7 apples, 6 bananas and 4 mangoes. How many selections of 3 fruits can be made so-that all 3 are apples ?
- (a) 35 ways
 - (b) 120 ways
 - (c) 168 ways
 - (d) 70 ways

ANSWER : A

8. Out of 7 boys and 4 girls a team of a debate club of 5 is to be chosen. The number of teams such that each team includes at least one girl is-
- (a) 439
 - (b) 429
 - (c) 419
 - (d) 441

ANSWER : D

9. If $P_4^n = 20 \cdot P_2^n$, where P denotes the number of permutations n = _____.
- (a) 2
 - (b) 4
 - (c) 5
 - (d) 7

ANSWER : D

10. From a group of 8 men and 4 women, 4 persons are to be selected to form a committee so that at least 2 women are there on the committee. In how many ways can it be done ?
- (a) 168
 - (b) 201
 - (c) 202
 - (d) 220

ANSWER : B

11. Three numbers in G.P. with their sum 130 and their product 27,000 are-
- (a) 10, 30, 90
 - (b) 90, 30, 10
 - (c) (a) & (b) both
 - (d) 10, 20, 30

ANSWER : C

12. The set of cubes of the natural number is –
- (a) a null set
 - (b) a finite set
 - (c) an infinite set
 - (d) a finite set of three numbers

ANSWER : C

13. Divide 69 into three parts which are in A.P. and are such that the product of the first two parts is 460.
- (a) 21, 23, 25
 - (b) 20, 23, 26
 - (c) 19, 23, 27
 - (d) 22, 23, 24

ANSWER : B

14. The inverse function f^{-1} of $f(y) = 3y$ is –
- (a) $y/3$
 - (b) $1/3y$
 - (c) $-3y$
 - (d) $1/y$

ANSWER : A

15. The 20th term of arithmetic progression whose 6th term is 38 and 10th term is 66 is _____
- (a) 118
 - (b) 136
 - (c) 178
 - (d) 210

ANSWER : B

16. Find the missing value in $3/8, 8/19, 18/41, ?, 78/173$
- (a) $37/84$
 - (b) $40/87$
 - (c) $39/86$
 - (d) $38/85$

ANSWER : D

17. Find the wrong term in :
G4T, J10R, M20P, P43N, S90L
(a) M20P
(b) P43N
(c) J10R
(d) G4T

ANSWER : C

18. If HEALTH is written as IFBMUI, then how will NORTH be written in that code ?
(a) OPSUI
(b) GSQNM
(c) FRPML
(d) IUSPO

ANSWER : A

19. Which of the following is odd one ?
6, 9, 15, 21, 24, 26, 30
(a) 30
(b) 24
(c) 26
(d) 9

ANSWER : C

20. If $y = x(x-1)(x-2)$ then dy/dx is
(a) $3x^2 - 6x + 2$
(b) $-6x$
(c) $6x + 2$
(d) $3x - 6$

ANSWER : A

21. One day, Ram left home and cycled 10 km southwards, turned right and cycled 5 km and turned right and cycled 10 km and turned left and cycled 10 km. How many kilometres will he have to cycle to reach his home straight ?
(a) 10
(b) 15
(c) 20
(d) 25

ANSWER : B

22. A man is facing west. He turns 45 degrees in the clockwise direction and then another 180 degrees in the same direction and then 270 degrees in the anticlockwise direction. Which direction is he facing now?
- (a) South – West
 - (b) North – West
 - (c) West
 - (d) South

ANSWER : A

23. Five girls : G, H, I, J, K are sitting in a row facing south not necessarily in the same order. H is sitting between G and K; I is immediate right to K; J is immediate left to G. Which of the following is true ?
- (a) J is third to the left of K
 - (b) G is second to the left of I
 - (c) H is to the right of K
 - (d) H is to the left of G

ANSWER : A

24. Eight friends I, J, K, L, M, N, O, and P are sitting in a circle facing the centre. J is sitting between O and L; P is third to the left of O and second to the right of I; K is sitting between I and O, and J & M are not sitting opposite to each other. Which of the following statement is NOT correct?
- (a) K is sitting third to the right of L
 - (b) I is sitting between K and N
 - (c) L and O are sitting opposite to each other
 - (d) M is sitting between N and L

ANSWER : D

25. A man can walk by having long, medium and short steps. Sixty meters can be covered by 100 long steps; 100 meters can be covered by 200 medium steps and 80 meters can be covered by 200 short steps. He walks taking 5000 long steps; then turn to his left and walk taking 6,000 medium steps. He turn to his right and walks by taking 2,500 short steps. How far (in meters) is he away from his starting point?
- (a) 4,000 m
 - (b) 5,000 m
 - (c) 6,000 m
 - (d) 7,000 m

25. ANSWER : B

26. Read the following information carefully and answer the questions below. In a family of six persons. A, C, E, F, I, K, there are two married couples, G is grandmother of A and mother C, E is wife of C and mother of K. K is the granddaughter of I. What is E to A?
- (a) Daughter
 - (b) Mother
 - (c) Grandmother
 - (d) Aunt

ANSWER : B

27. Pointing towards a person, a man said to a woman, "His mother is the only daughter of your father." How is the woman related to that person?
- (a) Mother
 - (b) Daughter
 - (c) Sister
 - (d) Wife

ANSWER : A

28. Vicky introduces John as the son of the only brother of his father's wife. How is Vicky related to John?
- (a) Son
 - (b) Cousin
 - (c) Uncle
 - (d) Brother

ANSWER : B

29. A man said to a lady "Your mother's husband's sister is my aunt". How is the man related to the lady?
- (a) Father
 - (b) Grandfather
 - (c) Son
 - (d) Brother

ANSWER : D

30. If you are facing north – east and move 10 m forward, turn left and move 7.5 m. then you are
- (a) North of your initial position
 - (b) South of your initial position
 - (c) East of your initial position
 - (d) None of the option

ANSWER : D

31. Statements : Some cars are towns, some towns are flowers. All plants are flowers.

Conclusions :

- (I) No plant is a car.
- (II) Some cars are flowers.

Choose the correct answer from the following :

- (a) If only conclusion (I) follows.
- (b) If only conclusion (II) follows.
- (c) If either (I) or (II) follows.
- (d) If neither (I) nor (II) follows.

ANSWER : C

32. Statements : All huts are flats. No flat is a building. All buildings are cottages.

Conclusions :

- (III) No hut is a cottage.
- (IV) Some buildings are huts.

Choose the correct answer from the following :

- (a) If only conclusion (I) follows.
- (b) If only conclusion (II) follows.
- (c) If either conclusion (I) or (II) follows.
- (d) If neither conclusion (I) nor (II) follows.

ANSWER : D

33. Rahim faces towards north, Turning to his right, he walks 25 m. He then turns to his left and walks 30 m. text, he moves 25 m to his right. He then turns to his right again and walks 55 m. Finally, he turns to the right and moves 40 m. In which direction is he now from her starting point ?

- (a) South-West
- (b) South
- (c) North-West
- (d) South-East

ANSWER : D

34. Pointing to a lady. A said 'that women is any nephew's maternal grandmother". How is that woman related to A's sister who has no sister?

- (a) Cousin
- (b) Son-in-law
- (c) Mother
- (d) Mother-in-law

ANSWER : C

35. Pointing out to a lady, Sahil said, "She is the daughter of the woman who is the mother of the husband of my mother." Who is the lady to Sahil?
- (a) Aunt
 - (b) Sister
 - (c) Daughter
 - (d) Sister-in-law

ANSWER : A

36. Sweetness of a sweet dish is –
- (a) An attribute
 - (b) A discrete variable
 - (c) A continuous variable
 - (d) A variable

ANSWER : A

37. Five auditors of your firm had reported their incomes. You computed their average and obtained Rs. 67,000 per month. You now state that the average income per month of all the auditors of your firm is Rs. 67,000. This is an example of _____ statistics.
- (a) Descriptive
 - (b) Inferential
 - (c) Detailed
 - (d) Non-detailed

ANSWER : B

38. The harmonic mean of A and B is $\frac{1}{3}$ and harmonic mean of C and D is $\frac{1}{5}$. The harmonic mean of A, B, C and D is
- (a) $\frac{8}{15}$
 - (b) $\frac{1}{4}$
 - (c) $\frac{1}{15}$
 - (d) $\frac{5}{3}$

ANSWER : B

39. Statistics cannot deal with _____ data.
- (a) Quantitative
 - (b) Qualitative
 - (c) Textual
 - (d) Attribute

ANSWER : B

40. Given that for a distribution the mean, median and mode are 23, 24 and 25.5. It is most likely that the distribution is _____skewed.
- (a) Positively;
 - (b) Symmetrically
 - (c) Asymptotically
 - (d) Negatively

ANSWER : D

41. Choose the one from the following which is not a measure of scatter in data.
- (a) Half range
 - (b) Average of first and third quartiles
 - (c) Average of squared deviations
 - (d) Average of absolute deviations

ANSWER : B

42. Two years ago, a team of four persons had an average age of 14. Now, a new member is added to the team and the average age of the team is 17. What is the age of the new member ?
- (a) 17
 - (b) 19
 - (c) 21
 - (d) 23

ANSWER : C

43. The number of types of cumulative frequency is –
- (a) 1
 - (b) 2
 - (c) 3
 - (d) 4

ANSWER : B

44. For open – end classification, which of the following is the best measure of central tendency –
- (a) AM
 - (b) GM
 - (c) Median
 - (d) Mode

ANSWER : C

45. The numbers of times city had mild, medium and heavy rains, respectively are 17, 10 and 5. Which of the following represent it ?
- (a) (17, 10, 5)
 - (b) Quantitative
 - (c) Continuous
 - (d) Average

ANSWER : B

46. A fire engine rush to a place of fire at a speed of 70 kmph and after the work, it returned to the base at a speed of 35 kmph. The average speed per hour per direction is obtained as _____ speeds.
- (a) Average of
 - (b) Harmonic means of
 - (c) Geometric mean of
 - (d) Half of harmonic mean of

ANSWER : B

47. The _____ are used when one wants to visually examine the relationship between two variables.
- (a) Bar graphs
 - (b) Pie charts
 - (c) Line charts
 - (d) Scatter plots

ANSWER : A

48. When data are classified according to one criterion, then it is called _____ classification.
- (a) Quantitative
 - (b) Qualitative
 - (c) Simple
 - (d) Factored

ANSWER : C

49. Which measure of dispersion is based on the absolute deviations only ?
- (a) Range
 - (b) Standard deviation
 - (c) Mean deviation
 - (d) Quartile deviation

ANSWER : C

50. A cricketer's run scores of last ten test matches are available. Statistics cannot be used to find the
- (a) Least score
 - (b) Largest score
 - (c) Best score
 - (d) Median score

ANSWER : C

51. The person A speaks times and B in 80% of times. In what percentage of times are they likely to contradict each other in narrating the same incident ?
- (a) 0.60
 - (b) 0.6
 - (c) 0.65
 - (d) 0.35

ANSWER : D

52. A basket contains 15 apples, 24 mangoes and 10 bananas. If a fruit is selected at random from the basket, then the probability of not selecting as apple is-
- (a) 0.20
 - (b) 0.25
 - (c) 0.30
 - (d) 0.70

ANSWER : D

53. If an unbiased coins is tossed twice, the probability of obtaining at least one fail is-
- (a) 1
 - (b) 0.5
 - (c) 0.75
 - (d) 0.25

ANSWER : C

54. When three fair dice are rolled simultaneously, what is the probability of getting a number on third die greater then the sum of numbers appeared on the first two dice?
- (a) $12/216$
 - (b) $24/216$
 - (c) $36/216$
 - (d) $48/216$

ANSWER : 20/216

55. Two fair dice are rolled simultaneously. What is the probability of getting a sum of the outcomes from the dice is a multiple of 3 ?
- (a) $4/36$
 - (b) $12/36$
 - (c) $6/36$
 - (d) $9/36$

ANSWER : B

56. If we change the parameter(s) of _____ distribution, the shape of the probability curve does not change.
- (a) Normal
 - (b) Binomial
 - (c) Poisson
 - (d) Non-Gaussian

ANSWER : A

57. Which one of the following is uniparametric distribution?
- (a) Poisson
 - (b) Normal
 - (c) Binomial
 - (d) Hyper geometric

ANSWER : A

58. For a Poisson distributed variable X, we have $P[X = 7] = 8 \cdot P[X = 9]$, the mean of the distribution is
- (a) 3
 - (b) 4
 - (c) 7
 - (d) 9

ANSWER : A

59. The quartile deviation of a normal distribution, mean 10 and standard deviation 4, is-
- (a) 23.20
 - (b) 54.24
 - (c) 0.275
 - (d) 2.70

ANSWER : D

60. If the probability for success in a binomial distribution is less than one-half, then the binomial distribution
- (a) is skewed to right
 - (b) is skewed to left
 - (c) has two modes
 - (d) has median at a point $> \text{mean} + \frac{1}{2}$

ANSWER : A

61. Scatter diagram does not help us to
- (a) Identify whether variables are correlated or not
 - (b) find the type of correlation
 - (c) determine the linear or nonlinear type
 - (d) find the numerical value of the correlation coefficient

ANSWER : D

62. Which of the following is spurious correlation ?
- (a) Negative correlation
 - (b) Correlation between 2 variables having no causal relation
 - (c) Bad relation between 2 variables
 - (d) Very low correlation between 2 variables

ANSWER : B

63. The weight for numbers 1, 2, n is respectively $1^2, 2^2, 3^2, \dots, n^2$. The weighted harmonic mean is _____.
- (a) $(2n + 1) / 6$
 - (b) $(2n + 1) / 4$
 - (c) $(2n + a) / 3$
 - (d) $(2n + 1) / 2$

ANSWER : C

64. Index numbers are expressed as _____.
- (a) Ratios
 - (b) Squares
 - (c) Percentages
 - (d) Combinations

ANSWER : A

65. Census reports used as a source of data is _____ data.
- (a) Primary
 - (b) Secondary
 - (c) Organized
 - (d) Confidential

ANSWER : B

66. Two values yielded an arithmetic mean of 24 and a harmonic mean of 6. The geometric mean of these values is_____.

- (a) 8
- (b) 12
- (c) 14
- (d) 16

ANSWER : B

67. Decomposition of time series is known as –

- (a) Histogram
- (b) Deterending
- (c) Analysis of time series
- (d) Historiagram

ANSWER : B

68. In time series seasonal variations can occur within a period of:

- (a) One year
- (b) Three years
- (c) Nine years
- (d) Five years

ANSWER : A

69. Fisher's ideal index number does not satisfy_____test.

- (a) Time reversal
- (b) Circular
- (c) Factor reversal
- (d) Unit

ANSWER : B

70. If Laspeyre's index number = 110, Fisher's ideal index number is 109, then Paasche's index number is _____

- (a) 118
- (b) 110
- (c) 109
- (d) 108

ANSWER : D

71. A plotted time series shows a periodic variation such that the recurrence period is more than one year. Hence the time series has_____variation.

- (a) Irregular
- (b) Seasonal
- (c) Cyclical
- (d) Long term

ANSWER : C

72. The covariance between two variable in
- (a) Strictly positive
 - (b) Strictly negative
 - (c) Always zero
 - (d) Either positive or negative or zero

ANSWER : D

73. Which one of the following has Poisson distribution?
- (a) The number of days to get a complete cure.
 - (b) The number of defects per meter on long roll of coated polythene sheet.
 - (c) The errors obtained in repeated measuring of the length of a rod.
 - (d) The number of claims rejected by an insurance agency.

ANSWER : A

74. A partially legible working sheet for the calculation of rank correlation coefficient revealed that the coefficient of Rank correlation is $1/3$ and the sum of squared differences of ranks is 80. What is the number of observations ?
- (a) 9
 - (b) 8
 - (c) 7
 - (d) 6

ANSWER : A

75. The fiftieth percentile can be computed from
- (a) Mode
 - (b) Interquartile range
 - (c) Median
 - (d) Average of first and third quartiles

ANSWER : C

76. If $a : b = 3 : 7$, then $3a + 2b : 4a + 5b = ?$
- (a) 23 : 47
 - (b) 27 : 43
 - (c) 24 : 51
 - (d) 29 : 53

ANSWER : A

77. If $\log_a \sqrt{3} = 1/6$, find the value of a
- (a) 9
 - (b) 81
 - (c) 27
 - (d) 3

ANSWER : C

78. $\log 9 + \log 5$ is expressed as –

- (a) $\log 4$
- (b) $\log 9/5$
- (c) $\log 5/9$
- (d) $\log 45$

ANSWER : D

79. If $a : b = 9 : 4$, then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = ?$

- (a) $\frac{3}{2}$
- (b) $\frac{2}{3}$
- (c) $\frac{6}{13}$
- (d) $\frac{13}{6}$

ANSWER : D

80. The ratio of number of boys and the number of girls in a school is found to be 15 : 32. How many boys and equal number of girls should be added to bring the ratio to $2/3$?

- (a) 19
- (b) 20
- (c) 23
- (d) 27

ANSWER : A

81. The rational root of the equation $0 = 2p^3 - p^2 - 4p + 2$ is

- (a) 2
- (a) -2
- (c) $\frac{1}{2}$
- (d) $-\frac{1}{2}$

ANSWER : C

82. Transpose of a row matrix is

- (a) Column matrix
- (b) Zero matrix
- (c) Row matrix
- (d) Diagonal matrix

ANSWER : A

83. If $2x^2 - (a + 6)2x + 12a = 0$, then the roots are

- (a) 6 and a
- (b) 4 and a^2
- (c) 3 and $2a$
- (d) 6 and $3a$

ANSWER : A

84. If $A^3 = \begin{bmatrix} 0 & -i \\ -i & 0 \end{bmatrix}$ and $A^4 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, where $i^2 = -1$, then $A^2 =$ _____

- (a) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$
- (b) $\begin{bmatrix} -i & 0 \\ 0 & -i \end{bmatrix}$
- (c) $\begin{bmatrix} 0 & -1 \\ -i & 0 \end{bmatrix}$
- (d) $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$

ANSWER : A

85. Find the value of a from the following :

$$(\sqrt{9})^{-5} \times (\sqrt{3})^{-7} = (\sqrt{3})^{-a}$$

- (a) 11
- (b) 13
- (c) 15
- (d) 17

ANSWER : D

86. Solving equation $m + \sqrt{m} = 6/25$ the value of m works out to

- (a) $1/25$
- (b) $2/25$
- (c) $3/25$
- (d) 1

ANSWER : A

87. The ratio of principal and the compound interest value for three years (compounded annually) is 216 : 127. The rate of interest is

- (a) 0.1777
- (b) 0.1567
- (c) 0.1666
- (d) 0.1588

ANSWER : C

88. An amount P becomes Rs, 5,100.5 and Rs. 5,203 after second and fourth years respectively, at r% of interest per annum compounded annually. Thus, values of P and r are
- Rs. 4,000 and 1.5
 - Rs. 5,000 and 1
 - Rs. 6,000 and 2
 - Rs. 5,500 and 3

ANSWER : B

89. A certain sum invested at 4% per annum compounded semi-annually amounts to Rs. 1,20,000 at the end of one year. Find the sum.
- 1,15,340
 - 1,10,120
 - 1,12,812
 - 1,13,113

ANSWER : C

90. Solving equation $3g^2 - 14g + 16 = 0$, we get roots as-
- ± 5
 - 0
 - 8 and $\frac{2}{3}$
 - 2 and $\frac{8}{3}$

ANSWER : D

91. Find the future value of annuity of Rs. 1,000 made annually for 7 years at interest rate of 14% compounded annually. Given that $1.14^7 = 2.5023$
- 10,730.7
 - 5,365.35
 - 8,756
 - 9,892.34

ANSWER : A

92. Find the present value of Rs. 1,00,000 to be required after 5 years if the interest rate be 9%. Given that $1.09^5 = 1.5386$
- 78,995.98
 - 64,994.20
 - 88,992.43
 - 93,902.12

ANSWER : B

93. A five-year annuity due has periodic cash flow of Rs. 100 each year. If the interest rate is 8%, the future value of this annuity is given by
- $(Rs. 100) \times (\text{Future value at rate 8\% for 5 years}) \times (0.08)$
 - $(Rs. 100) \times (\text{Future value at rate 8\% for 5 years}) \times (1 - .08)$
 - $(Rs. 100) \times (\text{Future value at rate 8\% for 5 years}) \times (1 + .08)$
 - $(Rs. 100) \times (\text{Future value at rate 8\% for 5 years}) \times (1 / 0.08)$

ANSWER : C

94. A person decides to invest Rs. 1,25,000 per year for the next five years in an annuity which gives 5% per annum compounded annually. What is the approx. future value? (use $1.05^5 = 1.2762$, if needed)
- 1,59,535
 - 6,90,704
 - 5,90,704
 - 3,59,535

ANSWER : B

95. Find the compound interest if an amount of Rs. 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semi annually
- Rs. 3080
 - Rs. 4080
 - Rs. 5456
 - Rs. 7856

ANSWER : B

96. Which of the following statements is TRUE ? (Assume that the yearly cash flows are identical for both annuities)
- The present value of an annuity due is greater than the present value of an ordinary annuity.
 - The present value of an ordinary annuity is greater than the present value of an annuity due.
 - The future value of an ordinary annuity is greater than the future value of an annuity due.
 - The future value of an annuity due is equal to future value of an ordinary annuity.

ANSWER : B

97. Rs. 2,500 is paid every year for 10 years to pay off a loan. What is the loan amount if interest rate be 14% per annum compounded annually?
- 15,847.90
 - 13,040.27
 - 14,674.21
 - 16,345.11

ANSWER : B

98. Suppose you deposit Rs. 900 per month into an account that pays 4.8% interest, compounded monthly. How much money (rounded to nearest Rupee) will you get after 9 months ? (Use, if needed : $1.0004^4 - 1.0008$)
- (a) Rs. 9,000
 - (b) Rs. 8,113
 - (c) Rs. 9,200
 - (d) Rs. 1,000

ANSWER : 8,230

99. An amount is lent at a nominal rate of 4.5% per annum compounded quarterly. What would be the gain in rupees over when compounded annually ?
- (a) 0.56
 - (b) 0.45
 - (c) 0.76
 - (d) 0.85

ANSWER : 0.076

100. A stock pays annually an amount of Rs. 10 from 6th year onwards. What is the present value of the perpetuity, if the rate of return is 20% ?
- (a) 20.1
 - (b) 19.1
 - (c) 21.1
 - (d) 22.1

ANSWER : A
