(GCF-2,3,4,5,6, VCF-1,2, VDCF-1,2 & SCF-1,2)

DATE: 15.10.2021 MAXIMUM MARKS: 100 TIMING: 3 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. log(1+2+3) is equal to :-
   (a) log1 + log2 + log3
   (b) log(1 x 2 x 3)
   (c) Both the above
   (d) None

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

3. The present value of Rs. 10000 due in 2 years at 5% p.a. compound interest when the interest is paid on half-yearly basis is:
   (a) Rs. 9070.50
   (b) Rs. 9069.50
   (c) Rs. 9065.50
   (d) Rs. 9059.50

4. 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

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

6. 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

7. 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

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

9. The third proportional to $(x^2 - y^2)$ and $(x - y)$ is
   (a) $\frac{x+y}{x-y}$
   (b) $\frac{x-y}{x+y}$
   (c) x + y
   (d) x - y

10. If $x + \frac{1}{x} = \sqrt{2}$ then $x^2 + \frac{1}{x^2}$ is equal to
   (a) 1
   (b) 2
   (c) 0
   (d) 4

11. 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

12. 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

13. 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

14. 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

15. 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

16. 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

17. 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

18. 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

19. The C.I on Rs. 16000 for $1\frac{1}{2}$ years at 10% p.a payable half -yearly is
(a) Rs. 2,222
(b) Rs. 2,522
(c) Rs. 2,500
(d) None of these

20. 8, 14, 26, 48, 98, 194, 386
(a) 14
(b) 48
(c) 98
(d) 194

21. 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

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.

22. 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

23. 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

24. 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

25. If CLOCK is coded 34235 and TIME is 8679, what will be code of MOTEL?
    (a) 72894
    (b) 77684
    (c) 72964
    (d) 27894

26. If the difference between mean and Mode is 63, then the difference between mean and Median will be _____.
    (a) 63
    (b) 31.5
    (c) 21
    (d) None of the above

27. 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

28. 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) $\left(\frac{1}{4}+\frac{3}{4}\right)^5$

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

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

(d) None of these

29. 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

30. 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

31. Spearman's correlation co-efficient from 10 pairs of observations was calculated at 0.8. Subsequently, it was discovered that the difference in ranks relating to one pair of items was wrongly taken as 7 instead of 9. Correct the co-efficient of rank correlation.

(a) 0.51
(b) 0.61
(c) 0.71
(d) 0.81

32. For the data given calculate Fisher's index
ΣP_1Q_0 = 3365, ΣP_0Q_0 = 3530,
ΣP_1Q_1 = 3400, ΣP_0Q_1 = 3600

(a) 99
(b) 90
(c) 90.25
(d) 94.88

33. 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

34. Suresh introduces a man as "He is the son of the woman who is the mother of the husband of my mother". How is Suresh related to the man?
(a) Uncle
(b) Son
(c) Cousin
(d) Grandson

35. Arun started from point A and walked 10 km East to point B, then turned to North and walked 3 km to point C and then turned West and walked 12 kms to point D, then again turned South and walked 3 kms to point E. In which direction is he from his straight point ?
(a) East
(b) South
(c) West
(d) North

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

Study the following information carefully and answer the questions given below:-
A, B, C, X, Y, Z are seated in a straight line facing north. C is third to the right of Z and B sits second to the right of C. X sits to the immediate right of A.

37. Which of the following represents the pairs of persons sitting exactly in the middle of the line?
(a) XB
(b) ZB
(c) BX
(d) XC

38. 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

39. 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

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

41. 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

42. 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

43. If the relationship between two variables x and u is u + 3x=10 and between two other variables y and v is 2y+5v=25, and the regression coefficient of y on x is known as 0.80, then what would be the regression coefficient of v on u?
(a) 0.32
(b) 0.1066
(c) 0.2548
(d) 0.1586

44. 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

45. 6 coins are tossed 512 times. Also, compute the mean and SD of the number of heads:
(a) 2 and 1.33
(b) 3 and 1.22
(c) 4 and 1.55
(d) 2 and 1.11

46. X is a binomial variable such that 2 P(X=2) = P(x=3) and mean of X is known to be 10/3. What would be the probability that X assumes at most the value 2?
(a) 16/81
(b) 17/81
(c) 47/2473
(d) 46/243

47. $\int \frac{dx}{x^2 + 2x - 3}$
(a) $\frac{1}{2}\log\left(\frac{x-1}{x+3}\right) + c$
(b) $\frac{1}{3}\log\left(\frac{1-x}{3+x}\right) + c$

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

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

48. 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

49. 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) $\frac{n(n+1)(2n+1)}{3}$
(d) $\frac{n(n+1)(n+2)}{3}$

50. 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

51. How many diagonals are there in a polygon with n sides?
(a) $\frac{n(n-1)}{2}$
(b) $\frac{n(n-2)}{3}$
(c) $\frac{n(n-3)}{2}$
(d) $\frac{n(n-2)}{6}$

52. 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

53. How many terms of $3 + \frac{3}{2} + \frac{3}{4} + \ldots\ldots$ are needed to give the sum $\frac{3069}{512}$?

(a) 9
(b) 10
(c) 11
(d) 12

54. The Sum of all natural numbers between 120 to 480, which are exactly divisible by 4 and 6 ?

(a) 8820
(b) 9300
(c) 8700
(d) 8600

55. A fertilizer company produces two types of fertilizers called Grade I and Grade II. Each of these types is processed through two critical chemical plant units. Plant A has maximum 120 hrs available in a week and Plant B has maximum of 180 hrs available in a week. Manufacturing one bag of Grade-I fertilizer required 6 hours in Plant A and 4 hours in Plant B. Manufacturing one bag of Grade-II fertilizer required 3 hrs in Plant A and 10 hours in Plant B. Express this situation using linear inequalities.

(a) $6x + 3y \leq 120\ ,\ 4x + 10y \geq 180$
(b) $6x + 3y \geq 120\ ,\ 4x + 10y \geq 180$
(c) $6x + 3y \leq 120\ ,\ 4x + 10y \leq 180$
(d) $6x + 3y \geq 120\ ,\ 4x + 10y \leq 180$

56. If A={2,3}, B={4,5}, C={5,6} then (A x B) $\cup$ (B x C) is :-

(a) {(2,4), (2,5), (2,6), (3,4), (3,5), (3,6)}
(b) {(2,5), (3,5)}
(c) {(2,4), (2,5), (3,4), (4,5), (3,5), (4,6), (5,5), (5,6)}
(d) None

57. A sum compounded annually become $\frac{25}{16}$ times of itself in 2 years, the rate of interest per annum is-

(a) 5%
(b) 12.5%
(c) 25%
(d) 50%

58. 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

59. 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) $(22)^n : (20)^n$

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

61. 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

62. In how many ways 6 men can sit at a round table so that all shall not have the same neighbour in any two occasions?
(a) 5!
(b) 5!÷2
(c) $(7!)^2$
(d) 7!

63. 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

64. If ${}^nP_r = 2880$ and ${}^nC_r = 120$ then the value of r is :-
(a) -24
(b) 6
(c) 4
(d) 3

65. Let R is the set of real numbers, such that the function $f : R \to R$ and $g : R \to R$ are defined by $f(x) = x^2 + 3x + 1$ and $g(x) = 2x-3$ find fog (-1) :-
(a) 10
(b) 12
(c) -11
(d) None

66. The number of arrangement of 15 different this taken 6 at a time in which are particular thing never occur is :-
(a) ${}^{15}C_6$
(b) ${}^{15}P_6$
(c) ${}^{14}C_6$
(d) ${}^{14}P_6$

67. Choose the missing term out of the given alternatives.
PG, NJ, LM, JP ?
(a) RG
(b) GR
(c) HS
(d) SH

68. If K = 11 and STEP = 15, how will you code 'SISTRUM' ?
(a) 16
(b) 17
(c) 19
(d) 48

69. Identify the odd one out.
(a) Teacher
(b) Trainer
(c) Professor
(d) Student

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

71. 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

72. 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

73. Five persons are sitting in a row. D is right to P and left to T. B is left to V and right to T. who are at the ends of the row?
(a) D, T
(b) T, B
(c) P, V
(d) D, B

74. A and B are Sisters. C and D are Brothers. Daughter of A is Sister of C, then how B is related to D?
(a) Mother
(b) Grandmother
(c) Sister
(d) Aunty

75. A girl introduced a boy as the son of the daughter of the father of her paternal uncle. The boy is related to the girl as –
(a) Son
(b) Uncle
(c) Nephew
(d) Cousin

76. 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

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) $\frac{\bar{x}}{\alpha} + 10$
(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 mean income of a group of workers is $\bar{x}$ and that of another group is $\bar{y}$. If the number of workers in the second group is 10 times the number of workers in the first group, then the mean income of the combined group is
(a) $(\bar{x} + 10\ \bar{y}) / 5$
(b) $(\bar{x} + 10\ \bar{y}) / 11$
(c) $(10\ \bar{x} + \bar{y}) / 11$
(d) $(\bar{x} + 10\ \bar{y}) / 9$

85. For ordering shoes of various sizes for resale, _____size will be more appropriate
(a) Median
(b) Mode
(c) Mean
(d) None

86. 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

87. 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

88. 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

89. 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) $\frac{27}{50}$
(b) $\frac{17}{50}$
(c) $\frac{37}{50}$
(d) $\frac{47}{50}$

90. 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

91. 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

92. 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

93. 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

94. A random variable X takes three values – 1, 2, 3 with the respective probabilities P(-1)= 1/3, P(2)=1/3. P(3)=1/3, then E(|x|) is
(a) 3/2
(b) -5/2
(c) 2
(d) 9/2

95. 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

96. 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

97. The symbol $\phi_{(a)}$ indicates the area of the standard normal curve between
(a) 0 to a
(b) a to ∞
(c) $-\infty$ To a
(d) $-\infty$ to

98. $\log\left(a+\sqrt{a^2+1}\right)+\log\left(\frac{1}{a+\sqrt{a^2+1}}\right)$ is equal to
(a) 1
(b) 0
(c) 2
(d) $\frac{1}{2}$

99. The variance of random variable x is-
(a) $E(x-\mu)^2$
(b) $E[x-E(x)]^2$
(c) $E(x^2-\mu)$
(d) (a) or (b)

100. 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

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