(GCF-2,3,4,5,6,7,8,10 VCF-1,2, VDCF-1,2 & SCF-1,2)

DATE: 29.11.2021 MAXIMUM MARKS: 100 TIMING: 2 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. If the rate of interests are 6%, 8% and 10% yearly for first, second and third year respectively, then the compound interest for 3 years on the amount Rs. 60,000 will be:-
   (a) Rs. 19,446
   (b) Rs. 15,556.80
   (c) Rs. 16,602
   (d) Rs. 75,556.80

2. A bag contains coins of Rs. 1, 50 paisa and 25 paisa in the ratio 4:5:6. If the total amount in the bag is Rs. 120, then the number of coins of 25 paisa, is :-
   (a) 60
   (b) 75
   (c) 90
   (d) 96

3. A, B, C, D are four quantities of the same kind such that A:B=4:5, B:C=7:8, C:D=12:13, then A:B:C is :-
   (a) 4:35:104
   (b) 4:35:84
   (c) 28:35:40
   (d) 30:40:45

4. The value of $\frac{1}{1+a^{x-y}}+\frac{1}{1+a^{y-x}}$ is equal to :
   (a) 1
   (b) 0
   (c) 2
   (d) a^{x+y+z}

5. Find the present value of Rs. 2000 to be received after 4 years if the interest rate is 8% per annum compounded annually ?
   (a) Rs. 1170.06
   (b) Rs. 1470.06
   (c) Rs. 1570.06
   (d) Rs. 1180.06

6. A car that costs Rs. 6,00,000 is bought by paying Rs. 1,00,000 as down-payment and equal annual payments for three-years. What is the annual installment if the interest is paid at 8% on the remaining amount compounded annually?
   (a) Rs. 1,94,016.75
   (b) Rs. 2,94,016.75
   (c) Rs. 1,61,013.75
   (d) Rs. 1,74,016.75

7. There are 15 points in a plane, out of there 6 are collinear. The number of straight lines formed by joining these points is:-
   (a) 90
   (b) 91
   (c) 45
   (d) 51

8. The number of arrangements of the letters of the word "SALOON" if the two O's do not come together is :-
   (a) 360
   (b) 720
   (c) 240
   (d) 120

9. In how many ways a committee of 5 members can be selected from 6 men and 5 women, consisting of 3 men and 2 women?
   (a) 108
   (b) 300
   (c) 140
   (d) 200

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

11. If ${}^{n}P_5 = 20\ {}^{n}P_3$ then n is equal to :-
   (a) 7
   (b) 6
   (c) 8
   (d) 5

12. Which is the first positive term of the sequence-
   -111, -107, -103, -99……
   (a) 20
   (b) 29
   (c) 30
   (d) 35

13. If $\log_{10} 2 = x$ and $\log_{10} 4 = y$, then $\log_{10} 80$ is equal to:
   (a) $x - y + 1$
   (b) $x + y + 1$
   (c) $x - y - 1$
   (d) $2x - y + 1$

14. If $\log_3 [\log_2 (\log_3 x)]=1$ then x is equal to:-
   (a) 8
   (b) 18
   (c) 81
   (d) 6561

15. $\frac{2^{n+3} - 10 \times 2^{n+1}}{2^{n+1} \times 6}$ is equal to:-

(a) -1
(b) 1
(c) 0
(d) 2

16. If $f : A \rightarrow R$ is a real valued function defined by $f(x) = \frac{1}{x - 1}$, then A is:-

(a) R
(b) R-{1}
(c) R-{0}
(d) R-{0,1}

17. If $f(x) = {}^{x}c_{2}$, *then* $f^{1}(3)$ is equal to:-

(a) $-\frac{5}{2}$
(b) $-\frac{2}{5}$
(c) $\frac{5}{2}$
(d) $\frac{2}{5}$

18. The difference between the roots of the equation $x^2 - 7x - 9 = 0$ is:

(a) 7
(b) $\sqrt{85}$
(c) 9
(d) $2\sqrt{85}$

19. If one root of the equation is $2 - \sqrt{3}$, form the equation.

(a) $x^2 - 2x + 2 = 0$
(b) $x^2 - 3x + 1 = 0$
(c) $x^2 - 5x + 5 = 0$
(d) $x^2 - 4x + 1 = 0$

20. A person received the salary for the 1st Year is Rs. 5,00,000 per year and he received an increment of Rs. 15,000 per year then the sum of the salary he taken in 10 years.

(a) Rs. 56,75,000
(b) Rs. 72,75,000
(c) Rs. 63,75,000
(d) None

21. What is the number of ways of arranging the letters of the word "BANANA" so that no two N's appear together?
(a) 40
(b) 60
(c) 80
(d) 100

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

23. 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) $k + \sqrt{10}$

24. R and S are brothers. X is the sister of Y and X is mother of R. What is Y to S?
(a) Uncle
(b) Brother
(c) Father
(d) Mother

25. 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. How many persons are seated between A and C ?
(a) One
(b) Two
(c) Three
(d) Four

26. A certain sum of money amounts to Rs. 6,300 in two years and Rs. 7,875 in three years nine months at simple interest find the rate of interest per annum :
(a) 20%
(b) 18%
(c) 15%
(d) 10%

27. A company establishes a sinking fund to provide for the payment of Rs. 2,00,000 debt maturing in 20 years. Contributions to the hind are to be made at the end of every year. Find the amount of each annual deposit if interest is 5% per annum :
(a) Rs. 6,142
(b) Rs. 6,049
(c) Rs. 6,052
(d) Rs. 6,159

28. In how many ways 5 gents and 5 ladies sit at a round table; if no two ladies are to sit together.
(a) 720
(b) 120
(c) 2,880
(d) 34,600

29. Two equal sums of money were lent at simple interest at 11 p.a. for $3\frac{1}{2}$ years and $4\frac{1}{2}$ years respectively. If the difference in interests for two periods was Rs. 825 then each sum is :
(a) Rs. 8,250
(b) Rs. 8,500
(c) Rs. 7,500
(d) Rs. 9,250

30. On what sum will the compound interest at 5% per annum for two years compounded annually be Rs. 1640?
(a) Rs. 18,000
(b) Rs. 20,000
(c) Rs. 16,000
(d) None

31. Given A = {2, 3}, B = {4, 5}, C = {5, 6} then A × (B $\cap$ C) is :
(a) {(2, 5), (3, 5)}
(b) {(5, 2), (5, 3)}
(c) {(2, 3), (5, 5)}
(d) None of these

32. A person deposited Rs. 5,000 in a bank. The deposit was left to accumulate at 6% compounded quarterly for the first five years and at 8% compounded semi-annually for the next eight years. The compound interest amount at the end of 13 years is :
(a) Rs. 12,621.50
(b) Rs. 7,613
(c) Rs. 12,613.10
(d) Rs. 7,316

33. The binomial distribution with mean 3 and variance 2 is.
(a) $\left(\frac{2}{3}+\frac{1}{3}\right)^9$
(b) $\left(\frac{2}{6}+\frac{1}{6}\right)^9$
(c) $\left(\frac{2}{3}+\frac{1}{3}\right)^6$
(d) $\left(\frac{2}{5}+\frac{1}{5}\right)^9$

34. The future value of an annuity of Rs. 1,000 made annually for 5 years at the interest of 14% compounded annually is: [Given that $(1.14)^5=1.92541$]
(a) Rs. 5,610
(b) Rs. 6,610
(c) Rs. 6,160
(d) Rs. 5,160

35. An examination paper with 10 question consist of 6 questions in mathematics and 4 questions in statistic part. At least one question from each part is to be attempted in how many ways can this be done?
(a) 1024
(b) 945
(c) 1005
(d) 1022

36. Consider the following data:

Year :	2000	2001	2002	2003	2004
Price :	15	44	36	60	70

The index number for 2003 based on 2000 is:
(a) 300
(b) 250
(c) 400
(d) None of these

37. The difference between compound interest and simple interest on a sum for 2 years at 8 per cent is Rs. 768. The sum is
(a) Rs. 1,00,000
(b) Rs. 1,10,000
(c) Rs. 1,20,000
(d) Rs. 1,70,000

38. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half – yearly is
(a) 6.06%
(b) 6.07%
(c) 6.08%
(d) 6.09%

39. What is the difference between the compound interests on Rs. 5,000 for 1 year at 4% per annum compounded yearly and half yearly?
(a) 2
(b) 3
(c) 4
(d) None of these

40. Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three year, and at the rate of 14% p.a. for the period beyond five years. If he pays a total interest of Rs. 11,400 at the end of the nine years, how much money did he borrow?
(a) Rs. 11,500
(b) Rs. 12,000
(c) Rs. 12,500
(d) Rs. 15,500

41. If it is known that the probability of a missile hitting a target is 1/8, what is the probability that out of 10 missiles fired, at least 2 will hit the target?
(a) 0.4258
(b) 0.3968
(c) 0.5238
(d) 0.3611

42. If four unbiased coins are tossed together, then the probability of getting at least two heads is
(a) 11/16
(b) 13/16
(c) 9/16
(d) 15/16

43. Mohit picked up a prime number from the set of first 20 natural numbers. What is the probability that it is 7?
(a) 1/19
(b) 1/20
(c) 2/7
(d) 1/8

44. If 'HONEY' is coded as JQPGA.
Which word is code as VCTIGVU?
(a) CARPETS
(b) TRAPETS
(c) TARGETS
(d) UMBRELU

45. Identify the single letter, which when removed from the following words form new words.
MINK, WARM, LAMP, TEAM
(a) A
(b) R
(c) M
(d) L

46. Find the odd one out.
(a) C72X
(b) E110V
(c) G140T
(d) J180P

47. What is the sum of $\sqrt{3} + \frac{1}{\sqrt{3}} + \frac{1}{3\sqrt{3}} + \ldots^{\infty}$?

(a) $\frac{\sqrt{3}}{2}$

(b) $\frac{3\sqrt{3}}{2}$

(c) $\frac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

48. A sum compounded annually become $\frac{75}{48}$ times of itself in 2 years, the rate of interest per annum is-
(a) 5%
(b) 12.5%
(c) 25%
(d) 50%

49. A person deposited a sum of Rs. 10,000 in a bank. After 2 years, he withdrew Rs. 4,000 and at the end of 5 years, he received an amount of Rs. 7,900; then the rate of simple interest is:
(a) 6%
(b) 5%
(c) 10%
(d) None of these

50. The no. of observations falling within a class is called
(a) density
(b) frequency
(c) both
(d) none

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

52. A man starts from a point, walk 8 km towards North, turns right and walks 12 km, turns left and walks 7 km turns and walks 20 towards South, turns right and walks 12 km. In which direction is he from the starting point ?
(a) North
(b) South
(c) West
(d) East

53. 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) $\frac{11}{14}$
(b) $\frac{22}{49}$

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

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

54. 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

Directions (Q. 55-56): Following questions are based on the information provided below:
(i) 'P x Q' means 'P is brother of Q.'
(ii) 'P ÷ Q' means 'P is sister of Q.'
(iii) 'P + Q' means 'P is mother of Q.'
(iv) 'P – Q' means 'P is father of Q.'

55. Which of the following means 'M is nephew of R' ?
(a) M x T + J ÷ R
(b) R x K – M x T
(c) R x K - M
(d) R – K ÷ M

56. Which of the following means 'D is maternal uncle of T' ?
(a) D x J + T
(b) D x J - T
(c) D ÷ J + T
(d) D ÷ J – T

57. Standard Deviation x is σ find SD of $\frac{ax+b}{c}$ -

(a) $\left|\frac{a}{c}\right|\sigma$

(b) $\left|\frac{b}{c}\right|\sigma$

(c) $\left|\frac{c}{a}\right|\sigma$

(d) None of these

58. Six members of a family namely A, B, C, D, E and F are travelling together. 'B' is the son of C but C is not the mother of B. A and C are married couple. E is the brother of C, D is the daughter of A. F is the brother of B. How many male members are there in the family ?

(a) 3
(b) 2
(c) 4
(d) 1

59. $\int (e^{3\log x} + e^{x\log 3})\,dx$

(a) $\frac{x^4}{4} + \frac{3^x}{\log 3} + C$

(b) $\frac{x^4}{4} + 3^x \log 3 + C$

(c) $\frac{1}{4} e^{3\log x} + \frac{1}{3} e^{x\log 3} + C$

(d) None

60. If $x^{2a-3}y^{2a} = x^{6-a}y^{5a}$ then the value of $a\log\frac{x}{y}$ is

(a) logx
(b) 3logx
(c) 6logx
(d) 4logx

61. What will be the next term of the following series?
1, 10, 37, 118, _____
(a) 354
(b) 361
(c) 363
(d) 586

62. _____is the reciprocal of the AM of reciprocal of observations.
(a) HM
(b) GM
(c) Both
(d) None

63. A person purchases 5 rupees worth of eggs from 10 different markets. You are to find the average no. of eggs per rupee for all the markets taken together. What is the suitable form of average in this case_____
(a) AM
(b) GM
(c) HM
(d) None

64. Which of the following relationship is true in a symmetrical distribution?
(a) Median $-Q_1=Q_3$-Median
(b) Median $-Q_1>Q_3$-Median
(c) Median $-Q_1<Q_3$-Median
(d) Median $-Q_1\#Q_3$-Median

65. Second decile is known as-
(a) 40^{th} Percentile
(b) 20^{th} percentile
(c) 20^{th} Decile
(d) 40^{th} Decile

66. There were 50 students in a class. 10 failed whose average marks were 2.5. The total marks of class were 281. Find the average marks of students who passed?
(a) 6.4
(b) 25
(c) 256
(d) 86

67. "Root-mean square deviation from Mean" is
(a) Standard deviation
(b) Quartile deviation
(c) Both
(d) None

68. The standard deviation of first n natural numbers is-
(a) $[n(n+1)(2n+1)]/6$
(b) $(n^2-1)/12$
(c) $\sqrt{\frac{n^2-1}{12}}$
(d) $n/2$

69. If events are mutually exclusive, then-
(a) Their probabilities are less than one
(b) Their probabilities sum to one
(c) Both events cannot occur at the same time
(d) Both of them contain every possible outcome of an experiment

70. If P(A)=3/8, P(B)=1/3 and $P(B^c)=1/4$ then $P(A^c)$ is equal to
(a) 5/8
(b) 3/8
(c) 1/8
(d) None

71. In a single throw with two dice the probability of getting a sum of five on the two dice is
(a) 1/9
(b) 5/36
(c) 5/9
(d) None of these

72. X is a random variable taking the values 5, 6 and 7 with probabilities 1/3, 1/4 and 5/12, then Find E(X).
(a) 5.14
(b) 6.08
(c) 7.12
(d) 3.29

73. In standard normal distribution
(a) Mean =1 SD=0
(b) Mean =1 SD=1
(c) Mean=0 SD=1
(d) Mean=0 SD=0

74. The normal curve is
(a) Positively skewed
(b) Negatively skewed
(c) Symmetrical
(d) All of these

75. Because of the symmetry of Normal distribution the median and the mode have the_____ value as that of the mean
(a) Greater
(b) Smaller
(c) Same
(d) None

76. If X & Y are two independent normal variates with means μ_1 & μ_2 and standard deviations σ_1 & σ_2 respectively, then X + Y follows_____
(a) Means = $\mu_1 + \mu_2$, S.D = 0
(b) Means = $\mu_1 + \mu_2$, S.D = $\sigma_1^2 + \sigma_2^2$
(c) Means = 0, S.D = $\sigma_1^2 + \sigma_2^2$
(d) Means = $\mu_1 + \mu_2$, S.D = $\sqrt{\sigma_1^2 + \sigma_2^2}$

77. For a variable the mean is 10 and the coefficient of variation is 50. Then the variance is
(a) 5
(b) 20
(c) 400
(d) 25

78. The median of X, $\frac{x}{2}, \frac{x}{3}, \frac{x}{5}$ is 10.
Find x where X>0
(a) 24
(b) 32
(c) 8
(d) 16

79. The average salary of 50 men was Rs. 80 but if was found the salary of two of them were Rs. 82 and 96 which was wrongly taken as Rs. 28 and 69. The revised average salary is -
(a) 78.56
(b) 82.92
(c) 85.26
(d) 81.62

80. What is the G.M. for the numbers 2,4,8,16,32,64?
(a) $2^{5/2}$
(b) $2^{7/2}$
(c) 33
(d) None

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

82. If the rank coefficient between debenture price and share price is found to be 0.143 and the sum of squares of the difference in the rank is 48, what is the number of share selected for study?
(a) 5
(b) 7
(c) 12
(d) 6

83. 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%

84. 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

85. Regression coefficient are_____
(a) dependent of change of origin and of scale
(b) independent of both change of origin and of scale
(c) dependent of change of origin but not of scale
(d) independent of change of origin but not of scale

86. The regression equation of y on x is y = -3 + 0.5 x and that of x on y is x = -7 + By. If the correlation co-efficient between x and y is 0.1, then B=
(a) 0.5
(b) -0.5
(c) 0.02
(d) -0.02

87. The average age of a group of 10 students was 20 years. The average age increased by 4 years when two new students joined the group. What is the average age of two new students who joined the group?
(a) 22 years
(b) 30 years
(c) 44 years
(d) 32 years

88. The two lines of regression are $2x - 7y + 6 = 0$ and $7x + 2y + 1 = 0$. What is the correlation coefficient between x and y?
(a) -2/7
(b) 2/7
(c) 4/49
(d) None of these

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

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

91. A main 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

92. 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

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

94. 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 you initial position
(d) None of the option

95. What is the difference (in Rs.) between the simple interest and the compound interest on a sum of 8,000 for $2\frac{2}{5}$ years at the rate of 10% p.a., when the interest is compounded yearly?
(a) 135.75
(b) 129.50
(c) 151.75
(d) 147.20

96. A and B start moving towards each other from two places 200 m apart. After walking 60 m, B turns left and goes 20 m, then he turns right and goes 40 m. He then turns right again and comes back to the road on which he had started walking. If A and B walk with the same speed, what is the distance between them now?
(a) 80 m
(b) 70 m
(c) 40 m
(d) 60 m

97. There are four towns P,Q,R and T. Q is to the south-west of P, R is to the east of Q and southeast of P, and T is to the north of R in line with QP. In which direction of P is T located?
(a) North
(b) North-East
(c) East
(d) South-East

98. Five friends A,B,C,D and E are staying in the same locality. B's house is to the east of A's house and to the north of C's house. C's house is to the west of D's house. D's house is in which direction with respect to A's house?
(a) North-East
(b) South-East
(c) North-West
(d) South-West

99. Pointing to a lady Ravi said, "She is the only daughter of the father of my sister's brother". How is she related to Ravi?
(a) Aunty
(b) Mother
(c) Sister
(d) None

100. John introduces Mary as the daughter of the only son of my father's wife. How is Mary related to john?
(a) Aunty
(b) Mother
(c) Sister
(d) Daughter

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