(GCF-19, GCF-20, VCF-4, SCF-6 & SCF-7)

DATE: 13.02.2020 **MAXIMUM MARKS: 100** **TIMING: 2 Hours**

MATHS, STATS & REASONING

All Questions is compulsory.

1. Find A^{-1} for $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

   (a) $\begin{bmatrix} 3 & -5 \\ -1 & 2 \end{bmatrix}$

   (b) $\begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

   (c) $\begin{bmatrix} 3 & 0 \\ 2 & 5 \end{bmatrix}$

   (d) $\begin{bmatrix} -3 & -5 \\ -1 & -1 \end{bmatrix}$

2. 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

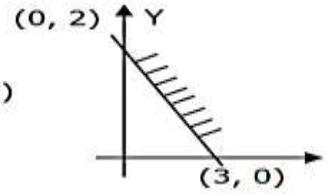
3. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half – yearly is
   (a) 6.06%
   (b) 6.07%
   (c) 6.08%
   (d) 6.09%

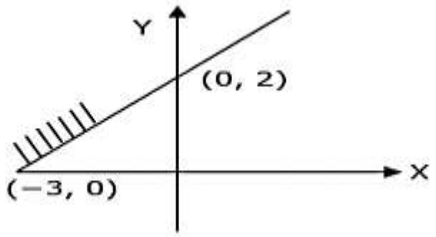
4. The simple interest on a certain sum of money for $2\frac{1}{2}$ year at 12% per annum is Rs. 40 less than the simple interest on the same sum for $3\frac{1}{2}$ years at 10% per annum. Find the sum.
   (a) 1,000
   (b) 800
   (c) 900
   (d) None of these

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

6. How many words, with or without meaning can be formed by using all the letters of the word "MACHINE", so that the vowels occurs only the odd positions ?
   (a) 1440
   (b) 720
   (c) 576
   (d) 640

7. Which option shows inequality $-2x+3y\geq 6$

(a)


(b)


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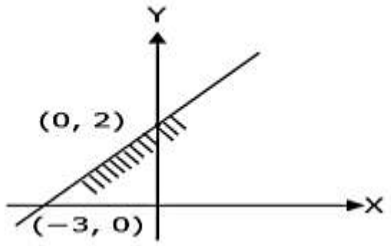
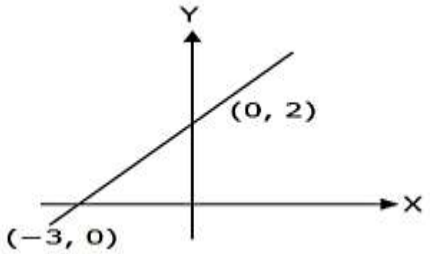


(d)


8. Calculate the sum of infinite geometric progression $1,-3,\ 9,-27,-------\infty$:
   (a) $\frac{1}{4}$
   (b) $\frac{3}{4}$
   (c) $-\frac{1}{4}$
   (d) does not exist

9. What is the present value of Rs. 1 to be received after two years compounded annually at 10% interest rate ?
   (a) 0.73
   (b) 0.60
   (c) 0.90
   (d) 0.83

10. If A is a square matrix such that $|A| = 5$, then the value of $|A\ A^T|$ is:
   (a) 125
   (b) 625
   (c) 25
   (d) 45

11. A sum of money amounts to Rs. 5,200 in 5 years and to Rs. 5,680 in 7 years at simple interest. The rate of interest per annum is :-
   (a) 3%
   (b) 4%
   (c) 5%
   (d) 6%

12. Divide Rs. 8,840 between A and B so that the amount received by A at the end of 8 years may be equal to the amount received by B at the end of 10 years, compound interest being at 10% per annum. Then the part of B :
    (a) Rs. 4,840
    (b) Rs. 4,000
    (c) Rs. 3,840
    (d) Rs. 3,600

13. 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

14. The value of $\frac{1}{\log_3 60}+\frac{1}{\log_4 60}+\frac{1}{\log_5 60}$ is :-
    (a) 0
    (b) 1
    (c) 5
    (d) 60

15. 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

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

17. If $\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} A = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$ then order of matrix A = ?
    (a) 2 x 2
    (b) 2 x 3
    (c) 3 x 2
    (d) 3 x 3

18. Insurance company is trying to sell you an investment policy that will pay you Rs. 30,000 per year forever. If the required return on this investment is 5.8% p.a. How much will you pay for this policy?
    (a) 5,32,241.48
    (b) 5,17,241.38
    (c) 4,82,348.38
    (d) 6,48,441.37

19. 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%

20. 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

21. A bag contains 4 red, 3 black and 2 white balls, in how many ways 3 balls can be drawn from this bag so that they include at least one black ball?
(a) 64
(b) 46
(c) 85
(d) None of the above

22. If A = {1,2,3,4,5,6,7,8,9,}
B = {1,3,4,5,7,8};C = {2,6,8,} then find (A – B)$\cup$C=
(a) {2,6,}
(b) {2,6,8}
(c) {2,6,8,9}
(d) None of these

23. If $\log_9^{x} + \log_3^{x} = \frac{3}{2}$ then x is
(a) 0
(b) 1
(c) $\frac{9}{4}$
(d) 3

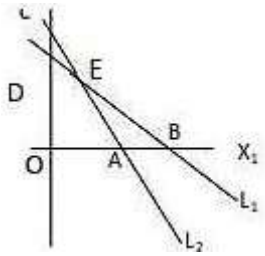
24. 5 chairs and 3 tables cost of Rs. 350. and 3 Chairs and 5 tables cost Rs. 370. What is the cost of the one table and two chairs?
(a) Rs. 130
(b) Rs. 120
(c) Rs. 150
(d) Rs. 140

25. If an examination a candidate was to pass in each of the 4 papers. In how many different ways can be failed?
(a) 14
(b) 16
(c) 17
(d) 15

26. 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

27. In a G.P. If the fourth term is '3' then the product of first seven terms is
(a) 3^5
(b) 3^7
(c) 3^6
(d) 3^8

28. The common region represented by the following inequalities
$L_1 = X_1 + X_2 \leq 4$; $L_2 = 2X_1 + X_2 \geq 6$



(a) 0ABC
(b) Outside of OAB
(c) Δ BCE
(d) Δ ABE

29. The number of diagonals in a polygon of 6 sides :
(a) 9
(b) 8
(c) 6
(d) 12

30. If $y^3 . x^5 = (x+y)^8$, $\frac{dy}{dx}$ is :
(a) $\frac{y}{x}$
(b) $\frac{-y}{x}$
(c) $\frac{y^5}{x^3}$
(d) None of these

31. If A = {1, 2, 3, 4, 5} and B = {6, 7, 8}, then cardinal number of A x B is:
(a) 15
(b) 5
(c) 3
(d) 8

32. If the curve $Y^2=AX^4+B$ Passes through the point P(1, 2). The value of $\frac{dy}{dx}$ at P is 4. Then
(a) A=4, B=0
(b) A=0, B=4
(c) A=2, B=0
(d) A=1, B=2

33. The sum of all natural numbers between 100 and 1000 which are multiple of 5 is:
(a) 98,450
(b) 96.450
(c) 97.450
(d) 95,450

34. On what sum will the compound interest at 5% per annum for two years compounded annually be Rs. 1640?
(a) Rs. 18000
(b) Rs. 20000
(c) Rs. 16000
(d) None

35. In how many ways the word "arrange" be arranged such that the 2 'r' do not come together?
(a) 1000
(b) 900
(c) 800
(d) None

36. $\int (\log x)^2 dx$
(a) $x (\log x)^2 - 2 x \log x + 2x + k$
(b) $x (\log x)^2 - 2x + k$
(c) $2x \log x - 2x + k$
(d) None of these

37. If the sum of n terms is $2n^2+5n$ then its nth term is
(a) 4n – 3
(b) 3n – 4
(c) 4n + 3
(d) 3n + 4

38. If ${}^6P_r = 24\ {}^6C_{r,}$ then find r:
(a) 4
(b) 6
(c) 10
(d) 120

39. How many numbers greater than 2000 can be formed with the digits 1, 2,3,4,5 with each digit distinct?
(a) 216
(b) 120
(c) 24
(d) 240

40. $\alpha\beta$ are the roots of the $2x^2+3x+7=0$. Then the value of $\alpha\beta^{-1}+\alpha^{-1}\beta$ is
(a) 2
(b) 3/7
(c) 7/2
(d) -19/14

41. The missing number in the series:- 7, 11, 13, 17, 19, 23, 25, 29, ?
(a) 30
(b) 31
(c) 32
(d) 33

42. In a certain code language "Great solution turn plan" is written "&T5 #N8 @N4 %N4". Then "Tamilnadu" written in that code:-
(a) #u9
(b) &T9
(c) @U9
(d) @T9

43. Rahim started from point X and walked straight 5 km west, then turned left and walked straight 2 km and again, turned left and walked straight 7 km. In which directions is he from the point X ?
(a) North - East
(b) South - West
(c) South - East
(d) North – West

44. Find odd man out of the following series:-
7, 9, 13, 17, 19
(a) 7
(b) 9
(c) 19
(d) 13

45. Pointing to an old man, vijay said,"His son is my son's uncle". How is old man related to Vijay?
(a) Brother
(b) Uncle
(c) Father
(d) Grand father

46. If P+Q means P is the mother of Q, P÷Q Means P is the father of Q, P-Q means P is the sister of Q. Then which of the following relationship show that M is the daughter of R?
(a) R÷M+N
(b) R+N÷M
(c) R-M÷N
(d) None

47. A man goes 3 km east from point A and then takes a right turn from point B to move 4 km to point C. What is the minimum distance between point A and point C ?

(a) $2\sqrt{2}km$
(b) $5km$
(c) $7km$
(d) $6km$

(Directions Q 48 to 51) Two or Three statements are followed by two conclusions I and II, you have to take the two given statements to be true, disregarding the commonly known facts and then decide which of the given conclusions logically follows from the two given statements?

48. **Statements :**

(i) All pen are rubber.
(ii) All scale is box.
(iii) Some rubber are box.

Conclusions :

(I) Some scale are pen.
(II) No scale are pen.
(a) Only Conclusion I follows
(b) Only Conclusion II follows
(c) Both Conclusion I and II follows
(d) Either Conclusion I or II follows

49. **Statements :**

(i) All A are C.
(ii) All D are C.

Conclusions :

(I) Some D are C.
(II) Some D are not A.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Either I or II follows.
(d) Both conclusion I and II follows.

50. **Statements :**

(i) Some cups are belt.
(ii) No Belt is black.

Conclusions :

(I) Some belt are cups.
(II) Some cups are not black.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Either I or II follows.
(d) Both conclusion I and II follows.

51. **Statements :**

(i) All ships are aeroplanes.
(ii) All trucks are ships.
(iii) All cars are trucks.

Conclusions :

(I) Some ships are not cars.
(II) All cars are aeroplanes.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Either I or II follows.
(d) Neither I nor II follows.

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

53. H is richer than J. M is richer than P. L is as rich as J, A is richer than H. What conclusion can be definitely drawn from the above statement?
(a) J is more poorer than P
(b) M is richer than A
(c) P is richer than L
(d) L is poorer than H

54. 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

55. K is a place which is located 2 km away in the north-west direction from the capital P. R is another place that is located 2 km away in the south-west direction from K. M is another place and that is located 2 km away in the North-west direction from R. T is yet another place that is located 2 km away in the south-west direction from M. In which direction is T located in relation to P ?
(a) South-West
(b) North-West
(c) West
(d) North

56. Which of the following is odd one :-
(a) CEHL
(b) KMPT
(c) OQTX
(d) NPSV

57. Gopal started walking 2 km straight from his school. Then he turned right and walked 1 km. Again he turned right and walked 1 km to reach his house. If his house is south-east form his school, then in which direction did Gopal start walking from the school ?
(a) East
(b) West
(c) South
(d) North

58. Ravi's father has a son Rohit who has an aunt Laxmi who has a husband Rao whose father-in-law is Mohan. What is the relation of Mohan to Ravi ?
(a) Nephew
(b) Grandfather
(c) Son
(d) Uncle

59. If PLAY is coded as 8123 and RHYME is coded as 49367. What will be code of MALE ?
(a) 6217
(b) 6198
(c) 6395
(d) 6285

60. 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

61. r, b_{xy}, b_{yx} all have ……. sign.
(a) different
(b) same
(c) both
(d) none

62. Link relative index number is expressed for period n is
(a) $\frac{P_n}{P_{n+1}}$
(b) $\frac{P_0}{P_{n-1}}$
(c) $\frac{P_n}{P_{n-1}} \times 100$
(d) None of these

63. An area diagram is
(a) Histogram
(b) Frequency Polygon
(c) Ogive
(d) None

64. The probability that a number selected from [1,2,3,4,……., 100] is a perfect cube is

(a) $\frac{1}{10}$

(b) $\frac{1}{25}$

(c) $\frac{1}{20}$

(d) $\frac{3}{100}$

65. For a standard normal distribution, the points of inflexion are given by
(a) μ-σ and μ+σ
(b) -σ and σ
(c) -1 and 1
(d) 0 and 1

66. Out of the following which is a positional average -
(a) Arithmetic mean
(b) Geocentric mean
(c) Median
(d) Harmonic mean

67. Which one of the following cannot be determined by graphic method-
(a) Mean
(b) Median
(c) Quartiles
(d) Mode

68. The mean and standard deviation of 10 observations are 35 and 2 respectively. Find out the changed mean and standard deviation if each observation is increased by 5.
(a) 40 , 2
(b) 35 , 7
(c) 40 , 7
(d) None

69. Consecutive rectangles in a Histogram have no space in between
(a) true
(b) false
(c) both
(d) none

70. Fisher Index = 149.94
Dorbish Index is 150
then find Paache Index
(a) 120
(b) 154
(c) 170
(d) 200

71. Mean of binomial distribution = 3 and variance = 4 find the value of n-
(a) 8
(b) 9
(c) $\frac{4}{3}$
(d) Not valid

72. 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

73. If the maximum and minimum values of 10 observations are 40 and 10 then coefficient of range is
(a) $\frac{5}{3}$
(b) $\frac{3}{5}$
(c) 30
(d) none of these

74. 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

75. 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%

76. 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

77. Purchasing power of money is
(a) Inversely proportional to price index number
(b) Directly proportional to price index number
(c) Both (a) and (b)
(d) None of these

78. Age of applicants for life insurance and the premium of insurance-correlation are :
(a) positive
(b) negative
(c) zero
(d) None

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

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

81. Sum of square deviation from mean for any set of observation is -
(a) Negative
(b) Minimum
(c) Zero
(d) None of these

82. 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

83. 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.

84. _____ is the entire upper part of the table which includes columns and sub-column and unit of measurement.
(a) Stub
(b) Box-head
(c) Body
(d) Caption

85. Which is true from the following.
(a) Q.D<M.D.<S.D
(b) Q.D>M.D>S.D
(c) Q.D<S.D<M.D
(d) Q.D>S.D>M.D

86. Standard Deviation is independent of change of _____ .
(a) Origin
(b) Scale
(c) Both
(d) None of these

87. If two variable are uncorrelated then regression lines are .
(a) Parareel
(b) Perpendicular
(c) Coincide
(d) 45^0 Angled

88. Correlation coefficient between x and y is equal to _____ of regression coefficients
(a) A.M
(b) G.M
(c) H.M
(d) None of these

89. If A and B are two events P (A) $=\frac{1}{2}$, P(B) $=\frac{5}{8}$, P(A$\cup$B)$=\frac{3}{4}$ find P($\overline{A}\cap\overline{B}$)
(a) 3/4
(b) 1/4
(c) 3/16
(d) None of these

90. If average of 50 person is 2850 Rs. but later on it was discovered one person salary is wrongly taken as 8000 instead of 7800 find correct mean.
(a) Rs. 5,854
(b) Rs. 5,846
(c) Rs. 5,650
(d) Rs. 2,846

91. To check the consistency of two data which measure of dispersion will be used-
(a) QD
(b) SD
(c) CV
(d) None of these

92. Two dice are rolled find probability that one dice have multiple of 3 other dice have multiple of 2
(a) 2/3
(b) 1/6
(c) 1/3
(d) None of these

93.

x	-20	-10	30	75	80
p	3/20	1/5	1/2	1/10	1/20

Find expected value of probability distribution
(a) 20.5
(b) 22.5
(c) 21.5
(d) 4.5

94. in normal distribution QD=6 find SD
(a) 4
(b) 9
(c) 7
(d) 6

95. A card is drawn from playing cards find the probability that it would be Red or King.
(a) 1/4
(b) 4/13
(c) 7/13
(d) 1/2

96. Skewness of normal distribution is
(a) Positive
(b) Negative
(c) Zero
(d) None of these

97. 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16 find coefficient of variation :
(a) 54.23
(b) 4.69
(c) 8.5
(d) None of these

98. The Q.D. of 6 numbers 15, 8, 36, 40, 38, 41 is equal to
(a) 12.5
(b) 25
(c) 13.5
(d) 37

99. The prices and quantities of 3 commodities in base and current years are as follows:

P_0	P_1	q_0	q_1
12	14	10	20
10	8	20	30
8	10	30	10

The Laspayer price index is
(a) 118.13
(b) 107.14
(c) 120.10
(d) None

100. For a symmetric distribution
(a) Mean = Median = Mode
(b) Mode = 3 Median –2 Mean
(c) Mode = $\frac{1}{3}$ Median = 1/2
(d) None

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