CA FOUNDATION N'18

SUBJECT- MATHS, L.R AND STATS

Test Code – CFP 4012

(Date :)

(100 Marks)

PART – A

MATHS

1. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ = k then $\frac{pa+qc+re}{pb+qd+rf}$ equals

   (a) k

   (b) (p + q + r)k

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

   (d) None of these

2. If $\frac{\sqrt{x+5}+\sqrt{x-16}}{\sqrt{x+5}-\sqrt{x-16}} = \frac{7}{3}$ then x equals

   (a) 10

   (b) 20

   (c) 30

   (d) 40

3. If $2^x \times 8^{\frac{1}{5}} = 2^{\frac{1}{5}}$, then the value of x is

   (a) $\frac{1}{5}$

   (b) $-\frac{1}{5}$

   (c) $\frac{2}{5}$

   (d) $-\frac{2}{5}$

4. If $a = xy^{m-1}$; $b = xy^{n-1}$; $c = xy^{p-1}$ then the value of $a^{n-p} \times b^{p-m} \times c^{m-n}$ reduces to

   (a) 1

   (b) –1

   (c) 0

   (d) None

5. If $\frac{\log 3}{x-y} = \frac{\log 5}{y-z} = \frac{\log 7}{z-x}$, then $3^{(x+y)} . 5^{(y+z)} . 7^{(z+x)}$ =

   (a) 2

   (b) 10

(c) 1

(d) 0

6. If $\frac{xy}{x+y} = 1$ and x ≠ y, what is x in terms of y ?

(a) $\frac{y+1}{y-1}$

(b) $\frac{y+1}{y}$

(c) $\frac{y}{y-1}$

(d) $\frac{y}{y+1}$

7. Solving equation $\frac{6x+2}{4} + \frac{2x^2-1}{2x^2+2} = \frac{10x-1}{4x}$ we get roots as

(a) ± 1

(b) +1

(c) -1

(d) 0

8. A motor boat traveling at 18 miles per hour traveled the length of a lake in one quarter of an hour less time than it took when traveling at 12 miles per hour. What was the length in miles of the lake ?

(a) 6

(b) 9

(c) 12

(d) 15

9. In the equation $ax^2 + bx + c = 0$, the roots are equal if

(a) $b^2 < 4ac$

(b) $b^2 - 4ac$

(c) $b^2 > 4ac$

(d) $b^2 = 4ac$

10. If α, β are the roots of the quadratic equation $2x^2 - 4x = 1$, then the value of $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$:

(a) -11

(b) 22

(c) -22

(d) 11

11. What is the smallest integer value of x that satisfies the inequality $4 - 3x < 11$?

(a) -3

(b) -2

(c) -1

(d) 0

12. In a class of boys (x) and girls(y) the maximum seating capacity is 360. This can be shown by –

(a) $x + y \leq 360$

(b) $x + y \geq 360$

(c) $x + y \neq 360$

(d) None of these

13. Solve for real 'x' if $5x - 2 \geq 2x + 1$ and $2x + 3 < 18 - 3x$

(a) $1 < x < 3$

(b) $-1 > x > -3$

(c) $1 \leq x < 3$

(d) $x = 3$

14. Sachin deposited Rs. 1,00,000 in his bank for 2 years at simple interest of 6%. How much interest would he earn ? How much would be the final value of deposit ?

(a) Rs. 6,000, Rs. 1,06,000

(b) Rs. 15,000, Rs. 1,15,000

(c) Rs. 11,600, Rs. 1,11,600

(d) Rs. 12,000, Rs. 1,12,000

15. The partners A & B together lent Rs. 3903 at 4% p.a. interest compounded annually. After a span of 7 years, A gets the same amount as B gets after 9 years. The share of A in the sum of Rs. 3903/- would have been

(a) Rs. 1875

(b) Rs. 2280

(c) Rs. 2028

(d) Rs. 2820

16. The difference between SI and CI on a certain sum for 3 years at 5% p.a. is Rs. 76.25. Find the sum.

(a) Rs. 5,000

(b) Rs. 8,000

(c) Rs. 9,000

(d) Rs. 10,000

17. Alibaba borrows Rs. 6 Lakhs Housing Loan at 6% repayable in 20 annual installments commencing at the end of the first year. How much annual payment is necessary ?

(a) Rs. 52,420

(b) Rs. 52,419

(c) Rs. 52,310

(d) Rs. 52,320

18. A company borrows Rs. 10,000 on condition to repay it with compound interest at 5% p.a. by annual installments of Rs. 1,000 each. The number of years by which the debt will be clear is –

(a) 14.2 years

(b) 10 years

(c) 12 years

(d) None of these

19. The number of arrangements in which the letters of the word MONDAY be arranged so that the words thus formed begin with M and do not end with N is –

(a) 720

(b) 120

(c) 96

(d) None of these

20. A family of 4 brothers and three sisters is to be arranged for a photograph in one row. In how many ways can they be seated if no two sisters sit together ?

(a) 840

(b) 1,440

(c) 2,210

(d) 1,020

21. How many different signals are possible if we wish to make signals by arranging 3 red, 2 yellow and 2 green flags in one post.

(a) 210

(b) 6,420

(c) 40,320

(d) 96

22. If $(n + 1)\ C_{r-1} : {}^{n}C_{r} : n - 1C_{r-1} = 8 : 3 : 1$ then find the value of n

(a) 14

(b) 15

(c) 16

(d) 17

23. A committee is to be formed of 2 teachers and 3 students out of 10 teachers and 20 students. The number of ways in which this can be done is –

(a) ${}^{10}C_2 \times {}^{20}C_3$

(b) ${}^{9}C_1 \times {}^{20}C_3$

(c) ${}^{10}C_2 \times {}^{19}C_3$

(d) None

24. Between the two numbers whose sum is $\frac{13}{6}$, an even number of A.M. is inserted. If the sum of arithmetic mean exceeds their number by unity, then number of arithmetic means inserted are –

(a) 6

(b) 10

(c) 8

(d) 12

25. A person pays Rs. 975 by monthly installment each less then the former by Rs. 5. The first installment is Rs. 100. The time by which the entire amount will be paid is

(a) 10 months

(b) 15 months

(c) 14 months

(d) None of these

26. If a, b, c, d are in GP. Then the value of $b(ab - cd) - (c + a)(b^2 - c^2)$ is ....

(a) 0

(b) 1

(c) -1

(d) None

27. Find the sum to Infinity of the Following series : $1 - 1 + 1 - 1 + 1 - 1 \ldots\ldots\infty$

(a) 1

(b) ½

(c) 0

(d) Not defined

28. The sum of n terms of the series 1.4 + 3.7 + 5.10 + …. is

(a) $\left(\frac{n}{2}\right)(4n^2 + 5n - 1)$

(b) $\left(\frac{n}{2}\right)(5n^2 + 4n - 1)$

(c) $\left(\frac{n}{2}\right)(4n^2 + 5n + 1)$

(d) None

29. If n (P) = 3 and n (Q) = 4, then n (P × Q) is

(a) 3

(b) 4

(c) 12

(d) 1

30. On a survey of 100 boys it was found that 50 used white shirt 40 red and 30 blue. 20 were habituated in using both white and red shirts 15 both red and blue shirts and 10 blue and white shirts. Find the number of boys using all the colours.

(a) 20

(b) 25

(c) 30

(d) None

31. If $f(x) = x^3 - x^2 + x + 1$ then the value of $[f(1) + f(-1)]/2$ will be

(a) 5

(b) 2

(c) 0

(d) -2

32. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$ then $f\left(\frac{2x}{1+x^2}\right)$ =

(a) f(x)

(b) 2f(x)

(c) 3f(x)

(d) $-$ f(x)

33. Obtain the inverse of the matrix $\begin{bmatrix} 2 & 4 & 1 \\ 3 & 1 & 2 \\ 1 & 3 & -3 \end{bmatrix}$ Hence solve the following system of equations.

2x + 4y – z = 9

3x + y + 2z = 7

X + 3y – 3z =4

(a) 2, 1, 1

(b) 2, 2, 2

(c) 1, 1, 1

(d) 1, 2, 1

34. A company is manufactured two types of autocycles for gents and ladies separately, which are assembled and finished in to workshops W_1 and W_2. Each type takes 15 hours and 10 hours for assembly and 5 hours and 2 hours for finishing in the respective shops. If total number of hours available are 400 and 120 in workshops W_1 and W_2 respectively, calculate the number of units of autocycles produced using matrix method.

(a) 20, 20

(b) 20, 10

(c) 10, 30

(d) 10, 20

35. Find the inverse of the matrix $\begin{bmatrix} 2 & -3 \\ 4 & -11 \end{bmatrix}$ hence, solve the system of equations

2x – 3y = 3

4x – 11y = 11

(a) 0, – 2

(b) – 3, 1

(c) 0, – 1

(d) –1, 1

36. $\frac{d}{dx} e^{2logx}$ is equal to

(a) 2

(b) 2x

(c) x^2

(d) 0

37. If $y = (1 + x)^{2x}$ then the value of $\frac{1}{y} \times \frac{dy}{dx}$ is

(a) $2[x(x + 1)^{-1} + \log (x + 1)]$

(b) $x(x + 1)^{-1} + \log (x + 1)$

(c) $2[x(x + 1)^{-1} - \log (x + 1)]$

(d) None

38. If $y = ae^{mx} + be^{-mx}$ then $\frac{d^2y}{dx^2}$ is

(a) m^2y

(b) my

(c) $-m^2y$

(d) $-my$

39. $\int \frac{(x^2+1)}{\sqrt{x^2+2}}$ is equal to

(a) $2\sqrt{x^2 + 2} + k$

(b) $\sqrt{x^2 + 2} + k$

(c) $(x^2 + 2)^{3/2} + k$

(d) None of these

40. Evaluate $\int_{-3}^{3}(x^3 + x)\, dx$

(a) 0

(b) 3

(c) -3

(d) 1

PART – B

LOGICAL REASONING

41. 4832, 5840, 6848, 7856, ?

(a) 8864 (b) 8815 (c) 8846 (d) 8887

42. 1, 1, 4, 8 , 9, ? , 16, 64

(a) 27 (b) 28 (c) 32 (d) 40

43. A man starts from a point, walks 4 miles towards north and turns left and walks 6 miles, turns right and walks for 3 miles and again turns right and walks 4 miles and takes rest for 30 minutes. He gets up and walks straight 2 miles in the same direction and turns right and walks one mile. What is the direction he is facing?

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

44. One evening, Raja started to walk toward the Sun. After walking a while, he turned to his right and again to his right. After walking a while, he again turned right. In which direction is he facing?

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

45. Six children A, B, C, D, E and F are standing in a row. B is middle of F and D. E is middle of A and C. A does not stand next to either F or D. C does not stand next to D. F is between which of the following pairs of children?

(a) B and E (b) B and C (c) B and D (d) B and A

46. There are five different houses, A to E, in a row. A is to the right of B and E is to the left of C and right of A, B is to the right of D. Which of the houses is in the middle?

(a) A (b) B (c) C (d) D

47. Seema is the daughter-in-law of Sudhir and sister-in-law of Ramesh. Mohan is the son of Sudhir and only brother of Ramesh. Find the relation between Seema and Mohan.

(a) Sister-in-law (b) Aunt (c) Cousin (d) Wife

48. There are 2 film stars. One is the father of the other's son. What is the relationship of the two with each other?

(a) Grandfather and Grandson (b) Grandfather and son

(c) Husband and wife (d) Father and Son

Directions (Qs. 49 - 52): Each of the following questions contains two statements followed by two conclusions numbered I and II. You have to consider the two statements to be true, even if they seen to be at variance at the commonly known facts. You have to decide which of the given conclusions definitely follows from the given statements.

Give answer (a) if only I follows; (b) if only conclusion II follows; (c) both I and II follows (d) if neither I nor II follows

49. **Statement:** Some cats are kittens.

All Rats are kittens.

Conclusions: I. Some cats are Rats.

II. Some Rats are cats.

50. **Statement:** All tigers are birds.

Some birds are cows.

Conclusions: I. Some cows are birds.

II. Some tigers are cows.

51. **Statement:** Many actors are directors.

All Directors are dancers.

Conclusions: I. Some actors are dancers.

II. No director is an actor.

52. **Statement:** Some girls are flowers.

Some flowers are books.

Conclusions: I. Some girls are books.

II. No books are girls.

53. If BROTHER is coded 2456784, SISTER coded as 919684, what is coded for BORBERS?

(a) 2542849 (b) 2542898 (c) 2454889 (d) 2524889

Find odd man out of the following

54. 835, 734, 642, 751, 853, 981, 532

(a) 751 (b) 853 (c) 981 (d) 532

55. If a man on a moped starts from a point and rides 4 km South then turns left and rides 2 km and turn again to the right to ride to go more towards which direction is he moving?

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

56. Raju is standing facing north. He goes 30 metres ahead and turns left and goes for 15 metres. Now he turns right and goes for 50 metres and finally turns to his right and walks. In which direction is he heading?

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

Directions (Q. No. 57- 58): Study the following information carefully to answer the given questions.

Eight persons P to W are sitting in front of one another in two rows. Each row has four persons. P is between U and V and facing North. Q, who is to the immediate left of S is facing W. R is between T and S and W is to the immediate right of V.

57. Who is sitting in front of R?

(a) U (b) Q (c) V (d) P

58. Who is to the immediate right of R?

(a) M (b) U (c) S or P (d) None of these

59. Suresh's sister is the wife of Ram. Ram is Rani's brother. Ram's father is Madhur. Sheetal is Ram's grandmother. Rema is Sheetal is daughter-in-law. Rohit is Rani's brother's son. Who is Rohit to Suresh?

(a) Brother-in-law (b) Son (c) Brother (d) Nephew

60. Introducing a man, a woman said, "His wife is the only daughter of my mother." How is the woman related with the man?

(a) Sister-in-law (b) Wife (c) Aunt (d) Mother-in-law

PART C

STATISTICS

61. In _____ method(s) information can be gathered by the researcher himself by contacting the interviewee.

(a) Personal Interview

(b) Telephone Interview

(c) Both (a) & (b)

(d) Indirect Oral

62. If the width of each of ten classes in a frequency distribution is 2.5 and the lower class boundary of the lowest class is 5.1, then the upper class boundary of the highest class is

(a) 30.1

(b) 30

(c) 31.1

(d) 27.6

63. The following data relate to the income of 86 persons :

Income in Rs.	No. of persons
500 – 999	15
1000 – 1499	28
1500 – 1999	36
2000 – 2499	7

What is the percentage of persons earning more than Rs. 1500 ?

(a) 50

(b) 45

(c) 40

(d) 60

64. 100 persons are divided into number of male/female and employed/unemployed it refers to

(a) Cardinal Data

(b) Ordinal Data

(c) Spatial Data

(d) Temporal Data

65. For construction of Histogram the Class intervals of frequency Distribution is

(a) Equal

(b) Unequal

(c) Either Equal or Unequal

(d) None

66. Find the AM for the following distribution :

Class	**Frequency**
350 – 369	23
370 – 389	38
390 – 409	58
410 – 429	82
430 – 449	65
450 – 469	31
470 – 489	11

(a) 416.71

(b) 520.13

(c) 432.62

(d) 225.71

67. If y = 5x – 20 & $\bar{x}$ = 30 then the value of $\bar{y}$ is

(a) 130

(b) 140

(c) 30

(d) None

68. If GM of x is 10 and GM of y is 15, then the GM of xy is

(a) 150

(b) Log 10 × log 15

(c) Log 150

(d) None of these

69. The median of a set of 9 distinct observations is 20.5 If each of the largest 4 observations of the set is increased by 2, then the median of the new set –

(a) Is decreased by 2

(b) Is two times the original median

(c) Remains the same as that of the original set

(d) Is increased by 2

70. The A.M. of square of first '2n' natural numbers is

(a) $\frac{1}{6}$(2n+1) (4n - 1))

(b) $\frac{1}{6}$ (2n – 1) (4n – 1)

(c) $\frac{1}{6}$ (2n – 1) (4n + 1) d)

(d) $\frac{1}{6}$ (2n + 1) (4n + 1)

71. If the range of x is 2, what would be the range of y = 3x - 5

(a) 2

(b) 6

(c) – 6

(d) 44

72. If the relation between x and y is 5y – 3x = 10 and the mean deviation about mean for x is 12, then the Mean deviation of y about mean is

(a) 7.20

(b) 6.80

(c) 20

(d) 18.80

73. 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

74. The SD of X is known to be 10 then the SD of 50 + 5X is :

(a) 50

(b) 100

(c) 10

(d) 500

75. What will be the probable value of mean deviation ?

When Q_3= 40 and Q_1= 15

(a) 17.50

(b) 18.75

(c) 15.00

(d) None of the above

76. The correlation is said to be positive

(a) When the values of two variables move in the same direction.

(b) When the values of two variables move in the opposite direction.

(c) When the values of two variables would not change.

(d) None of these

77. The more scattered the points are around a straight line in a scattered diagram, the _____ is the correlation coefficient.

(a) Zero

(b) More

(c) Less

(d) None

78. If r = 0.28, Cov (x, y) = 7.6, V(x) = 9, then σ_y =

(a) 8.75

(b) 9.04

(c) 6.25

(d) None

79. The regression lines are identical if r is equal to –

(a) + 1

(b) -1

(c) + 1 or -1

(d) 0

80. The two regression lines are : 16x – 20y + 132 = 0 and 80x – 30y – 428 = 0, the value of correlation coefficient is

(a) 0.6

(b) -0.6

(c) 0.54

(d) 0.45

81. If for two events A and B, P (A $\cup$ B) = 1, then A and B are

(a) Mutually exclusive events

(b) Equally likely events

(c) Exhaustive events

(d) Dependent events

82. For two events A and B, P (B) = 0.3, P(A but not B) = 0.4 and P (not A) = 0.6. The events A and B are

(a) Exhaustive

(b) Independent

(c) Equally likely

(d) Mutually exclusive

83. A bag contains 6 green and 5 red balls. One ball is drawn at random. The probability of getting a red ball is ?

(a) $\frac{5}{11}$

(b) $\frac{6}{11}$

(c) $\frac{6}{5}$

(d) None

84. There are three persons A, B and C having different ages. The probability that A survives for another 5 years is 0.80, B survives for another 5 years is 0.60 and C survives for another 5 years is 0.50. The probabilities that A and B survive for another 5 years is 0.46, B and C survive for another 5 years is 0.32, A and C survive for another 5 years is 0.48 and probability that all will survive is 0.26. Find the probability that at least one of them survives for another 5 years.

(a) 0.80

(b) 0.90

(c) 0.78

(d) 0.64

85. A random variable X takes values. 0, 1, 2, 3, and its mean is 1.3. If P (X = 3) = 3P (x = 1), and P(x = 2) = 0.3, then P (X = 0) is

(a) 0.1

(b) 0.42

(c) 0.3

(d) 0.4

86. In a class of 80 students , 35% play only cricket , 45% only tennis , how many play cricket?

(a) 86

(b) 54

(c) 36

(d) 44

87. In Binomial distribution is _____ . The parameter(s) are-

(a) Biparametric, n and q

(b) Biparametric, n and p

(c) Uniparametric, p

(d) Uniparametric, q

88. In Binomial Distribution $\mu = 4$, $\sigma^2 = 3$, then mode =

(a) 4

(b) 4.25

(c) 4.5

(d) 4.1

89. A coin is tossed 10 times. Assuming the coin to be unbiased, what is the probability of getting at least 4 heads ?

(a) $\frac{563}{1024}$

(b) $\frac{758}{1024}$

(c) $\frac{848}{1024}$

(d) $\frac{663}{1024}$

90. A discrete random variable x follows Poisson distribution. Find the value of $P(X \leq 2/ X \geq 1)$. You are given that E(x) = 2.20 and $e^{-2.20} = 0.1108$.

(a) 0.58

(b) 0.64

(c) 0.89

(d) 0.76

91. In a Normal Distribution the relation between QD and SD is –

(a) 3 QD = 2SD

(b) 3 SD = 2 QD

(c) 4 QD = 3 SD

(d) None of these

92. The mean of normal distribution is 500 and 16 percent of the values are greater than 600. What is the standard deviation of distribution ?

(a) 75

(b) 100

(c) 50

(d) 60

93. When the trend is of exponential type, the moving averages are to be computed by using :

(a) Arithmetic mean

(b) Geometric mean

(c) Harmonic mean

(d) Weighted mean

94. The additive model of the time series is :

(a) $Y = T + S + C + I$

(b) $Y = TSCI$

(c) $Y = a + bX$

(d) $Y = a + bX + cX2$

95. Purchasing power of money is

(a) Reciprocal of price index number

(b) Equal to price index number

(c) Unequal to price Index number

(d) None of these

96. Fisher's ideal index is

(a) Arithmetic mean of Laspeyre's and Paasche's index.

(b) Median of Laspeyre's and Paasche's index

(c) Geometric mean of Laspeyre's and Paasche's index

(d) Geometric mean of Bowley's and Paasche's index.

97. From the data given below

Commodity	**Price Relative**	**Weight**
A	125	5
B	67	2
C	250	3

Then the suitable index number is

(a) 150.9

(b) 155.8

(c) 145.8

(d) None of these

98. From the following data

Commodity		**A**	**B**	**C**	**D**
1992 base year	Price	3	5	4	1
	Quantity	18	6	20	14
1993 Current Year	Price	4	5	6	3
	Quantity	15	9	26	15

The Paasche's price index number is :

(a) 146.41

(b) 148.25

(c) 144.25

(d) None

99. If $\Sigma P_0Q_0 = 1360$, $\Sigma P_nQ_0 = 1900$, $\Sigma P_0Q_n = 1344$, $\Sigma P_0Q_n = 1880$, then the Laspeyre's Index number is

(a) 0.71

(b) 1.39

(c) 1.75

(d) None of these

100. Consumer price index number goes up from 110 to 200 and the Salary of a worker is also raised from Rs. 325 to Rs. 500. Therefore, in real terms he has no gain, to maintain his previous standard of living he should get an additional amount is :

(a) Rs. 85

(b) Rs. 90.91

(c) Rs. 98.25

(d) None of these