(GCF-11 & 12, CA FOUNDATION GD & PD)

DATE: 03.03.2021 MAXIMUM MARKS: 100 TIMING: 3 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. 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

2. 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

3. 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

4. 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

5. Insert 4 GM's between 9 and 288 :-
   (a) 27, 54, 108, 144
   (b) 18, 36, 72, 144
   (c) 36, 72, 144, 208
   (d) 18, 27, 54, 108

6. Suppose the revenues of a company for five years:-

Year	2013	2014	2015	2016	2017
Revenues	100	120	160	210	260

   Calculate compound annual growth rate.
   (a) 26.98%
   (b) 27.74%
   (c) 25.96%
   (d) 29.01%

7. In a class of 120 students, 35% students can play only cricket, 45% students can play only table tennis and the remaining students can play both the games. In all how many students can play cricket?
   (a) 55
   (b) 66
   (c) 60
   (d) 70

8. $\int \frac{dx}{x+\sqrt{x^2-1}}$

(a) $\frac{x^2}{2}-\frac{x}{2}\sqrt{x^2+1}+\frac{1}{2}\log\,(x+\sqrt{x^2-1})+C$

(b) $x-\frac{x}{2}\sqrt{x^2-1}-\frac{1}{2}\log\,(x+\sqrt{x^2-1})+C$

(c) $\frac{x^2}{2}+\frac{x}{2}\sqrt{x^2-1}+\frac{1}{2}\log\,(x+\sqrt{x^2-1})+C$

(d) $\frac{x^2}{2}-\frac{x}{2}\sqrt{x^2-1}+\frac{1}{2}\log\,(x+\sqrt{x^2-1})+C$

9. The derivative of $x^2 \log x$ is :-
(a) 1 + 2 log*x*
(b) 2 long*x*
(c) *x* (1+2 log*x*)
(d) None

10. If $f(x)=\frac{x-1}{x}$ *and* $g(x)=\frac{1}{1-x}$ then fog (x) is equal to:-
(a) x-1
(b) x
(c) 1-x
(d) -x

11. The difference between the roots of the equation $x^2 - 7x - 9 = 0$ is:
(a) 7
(b) $\sqrt{85}$
(c) 9
(d) $2\sqrt{85}$

12. Two machines (I and II) produce two grades of plywood, Grade A and Grade B. In one hour of operation, machine I produces 2 units of Grade A and one unit of Grade B, while machine II, in one hour of operation produces 3 units of grade A and four units of grade B. The machines are required to meet a production schedule of atleast 14 units of grade A and 12 units of grade B. Express this using linear inequalities.
(a) $2x+3y\geq 14,\ x+4y\geq 12,\ x\geq 0,\ y\geq 0$
(b) $2x+3y\leq 14,\ x+4y\geq 12,\ x\geq 0,\ y>0$
(c) $2x+3y\leq 14,\ x+4y\leq 12,\ x\geq 0,\ y\geq 0$
(d) $2x+3y\geq 14,\ x+4y\leq 12,\ x\geq 0,\ y\geq 0$

13. If $A=\begin{pmatrix} 2i & 3i \\ 2i & -i \end{pmatrix}$ ($i^2=-1$) then $|A|=?$
(a) 2
(b) 8
(c) 4
(d) 5

14. 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

15. If water is called food, food is called tree, tree is called sky, sky is called wall, on which of the following grows a fruit?

(a) Sky
(b) Tree
(c) Food
(d) Wall

16. 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

17. A Pie Diagram used to represent the following data:

Source	Customers	Excise	Income Tax	Wealth Tax
Revenue in millions	120	180	240	180

The Central Angles corresponding to Income Tax and Wealth Tax-

(a) $(130^0, 90^0)$
(b) $120^0, 90^0$
(c) $60^0, 120^0$
(d) $90^0, 60^0$

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

19. If the plotted points in a scatter diagram lie from upper left to lower right, then correlation is:

(a) Positive
(b) Zero
(c) Negative
(d) None of these

20. 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

21. Find the coefficient of correlation when its probable error is 0.2 and the number of pairs of item is 9:
(a) 0.505
(b) 0.332
(c) 0.414
(d) 0.316

22. If $P(\bar{A} \cup \bar{B}) = 5/6, P(A) = 1/2$ **and** $P(\bar{B}) = 2/3,$ **what is** $P(A \cup B)$?
(a) 1/3
(b) 5/6
(c) 2/3
(d) 4/9

23. 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

24. Find out sum of the roots of equation $3x^2 + (5m - 2)x + m = 0$ if one root is reciprocal to other.
(a) $\frac{15}{2}$
(b) $\frac{-13}{3}$
(c) $\frac{5m-2}{3}$
(d) $\frac{13}{2}$

25. $f(x) = \left(x + \frac{1}{x}\right)^2$ find derivative $\frac{dy}{dx}$
(a) $2x - \frac{2}{x3}$
(b) 2x
(c) 2x – 2
(d) None of these

26. If $f(x) = 2x^2+3x-5$, then what is $f'(0)+3f'(-1)$ equal to :
(a) –1
(b) 0
(c) 1
(d) 2

27. Five competitors in a contest are ranked by two judges in the order 1, 2, 3, 4, 5 and 5,4,3,2,1 respectively. Calculate the Spearman's rank correlation coefficient.
(a) -0.5
(b) -1
(c) 0.5
(d) 1

28. Given the prices of 2 commodities are increased by 10% and 20% respectively and the price of another commodity is decreased by 30%. The relative importance of 3 commodities are in the ratio 3:3:1. Find weighted price index number.
(a) 80
(b) 109
(c) 108.5
(d) 110

29. Given the following data :

Commodity	P_0	q_0	p_1	q_1
A	1	10	2	5
B	1	5	X	2

where p and q represent price and quantity respectively and subscript for the time period. The value of X if the ratio between Laspeyres (L) and Paasche's (P) index numbers is 28 : 27 i.e., L : P = 28 : 27 is :
(a) 3
(b) 4
(c) 5
(d) 6

30. Mean and S.D. of a given set of observations is 1,500 and 400 respectively. If there is hiked by 20% in the first year and each observation is an increment of 100 in 2nd year, then find new mean and S.D.
(a) 1920, 480
(b) 1900, 480
(c) 1600, 480
(d) 1600, 400

31. Chronological classification is :
(a) classification of units on the basis of time
(b) classification of units on the basis of geographical area
(c) classification of units according to the characteristic of attributes
(d) classification of units according to the characteristic of variables

32. 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

33. 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) $\frac{35}{49}$

34. 10, 100, 200, 310, 430 ?
(a) 560
(b) 540
(c) 550
(d) 590

35. 7, 26, 63, 124, 215, ?, 511
(a) 342
(b) 343
(c) 441
(d) 421

36. If DELHI is coded as CCIDD, how would you encode BOMBAY ?
(a) AJMTVT
(b) AMJXVS
(c) MJXVSU
(d) WXYZAX

37. A man started walking West. He turned right, then right again and finally turned left. Towards which direction was he walking now ?
(a) North
(b) South
(c) West
(d) East

Directions (Q 38–40): Study the following carefully and answer the questions given below:

A, B, C, D, E, F, G, H and K are sitting around a circle facing the centre. B is fourth to the left of G, who is second to the right of C. F is fourth to the right of C and is second to the left of K. A is fourth to the right of K. D is not an immediate neighbour of either K or B. H is third to the right of E.

38. In which of the following combinations is the third person sitting between the first and the second persons?
(a) EKB
(b) CHB
(c) AGC
(d) FGD

39. Who is fourth to the left of E ?
(a) A
(b) C
(c) G
(d) Data inadequate

40. Who is the second to the right of K ?
(a) C
(b) H
(c) F
(d) E

41. 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

42. The difference between C.I and S.I on a certain sum of money invested for 3 years at 6% p.a is Rs. 110.16. The sum is
(a) Rs. 3,000
(b) Rs. 3,700
(c) Rs. 12,000
(d) Rs. 10,000

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

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

45. 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

46. 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) $\alpha \bar{x} + 10$

47. 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

48. If you want to accumulate Rs. 50,000 by making equal payments at the end of each quarter for the next five years, what will be the size of these investments, if money is worth 6% per annum converted quarterly?
(a) 3024.13
(b) 2103.13
(c) 2190.02
(d) 2162.29

49. If the relation between two variables x and y is 5x+2y=6 and the mean deviation (M.D.) of x about its mean is 6 then the M.D. of y about its mean is
(a) 6
(b) 15
(c) 18
(d) none of these

50. The interval ($\mu-3\sigma$, $\mu+3\sigma$) covers _____ area of a normal distribution.
(a) 90%
(b) 95%
(c) 99%
(d) 99.73%

51. A sum was invested for 3 years as per C.I and the rate of interest for first year is 9%, 2nd year is 6% and 3rd year is 3% p.a. respectively. Find the sum if the amount in three years is Rs. 550?
(a) Rs. 250
(b) Rs. 300
(c) Rs. 462.16
(d) Rs. 350

52. 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%

53. 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) 5 *km*
(c) 7 *km*
(d) 6 *km*

54. 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

55. P, T, V, R, M, D, K and W are sitting around a cricular table facing the centre. V is second to the left of T. T is fourth to the right of M. D and P are not immediate neighbours of T. D is third to the right of P. W is not an immediate neighbuor of P. P is to the immediate left of K.
What is R's position with respect to V ?
(a) Third to the right
(b) Fifth to the right
(c) Third to the left
(d) Second to the left

56. If in two years time a principal of Rs. 100 amounts to Rs. 121 when the interest at the rate of r% is compounded annually, then the value of r will be :
(a) 10.5
(b) 10
(c) 15
(d) 14

57. 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

58. 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

59. If the difference of S.I and C.I is Rs. 72 at 12 % for 2 years. Calculate the amount.
(a) 8,000
(b) 6,000
(c) 5,000
(d) 7,750

60. The value of $\left(\frac{x/y-1}{x^2/y^2-1}\right)$ is
(a) $\frac{y}{x+y}$
(b) $\frac{x}{x+y}$
(c) $\frac{xy}{x+y}$
(d) $\frac{x}{x-y}$

61. $\frac{\log_b x}{\log_{2b} x}$ is equal to
(a) 1+ $\log_b 2$
(b) 1+ $\log_2 b$
(c) $\frac{1}{2}$
(d) log 2

62. Value of. $\left(\frac{a^{-1}b^2}{a^2b^{-4}}\right)^7 \times \left(\frac{a^3b^{-5}}{a^{-2}b^3}\right)^{+5} \times a^{-4}b^{-2}$ is
(a) 0
(b) $a^2 b^2$
(c) 1
(d) $a^{-1} b^{-1}$

63. Ratio of $\log_{.01}.00000001$ and $\log_{\sqrt{3}}81$ is
(a) 1 : 1
(b) 2 : 1
(c) 1 : 2
(d) 1 : 4

64. Find the value of x from the equation $5^{x+1}+5^{2-x}=5^3+1$
(a) (1, 2)
(b) (2, 1)
(c) (–1, 2)
(d) (1, –2)

65. 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

66. If $a = 1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + ------\infty$

$b = 1 + \frac{1}{6} + \frac{1}{6^2} + \frac{1}{6^3} + ------\infty$

Then the value of ab is:-
(a) $\frac{5}{12}$
(b) $\frac{5}{6}$
(c) $\frac{12}{5}$
(d) 2

67. If $\frac{1}{2}, \frac{1}{3}, \frac{1}{5}$ and $\frac{1}{x}$ are in proportion, then the value of 'x' will be:-
(a) $\frac{2}{15}$
(b) $\frac{15}{2}$
(c) $\frac{10}{3}$
(d) $\frac{5}{6}$

68. The cost of living index numbers in years 2015 and 2018 were 97.5 and 115 respectively. The salary of a worker in 2015 was Rs. 19500. How much additional salary was required for him in 2018 to maintain the same statement of living as in 2015?
(a) Rs. 3,000
(b) Rs. 4,000
(c) Rs. 3,500
(d) Rs. 4,500

69. Given the following data:

Variable	:	X	Y
Mean	:	80	98
Variance	:	4	9

Coefficient of correlation = 0.6

What is the most likely value of y when x = 90?
(a) 90
(b) 103
(c) 104
(d) 107

70. If all the values taken by a random variable are equal then
(a) its expected value is zero
(b) its standard deviation is zero
(c) its standard deviation is positive
(d) its standard deviation is a real number

71. The value exactly at the middle of a class interval is called
(a) class mark
(b) mid value
(c) both
(d) none

72. The average rainfall for a week excluding Sunday was 10 cms. Due to heavy rainfall on Sunday, the average rainfall for the week rose to 15 cms. How much rainfall was there on Sunday?
(a) 40 cm
(b) 45 cm
(c) 50 cm
(d) 165 cm

73. The mean salary paid per week to 1,000 employees of an establishment was found to be Rs. 900. Later on, it was discovered that the salaries of two employees were wrongly recorded as Rs. 750 and Rs. 365 instead of Rs. 570 and Rs. 635. Find the corrected mean salary.
(a) 280
(b) 1000
(c) 900.09
(d) 800.09

74. For the distribution

X	1	2	3	4	5	6
F	6	9	10	14	12	8

The value of median is
(a) 3.5
(b) 3
(c) 4
(d) None of these

75. 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

76. Trend in semi average is
(a) Linear
(b) Parabola
(c) Exponential
(d) None of these

77. The sum of mean and SD of a series is a+b, if we add 2 to each observation of the series then the sum of mean and SD is
(a) a + b + 2
(b) 6 + a + b
(c) 4 + a – b
(d) a + b + 4

78. Histogram is used for finding
(a) Mode
(b) Mean
(c) First Quartile
(d) None

79. If 1.5 per cent of items produced by a manufacturing units are known to be defective, what is the probability that a sample of 200 items would contain no defective item?
(a) 0.05
(b) 0.15
(c) 0.20
(d) 0.22

80. If a coin tossed two times it two heads comes person receive 5 Rs. it one head appear person receive 2 Rs. and if no head appear receive 1 Rs. then expected income is :-
(a) 3.5
(b) 2.5
(c) 4.5
(d) 5.5

81. 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

(Directions Q 82 to 85) 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?

82. **Statement:** I. Some boys are student.
II. All students are Engineers.
Conclusions: I. All Engineers are students.
II. Some boys are Engineers.

(a) Only I follows
(b) Only II follows
(c) Both I and II follows
(d) Neither I nor II follows

83. **Statement:** I. All Lotus are flowers.
II. No Lily is a Lotus
Conclusions: I. No Lily is a flower.
II. Some Lilies are flowers.
(a) Only I follows
(b) Only II follows
(c) Either I or II follows
(d) Neither I nor II follows

84. **Statement:** Some files are rats.
All animals are rats
Conclusions: I. All files are rats.
II. Some rats are animals.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Either I or II follows.
(d) Both conclusion I and II follows.

85. **Statements:** I. All Soaps are Liquid
II. All Shirts are Soaps
III. No Shirt is a Gold.
Conclusions: I. Some Liquid, if they are shirts are also soaps.
II. All gold being soap is a possibility.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Both conclusions are correct.
(d) Neither I nor II follows.

86. If a, b, c are in A.P. and x, y, z are in G.P. then the value of $x^{(b-c)} .y^{(c-a)}. z^{(a-b)}$ is:
(a) 1
(b) 0
(c) b(c - a)
(d) None

87. Find the next term of the series BKS, DJT, FIU, HHV, ?
(a) GWJ
(b) JGW
(c) GJW
(d) None

88. Find odd One out :
4, 12, 44, 176, 890
(a) 4
(b) 12
(c) 44
(d) 176

89. A man starts form a point, walks 4 miles North, turns to his right and walks 2 miles, again turns to his right and walks 2 miles, again turns to his right and walks 2 miles. In which direction would he be now from his starting point?
(a) North
(b) South
(c) East
(d) West

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

91. If byx = 1.24, bxy = 0.36, $\overline{x} = 5.5, \overline{y} = 8.8$, 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

92. 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

93. 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

94. 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

95. 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

96. 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

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

98. 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

99. The solution of the inequality $8x+6<12x+14$ is
(a) (-2,2)
(b) (0, -2)
(c) $(2, \infty)$
(d) $(-2, \infty)$

100. When the product of price index and the quantity index is equal to the corresponding value index then it is known as :
(a) Unit test
(b) Time reversal test
(c) Factor reversal test
(d) None

__**__