

(ALL CA FOUNDATION BATCHES)

DATE: 02.11.2020

MAXIMUM MARKS: 100

TIMING: 3 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

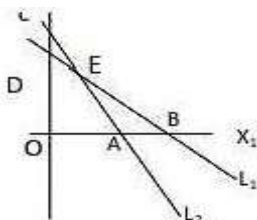
1. There are 7 Men and 3 Ladies. Find the number of ways in which a committee of 6 can be formed of them if the committee is to include at least two ladies ?
(a) 160
(b) 180
(c) 150
(d) None
2. If $A = \begin{pmatrix} 0 & 2 & 2 & 3 \\ 3 & 2 & 1 & 0 \end{pmatrix}; B = \begin{pmatrix} 0 & 3 \\ 1 & 2 \\ 2 & 1 \\ 3 & 0 \end{pmatrix}$
(a) $AB \neq BA$
(b) $AB = BA$
(c) AB exists BA not exists
(d) AB not exists BA exists
3. The condition that one of $ax^2 + bx + c = 0$ the roots of is thrice the other is :-
(a) $3b^2 = 16ac$
(b) $b^2 = 9ac$
(c) $3b^2 = -16ac$
(d) $b^2 = -9ac$
4. 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
5. A man deposited Rs. 8,000 in a bank for 3 years at 5% per annum compound interest, after 3 years he will get :
(a) Rs. 8,800
(b) Rs. 9,261
(c) Rs. 9,200
(d) Rs. 9,000
6. 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%

7. 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
8. Find the next term of the series BKS, DJT, FIU, HHV, ?
(a) GWJ
(b) JGW
(c) GJW
(d) None
9. 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) $6km$
10. Which of the following is odd one :-
(a) CEHL
(b) KMPT
(c) OQTX
(d) NPSV
11. 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
12. P, T, V, R, M, D, K and W are sitting around a circular 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 neighbor 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
13. If ROSE is written as TQUG, how BISCUIT can be written in that code?
(a) DKUEWKV
(b) CJTDVJU
(c) DKVEWKV
(d) DKUEWKY
14. Madhuri moved a distance of 75 meters toward north. She then turned to the left and walking for about 25m, turned left again and walks 80m, finally she turned to the right at an angle of 45° . In which direction was she moving finally?

- (a) South – East
(b) South – West
(c) North – west
(d) North – East
15. The population of a village increase by 2% per year, if current population is 50,000 then find the population of village after 2 years:-
(a) 52,020
(b) 52,000
(c) 51,980
(d) 52,100
16. 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
17. 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. 11,440 at the end of the nine years, how much money did he borrow?
(a) 11,500
(b) 12,000
(c) 12,500
(d) 15,500
18. 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%
19. If Rs. 1,000 be invested at interest rate of 5% and the interest be added to the principal every 10 years then the number of years in which it will amount to Rs. 2,250 is:
(a) $16\frac{2}{3}$ years
(b) 20 years
(c) 16 years
(d) $6\frac{2}{3}$ years
20. 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
21. If the sum of n terms is $2n^2 + 5n$ then its n th term is
(a) $4n - 3$
(b) $3n - 4$
(c) $4n + 3$
(d) $3n + 4$
22. Two regression lines always intersect at the means.
(a) true
(b) false
(c) both
(d) none
23. 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.
24. The probability that a number selected from $[1, 2, 3, 4, \dots, 100]$ is a perfect cube is
(a) $\frac{1}{10}$
(b) $\frac{1}{25}$
(c) $\frac{1}{20}$
(d) $\frac{3}{100}$
25. 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) $1/8$
26. Out of the following which is a positional average -
(a) Arithmetic mean
(b) Geocentric mean
(c) Median
(d) Harmonic mean

27. Which one of the following cannot be determined by graphic method-
- (a) Mean
 - (b) Median
 - (c) Quartiles
 - (d) Mode
28. Consecutive rectangles in a Histogram have no space in between
- (a) true
 - (b) false
 - (c) both
 - (d) none
29. Fisher Index = 149.94
Dorbish Index is 150
then find Paache Index
- (a) 120
 - (b) 154
 - (c) 170
 - (d) 200
30. 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
31. S borrows Rs. 5,00,000 to buy a house. If he pays equal instalments for 20 years and 10% interest on outstanding balance what will be the equal annual instalment?
- (a) Rs. 48792.72
 - (b) Rs. 58729.84
 - (c) Rs. 57829.61
 - (d) None of these
32. Ramesh wants to retire and receive Rs. 4,000 a month. He wants to pass this monthly payment to future generations after his death. He can earn an interest of 8% compounded annually. How much will he need to set aside to achieve his perpetuity goal?
- (a) Rs. 6,00,000
 - (b) Rs. 6,50,000
 - (c) Rs. 6,25,000
 - (d) Rs. 6,80,000
33. 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) OABC
(b) Outside of OAB
(c) ΔBCE
(d) ΔABE
34. Certain sum of money borrowed at simple interest amount to Rs. 2688 in three years and to Rs. 2784 in four years at the rate per annum equal to :
(a) 6%
(b) 7%
(c) 5%
(d) 4%
35. A mixture contains milk and water in the ratio 5:1. In adding 5 liters of water, the ratio of milk and water becomes 5:2 the quantity of milk in the original mixture is:
(a) 16 liters
(b) 25 liters
(c) 22.75 liters
(d) 32.5 liters
36. If $3a = 4b$ and $5c = 2b$ then $a : c$ is
(a) 3 : 10
(b) 10 : 3
(c) 5 : 2
(d) 2 : 5
37. The denominator of a fraction exceeds the numerator by 7 and if the 2 is added to the denominator then the fraction becomes $\frac{4}{7}$ Find the fraction
(a) $\frac{12}{19}$
(b) $\frac{7}{14}$
(c) $\frac{9}{16}$
(d) $\frac{11}{18}$
38. 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) $\frac{x}{x - y}$

39. Value of $\frac{6^{n+2} - 30 \times 6^{n-1}}{6^n \times 10}$ is

- (a) 3
- (b) $\frac{31}{10}$
- (c) $\frac{36}{10}$
- (d) None of them

40. $\frac{\log_b x}{\log_{2b} x}$ is equal to

- (a) $1 + \log_b 2$
- (b) $1 + \log_2 b$
- (c) $\frac{1}{2}$
- (d) $\log 2$

41. The roots of the equation : $\frac{1}{a+b+x} - \frac{1}{x} = \frac{1}{a} + \frac{1}{b}$ are:

- (a) a, b
- (b) $-a, -b$
- (c) $a, -b$
- (d) $-a, b$

42. $\sqrt{2 + \sqrt{2 + \sqrt{2 + \dots \infty}}}$ equals to

- (a) -1
- (b) 2
- (c) a & b
- (d) None of these

43. The length of a rectangle is 4cm more than the breadth and the perimeter is 11cm more than the breadth. The length of the rectangle is :

- (a) 5 cm
- (b) 7 cm
- (c) 9 cm
- (d) none of these

44. 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^2b^2
(c) 1
(d) $a^{-1}b^{-1}$.
45. Ratio of $\log_{.01}.00000001$ and $\log_{\sqrt{3}}81$ is
(a) 1 : 1
(b) 2 : 1
(c) 1 : 2
(d) 1 : 4
46. 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)
47. The compound interest on 10 lakh at 8% per annum is Rs. 2,59,712 when interest is compounded yearly then the time period is:-
(a) 2 years
(b) 3 years
(c) 4 years
(d) 5 years
48. 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
49. The value of furniture depreciates by 10% a year, if the present value of the furniture in an office is Rs. 21,870, calculate the value of furniture 3 years ago:-
(a) Rs. 30,000
(b) Rs. 35,000
(c) Rs. 40,000
(d) Rs. 50,000
50. On what sum difference between compound interest and simple interest for two year at 10% per annum is Rs. 372.
(a) Rs. 37,200
(b) Rs. 37,000
(c) Rs. 37,500
(d) None
51. If $a = 1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots - \infty$
 $b = 1 + \frac{1}{6} + \frac{1}{6^2} + \frac{1}{6^3} + \dots - \infty$

Then the value of ab is:-

- (a) $\frac{5}{12}$
- (b) $\frac{5}{6}$
- (c) $\frac{12}{5}$
- (d) 2

52. If $x = \log t$ and $y = \frac{1}{t}$, then $\frac{d^2y}{dx^2} + \frac{dy}{dx}$ is equal to :

- (a) 0
- (b) 1
- (c) - 1
- (d) None of these

53. 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) $\frac{5}{6}$

54. If one of the roots of the equation $a(b - c)x^2 + b(c - a)x + c(a - b) = 0$ is 1, then what is the second root?

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

55. If $y = \sqrt{\frac{1-x}{1+x}}$

Find the value of $(1 - x^2) \frac{dy}{dx}$

- (a) y
- (b) y^2
- (c) $-y$

(d) $-y^2$

56. Mean of binomial distribution = 3 and variance = 4 find the value of n-

(a) 8

(b) 9

(c) $\frac{4}{3}$

(d) Not valid

57. 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. 3000

(b) Rs. 4,000

(c) Rs. 3,500

(d) Rs. 4,500

58. Which is called an ideal index number?

(a) Laspayer's index number

(b) Pasche's index number

(c) Fisher's index number

(d) Marshall Edgeworth index number

59. Given that

X	-3	-3/2	0	3/2	3
Y	9	9/4	0	9/4	9

The Karlpearson's coefficient of correlation is

(a) Positive

(b) Zero

(c) Negative

(d) None

60. 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

61. The no. of observations falling within a class is called

(a) density

(b) frequency

(c) both

(d) none

62. 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
63. Frequencies are also called weights.
(a) True
(b) false
(c) both
(d) none
64. The value exactly at the middle of a class interval is called
(a) class mark
(b) mid value
(c) both
(d) none
65. Covariance = 60
Variance of $x = 100$ then
(a) Variance of Y should less than 25
(b) Variance of Y should more than 36
(c) Standard deviation of Y should less than 10
(d) None of these
66. The mean of poison distribution is 3.20 find the probability of getting variable X of non zero values - $e^{-3.20} = 0.1108$
(a) 0.1108
(b) 0.8892
(c) 0.3264
(d) 0.12
67. G.M. of a set of n observations is the root of their product.
(a) n th
(b) $(n+1)$ th
(c) n^2 th
(d) $(n-1)$ th
68. 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
69. 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

70. In following data-

	Male	Female
Observations	2	2
GM	4	25

then find combined geometric mean-

- (a) 9
(b) 6.11
(c) 10
(d) None of these

71. Which is always true for distinct observations-

- (a) Standard Deviation = $\sqrt{\frac{\sum x^2}{n}}$
(b) Standard Deviation = $\sum x^2 + n^2$
(c) $\sum x^2 = n(\sigma^2 + \bar{x}^2)$
(d) $\bar{x}^2 = \sigma^2 + n^2$

72. Standard Deviation is independent of change of_____.

- (a) Origin
(b) Scale
(c) Both
(d) None of these.

73. To check the consistency of two data which measure of dispersion will be used-

- (a) QD
(b) SD
(c) CV
(d) None of these.

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

P_0	P_1	q_0	q_1
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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
77. Trend in semi average is
- (a) Linear
 - (b) Parabola
 - (c) Exponential
 - (d) None of these
78. Coefficient of quartile deviation is $\frac{1}{4}$ then Q_3/Q_1 is
- (a) $\frac{5}{3}$
 - (b) $\frac{4}{3}$
 - (c) $\frac{3}{4}$
 - (d) $\frac{3}{5}$
79. 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) $a + b + 4$
80. For a symmetric distribution
- (a) Mean = Median = Mode
 - (b) Mode = 3 Median - 2 Mean
 - (c) Mode = $\frac{1}{3}$ Median = $\frac{1}{2}$
 - (d) None
81. Histogram is used for finding
- (a) Mode
 - (b) Mean
 - (c) First Quartile
 - (d) None
82. $E(13x+9)=$
- (a) $13x$
 - (b) $13E(x)$
 - (c) $13E(x) + 9$
 - (d) 9
83. 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
84. If the inflexion points of a Normal Distribution are 6 and 14. Find its standard Deviation?
(a) 4
(b) 6
(c) 10
(d) 12
85. A sample of 100 dry battery cells tested to find the length of life produced the following results: $\bar{X} = 12$ hours, $\sigma = 3$ hours. What percentage of battery cells are expected to have life less than 6 hours?
[Area under the normal curve from $z = 0$ to $z = 2$ is 0.4772]
(a) 2.28%
(b) 2.56%
(c) 4.56%
(d) 1.93%
86. For normal distribution
(a) First and second Quartile have same distance from median
(b) Second and third Quartile have same distance from median
(c) First and third Quartile have same distance from median
(d) None of these.
87. If a coin tossed two times it two heads comes person receive 5 Rs. if 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
88. Find odd man out of the following series:-
7, 9, 13, 17, 19
(a) 7
(b) 9
(c) 19
(d) 13
89. 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
90. 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
91. Next term of the series :
120, 168, 288, 360, 528, ?
(a) 624
(b) 728
(c) 840
(d) 900
92. 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
93. Five Friends P, Q, R, S and T are sitting in a row facing North. Here S is between T and Q and Q is to the immediate left of R. P is to the immediate left of T. Who is in the middle?
(a) S
(b) T
(c) Q
(d) R
94. You go North, turn right, then right again and then go to the left. In which direction are you now ?
(a) South
(b) East
(c) West
(d) North

(Directions Q 95 to 98) 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?

95. **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
96. **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
97. **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.
98. **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.
99. In a certain code language 'in bape' means 'he has won', 'lekiba' means 'she has lost' and 'in se pe' means 'he always won'. Which word in that language means he?
(a) in
(b) pe
(c) se
(d) Data inadequate
100. In a certain code DESIGN is written as FCUGIL, how is REPORT written in that code?
(a) TCRMPR
(b) TCRMTR
(c) TCTMPR
(d) TCTNTR
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