**Course: CA Foundation**
**Paper: Business Mathematics and Logical Reasoning and Statistics** **Marks: 100**
**Test: Prelim** **Time Allowed: 2 Hour**

**All Questions are Compulsory.**
**Section A: Business Mathematics and Logical Reasoning**

**1)** Two numbers are in the ratio 2 : 3 and the difference of their squares is 320. The numbers are:
(a) 12, 18 (b) 16, 24
(c) 14, 21 (d) None.

**2)** If log 2 = 0.3010 and log 3 = 0.4771, then the value of log 24 is:
(a) 1.0791 (b) 1.7323
(c) 1.3801 (d) 1.8301

**3)** There are total 23 coins of ₹ 1, ₹ 2 and ₹ 5 in a bag. If their value is ₹ 43 and the ratio of coins of ₹ 1 and ₹ 2 is 3:2. Then the number of coins of ₹ 1 is:
(a) 12 (b) 5
(c) 10 (d) 14

**4)** $\log_{0.01} 10{,}000 = ?$
(a) 2
(b) –2
(c) 4
(d) –4

**5)** The price of scooter and moped are in the ratio 7 : 9. The price of moped is ₹ 1,600 more than that of scooter. Then the price of moped is:
(a) ₹ 7,200
(b) ₹ 5,600
(c) ₹ 800
(d) ₹ 700

**6)** A man sells 6 radios and 4 televisions for ₹ 18,480. If 14 radios and 2 televisions are sold for the same amount, what is the price of a television?
(a) ₹ 1,848 (b) ₹ 840
(c) ₹ 1,680 (d) ₹ 3,360

7) If one root of a equation is $2 + \sqrt{5}$, then the quadratic equation is :

(a) $x^2 + 4x - 1 = 0$ (b) $x^2 - 4x - 1 = 0$

(c) $x^2 + 4x + 1 = 0$ (d) $x^2 - 4x + 1 = 0$

8) A man starts his job with a certain monthly salary and earns a fixed increment every year. If his salary was ₹ 1,500 after 4 years of service and ₹ 1,800 after 10 years of service, what was his starting salary and what is the annual increment in rupees?

(a) ₹ 1,300, ₹ 50 (b) ₹ 1,100, ₹ 50

(c) ₹ 1,500, ₹ 30 (d) None.

9) A man rowing at the rate of 5 km in an hour in still water takes thrice as much time in going 40 km up the river as in going 40 km down. Find the rate at which the river flows :

(a) 9 km/hr (b) 2.5 km/hr

(c) 12 km/hr (d) None.

10) If $(2 + \sqrt{3})$ is a root of a quadratic equation $x^2 + p_x + q = 0$ then find the value of p and q.

(a) (4,– 1) (b) (4,1)

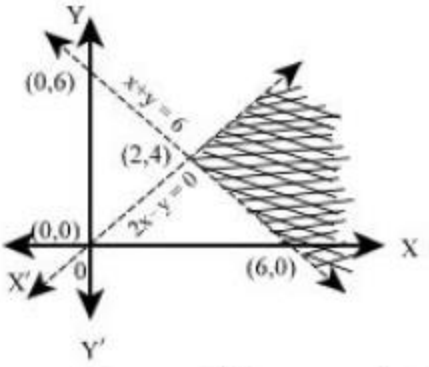
(c) (– 4,1) (d) (2,3)

11) If $|x - 2| + |x - 3| = 7$ then, 'x' will be equal to

(a) 6 (b) – 1

(c) 6 and – 1 (d) None of the above.

12) The shaded region represents :




(a) $x + y > 6, 2x - y > 0$ (b) $x + y < 6, 2x - y > 0$

(c) $x + y > 6, 2x - y < 0$ (d) None of these

13) The union forbids employer to employ less than two experienced person (x) to each fresh person (y). This situation can be expressed as:

(a) $x \leq y/2$ (b) $y \leq x/2$

(c) $y \geq x/2$ (d) None of these.

14) An employer recruits experienced (x) and fresh workmen (y) for his under the condition that he cannot employ more than 11 people. x and y can related by the inequality.

(a) $x + y \neq 11$

(b) $x + y \leq 11, x \geq 0, y \geq 0$

(c) $x + y \geq 11, x \geq 0, y \geq 0$

(d) None of these

15) Mr. X Invests ₹ 10,000 every year starting from today for next 10 years suppose interest rate is 8% per annum compounded annually. Calculate future value of the annuity:

[Given that $(1 + 0.08)^{10} = 2.15892500$]

(a) ₹ 1,56,454.88

(b) ₹ 1,44,865.625

(c) ₹ 1,56,554.88

(d) None of these

16) A certain sum of money amounts to ₹ 6,300 in two years and ₹ 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%

17) A company is considering proposal of purchasing a machine either by making full payment of ₹ 4,000 or by leasing it for four years at an annual rate of ₹ 1,250. Which course of action is preferable, if the company can borrow money at 14% compounded annually?

[Given : $(1.14)^4 = 1.68896$]

(a) Leasing is preferable

(b) Should be purchased

(c) No difference

(d) None of these

18) A person borrows ₹ 5,000 for 2 years at 4% p.a. simple interest . He immediately lends to another person $6\frac{1}{4}$% p.a. simple interest for 2 years. Find his gain in the transaction per year :

(a) ₹ 112.50

(b) ₹ 125

(c) ₹ 225

(d) ₹ 167.50

19) The effective rate of interest for one year deposit corresponding to a nominal 7% rate of interest per annum convertible quarterly is

(a) 7%

(b) 7.5%

(c) 7.4%

(d) 7.18%

20) 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 ₹ 550?

(a) ₹ 250

(b) ₹ 300

(c) ₹ 462.16

(d) ₹ 350

**21)** Present value of a scooter is ₹ 7,290 if its value decreases every year by 10% then its value before 3 years is equal to:
(a) 10,000
(b) 10,500
(c) 20,000
(d) 20,500

**22)** An examination paper consists of 12 questions divided into two parts A and B. Part A contains 7 questions and part B contains 5 questions. A candidate is required to attempt 8 questions selecting at least 3 from each part. In how many maximum ways can the candidate select the questions?
(a) 35 (b) 175
(c) 210 (d) 420

**23)** Find the number of combinations of the letters of the word COLLEGE taken four together :
(a) 18 (b) 16
(c) 20 (d) 26

**24)** The letters of the word "VIOLENT" are arranged so that the vowels occupy even place only. The number of permutations is _____.
(a) 144 (b) 120
(c) 24 (d) 72

**25)** A person has ten friends of whom six are relatives. If he invites five guests such that three of them are his relatives, then the total number of ways in which he can invite them are:
(a) 30 (b) 60
(c) 120 (d) 75

**26)** 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

**27)** If arithmetic mean between roots of a quadratic equation is 8 and the geometric mean between them is 5, the equation is _____.
(a) $x^2 - 16x - 25 = 0$ (b) $x^2 - 16x + 25 = 0$
(c) $x^2 - 16x + 5 = 0$ (d) None of these.

**28)** The sum of all numbers between 100 and 1000 which are divisible by 11 will be:
(a) 44550 (b) 66770
(c) 55440 (d) 33440

29) Insert two arithmetic means between 68 and 260.
(a) 132, 196
(b) 130, 194
(c) 70, 258
(d) None of the above

30) If the AM and GM of two numbers is 6.5 and 6 the no.'s are:
(a) 3 and 2
(b) 9 and 4
(c) 81 and 16
(d) None

31) If the sum of fine terms of AP is 75. Find the third term of the series
(a) 35
(b) 30
(c) 15
(d) 20

32) In a town of 20,000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, then the number of families which buy A only is:
(a) 6600
(b) 6300
(c) 5600
(d) 600

33) If $f(x-1) = x^2 - 4x + 8$, then $f(x+1) =$ _____
(a) $x^2+8$
(b) $x^2+7$
(c) $x^2+4$
(d) $x^2 - 4x$

34) The number of elements in range of constant function is
(a) One
(b) Zero
(c) Infinite
(d) Indetermined

35) The inverse function $f^{-1}$ of $f(x) = 100x$ is:
(a) $\frac{x}{100}$
(b) $\frac{1}{100x}$
(c) $\frac{1}{x}$
(d) None of these

36) $f(n) = f(n-1) + f(n-2)$ when $n = 2, 3, 4$ ..... $f(0) = 0$, $f(1) = 1$ then $f(7) = ?$
(a) 3
(b) 5
(c) 8
(d) 13

37) The derivative of $x^2 \log x$ is :
(a) $1 + 2 \log x$
(b) $2 \log x$
(c) $x(1 + 2 \log x)$
(d) None of these

**38)** If $x = y \log (xy)$, then $\frac{dy}{dx}$ is equal to:

(a) $\frac{x + y}{x (1 + \log xy)}$ (b) $\frac{x - y}{x (1 + \log xy)}$

(c) $\frac{x + y}{x (\log x + \log y)}$ (d) $\frac{x - y}{x (\log x + \log y)}$

**39)** If $x^3 - 2x^2y^2 + 5x + y = 5$, then $\frac{dy}{dx}$ at $x = 1$ and $y = 1$ is :

(a) 4/3 (b) – 5/4

(c) 4/5 (d) – 4/3

**40)** The slope of the tangent to the curve $y = \sqrt{4 - x^2}$ at the point, where the ordinate and the abscissa are equal, is :

(a) – 1 (b) 1

(c) 0 (d) None

**41)** 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

**42)** Which of the following is odd one 4,12,44,176, 890 .....

(a) 4

(b) 12

(c) 44

(d) 176

**43)** In a certain code MADRAS is NBESBT now DELHI is coded as:

(a) EMMJI

(b) JIFEM

(c) EFMIJ

(d) CDKGH

**44)** Ravi left home and cycled 10 km towards South, then he turned right and cycled 5 km and then again turned right and cycled 10 km. After this he turned left and cycled 10 km. How many km. will he have to cycle to reach his home straight?

(a) 10 km (b) 15 km

(c) 12 km (d) 17 km

**45)** Reena walked from A to B in the East 10 Feet. The she turned to the right and walked 3 Feet. Again she turned to the right and walked 14 Feet. How far is she from A?

(a) 4 FT (b) 5 FT

(c) 12 FT (d) 13 FT

**46)** Anoop Starts walking towards South after walking 15 metres he turns towards North. After walking 20 metres he turns towards East and walks 10 metres. He then turns towards south and walks 5 metres. In which direction is he from the original position.

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

**47)** Manu wants to go to the market. He starts from his house towards North reaches at a crossing after 30m. He turns towards East, goes 10m till the second crossing and turns again, moves towards South straight for 30m where marketing complex exits. In which direction is the market from his house?

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

**48)** 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 $45^0$ . In which direction was she moving finally?

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

**49)** (a) Eleven students A, B, C, D, E, F, G, H, I, J and K are sitting in first line facing to the teacher.
(b) D who is just to the left of F, is to the right of C at second place.
(c) A is second to the right of E who is at one end.
(d) J is the nearest neighbour of A and B and is to the left of G at third place.
(e) H is next to D to the left and is at the third place to the right of I who is just in the middle?

(a) A (b) B
(c) H (d) I

**50)** Five senior citizens are living in a multi-storeyed building. Mr. Manu lives a flat above Mr. Ashokan, Mr. Lokesh in a flat below Mr. Gaurav, Mr. Ashokan lives in a flat below Mr. Gaurav and Mr. Rakesh lives in a flat below Mr. Lokesh. Who lives in the top most flat?

(a) Mr. Lokesh (b) Mr. Gaurav
(c) Mr. Muan (d) Mr. Rakesh

**51)** Five students A, B, C, D and E are standing in a row. D is on the right of E, B is on the left of E but on the right of A. D is next to C on his left. The student in middle is

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

52) In a straight line there are six person sitting in a row? B is between F and D.E is between A and C. A does not stand next to F or D, C does not stand next to D. F is between which of the following person?
(a) B and E
(b) B and C
(c) B and D
(d) B and A

53) Pointing to a lady in the photograph, Monika said, "Her son's father is the son-in-law of my mother" How is Monika related to the lady?
(a) Aunt
(b) Sister
(c) Mother
(d) Cousin

54) Amit introduced Akash of the son of the only brother of his father's wife. How is Akash related to Amit ?
(a) Cousin
(b) Son
(c) Uncle
(d) Son-in-law

55) Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother". How is Suresh related to that boy ?
(a) Brother
(b) Uncle
(c) Cousin
(d) Father

56) If A + B means A is the brother of B, A - B means A is the sister of B, and A x B means A is the father of B. Which of the following means that C is the son of M ?
(a) M - N x C + F
(b) F - C + N x M
(c) N + M - F x C
(d) M x N - C + F

57) Five bulbs of which three are defective are to be tried in two lights-points in a dark-room. In how many trials the room shall be lighted?
(a) 10
(b) 7
(c) 3
(d) None of these

58) The number of triangle that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line, is:
(a) 185
(b) 175
(c) 115
(d) 105

59) The number of elements in range of constant function is
(a) One
(b) Zero
(c) Infinite
(d) Indetermined

60) A certain ball when dropped to the ground rebounds to $\frac{4}{5}^{th}$ of the height from which it falls; it is dropped from a height of 100 metres find the total distance it travels before finally coming to rest :

(a) 600m (b) 700m
(c) 900m (d) 200m

## SECTION B: STATISTICS

61) The following data relates to the incomes of 90 persons :

| Income in ₹ : | 1500-1999 | 2000-2499 | 2500-2999 | 3000-3499 |
|---|---|---|---|---|
| No. of Persons : | 13 | 32 | 20 | 25 |

What is the percentage of persons earning more than ₹ 2,500 ?

(a) 45 (b) 50
(c) 52 (d) 55

62) Relative frequency for a particular class lies between :

(a) 0 and 1 (b) 0 and 1, both inclusive
(c) – 1 and 0 (d) – 1 and 1

63) The following frequency distribution

| X : | 12 | 17 | 24 | 36 | 45 |
|---|---|---|---|---|---|
| F : | 2 | 5 | 3 | 8 | 9 |

is classified as

(a) Continuous distribution
(b) Discrete distribution
(c) Cumulative frequency distribution
(d) None of the above

64) In 2000, out of total of 1,750 workers of a factory, 1,200 were members of a trade union. The number of women employed was 200 of which 175 did not belong to a trade union. In 2004, there were 1,800 employees who belong to a trade union and 50 who did not belong to trade union. Of all the employees in 2004, 300 were women of whom only 8 did not belong to the trade union. On the basis of this information, the ratio of female members of the trade union in 2000 and 2004 is :

(a) 292 : 25 (b) 8 : 175
(c) 175 : 8 (d) 25 : 292

65) The lower class boundary is :

(a) An upper limit to Lower Class Limit
(b) A lower limit to Lower Class Limit.
(c) Both (a) & (b)
(d) None of these

66) From the following data find the number class intervals if class length is given as 5.
73, 72, 65, 41, 54, 80, 50, 46, 49, 53.
(a) 6 (b) 5
(c) 7 (d) 8

67) Difference between the maximum and minimum value of a given data is called
(a) Width (b) Size
(c) Range (d) Class

68) If x and y are related by x - y - 10 = 0 and mode of x is known to be 23, then the mode of y is :
(a) 20 (b) 13
(c) 3 (d) 23

69) For a moderately skewed distribution, quartile deviation and the standard deviation are related by:
(a) S. D. = $\frac{2}{3}$ Q.D (b) S. D.= $\frac{3}{4}$ Q.D
(c) S. D.= $\frac{4}{3}$ Q.D (d) S. D.= $\frac{3}{2}$ Q.D

70) Measures of dispersion are called averages of the ____ order.
(a) $1^{st}$ (b) $2^{nd}$
(c) $3^{rd}$ (d) None

71) An aeroplane flies from A to B at the rate of 500 km / hr and comes back from B to A at the rate of 700 km / hr. The average speed of the aeroplane is :
(a) 600 km / hr (b) 583.33 km / hr
(c) $100\sqrt{35}$ km / hr (d) 620 km / hr.

72) If x and y are related as 3x – 4y = 20 and the quartile deviation of x is 12, then the quartile deviation of y is :
(a) 14 (b) 15
(c) 16 (d) 9

73) Mean and S. D. of a given set of observations is 1,500 and 400 respectively. If there is an increment of 100 in the first year and each observation is hiked by 20% in $2^{nd}$ years, then find new mean and S.D.
(a) 1920, 480 (b) 1920, 580
(c) 1600, 480 (d) 1600, 400

74) In a class of 11 students, 3 students were failed in a test. 8 students who passed secured 10,11, 20, 15, 12, 14, 26 and 24 marks respectively. What will be the median marks of the students :
(a) 12 (b) 15
(c) 13 (d) 13.5

75) If the mean of two numbers is 30 and geometric mean is 24 then what will be these two numbers?
(a) 36 and 24
(b) 30 and 30
(c) 48 and 12
(d) None of these

76) Coefficient of variation is 80. Mean is 20. Find variance:
(a) 640
(b) 256
(c) 16
(d) 250

77) In a non - leap year, the probability of getting 53 sundays or 53 Tuesdays or 53 Thursdays is :
(a) $\frac{4}{7}$
(b) $\frac{2}{7}$
(c) $\frac{3}{7}$
(d) $\frac{1}{7}$

78) The probability of getting qualified in IIT- JEE and AIEEE by a student are respectively $\frac{1}{5}$ and $\frac{3}{5}$. The probability that the student gets qualified for one of the these tests is:
(a) $\frac{17}{25}$
(b) $\frac{22}{25}$
(c) $\frac{8}{25}$
(d) $\frac{3}{25}$

79) Three identical dice are rolled. The probability that the same number will appear on each of them is :
(a) 1/6
(b) 1/12
(c) 1/36
(d) 1

80) An article consists of two parts A and B. The manufacturing process of each part is such that probability of defect in A is 0.08 and that B is 0.05. What is the probability that the assembled product will not have any defect?
(a) 0.934
(b) 0.864
(c) 0.85
(d) 0.874

81) In how many ways can the letters of 'REGULATION' be arranged so that the vowels come at odd places?
(a) 1/252
(b) 1/144
(c) 144/252
(d) None of these

82) In how many ways a team of 5 can be made out of 7 Boys and 8 Girls, if 2 Girls are compulsory to form a Team.
(a) 2,646
(b) 1,722
(c) 2,702
(d) 980

**83)** The odds against A solving a certain problem are 4 to 3 and the odds in favour of B solving the same problem are 7 to 5.
What is the probability that the problem will be solved if they both try ?
(a) 15/21 (b) 16/21
(c) 17/21 (d) 13/21

**84)** A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball form the bag is twice that of a red ball, find the number of blue balls in the bag
(a) 10 (b) 12
(c) 14 (d) 16

**85)** For two events A, B let $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{8}$ and $P(A \cap B) = \frac{1}{4}$ then A and B are:
(a) Mutually exclusive but not independent
(b) Independent but not mutually exclusive
(c) Mutually exclusive and independent
(d) None of these

**86)** The probability that a leap year has 53 Wednesday is
(a) $\frac{2}{7}$ (b) $\frac{3}{5}$
(c) $\frac{2}{3}$ (d) $\frac{1}{7}$

**87)** The number of calls arriving at an internal switch board of an office is 96 per hour. Find the probability that there will be:
(i) not more than 3 calls on the board, per minute.
(ii) at least three calls in a minute on the board. [Given : $e^{-1.6} = 0.2019$]
(a) 0.08 and 0.92 respectively (b) 0.19 and 0.92 respectively
(c) 0.92 and 0.13 respectively (d) 0.92 & 0.08 respectively

**88)** If 5% of the families in Kolkata do not use gas as a fuel, what will be the probability of selecting 10 families in a random sample of 100 families who do not use gas as fuel?
[Given : $e^{-5} = 0.0067$]
(a) 0.038 (b) 0.028
(c) 0.048 (d) 0.018

**89)** Examine the validity of the following:
Mean and standard Deviation of a binomial distribution are 10 and 4 respectively.
(a) Not valid (b) Valid
(c) Both (a) & (b) (d) Neither (a) nor (b)

**90)** If the inflexion points of a Normal Distribution are 6 and 14. Find its Standard Deviation ?
(a) 4 (b) 6
(c) 10 (d) 12.

**91)** 5,000 students were appeared in an examination. The mean of marks was 39.5 with a Standard Deviation 12.5 marks. Assuming the distribution to be normal, find the number of students recorded more than 60% marks.
Given: When Z = 1.64, Area of normal curve = 0.4495
(a) 1,000 (b) 505
(c) 252 (d) 2,227

**92)** For a normal distribution having mean = 2 and variance = 4, the fourth central moment $\mu_4$ is:
(a) 16 (b) 32
(c) 48 (d) 64

**93)** Take 200 and 150 respectively as the assumed mean for X and Y series of 11 values, then dx = X – 200, dy = Y – 150, $\Sigma dx = 13$, $\Sigma dx^2 = 2667$, $\Sigma dy = 42$, $\Sigma dy^2 = 6964$, $\Sigma dx\, dy = 3943$. The value of r is:
(a) 0.77 (b) 0.98
(c) 0.92 (d) 0.82

**94)** The lines of regression are as follows :
$5x - 145 = -10y$ ; $14y - 208 = -8x$. The mean values $(\bar{x}, \bar{y})$ is :
(a) (12, 5) (b) (5, 7)
(c) (7, 12) (d) (5, 12)

**95)** Given : $\bar{x} = 16$ , $\sigma x = 4.8$
$\bar{y} = 20$ , $\sigma y = 9.6$
The coefficient of correlation between x and y is 0.6. What will be the regression coefficient of 'x' on 'y'?
(a) 0.03 (b) 0.3
(c) 0.2 (d) 0.05

**96)** The coefficient of correlation between two variables x and y is 0.28. Their covariance is 7.6. If the variance of x is 9, then the standard deviation of y is:
(a) 8.048 (b) 9.048
(c) 10.048 (d) 11.048

**97)** If the two lines of regression are $x + 2y - 5 = 0$ and $2x + 3y - 8 = 0$, then the regression line of y on x is:
(a) $x + 2y - 5 = 0$ (b) $2x + 3y - 8 = 0$
(c) $x + 2y = 0$ (d) $2x + 3y = 0$

**98)** In Passche's index, weights are based on :
(a) Current year quantities (b) Base year quantities
(c) Weighted average prices (d) None of these

**99)** The index number of prices at a place in the year 2008 is 225 with 2004 as the base year then there is:

(a) average 125% increase in prices.
(b) average 225% increase in prices.
(c) average 100% increase in prices.
(d) None of the above.

**100)** If $\Sigma P_0Q_0 = 1360$, $\Sigma P_nQ_0 = 1900$, $\Sigma P_0Q_n = 1344$, $\Sigma P_nQ_n = 1880$, then the Laspeyre's Index Number is

(a) 0.71 (b) 1.39
(c) 1.76 (d) none.