

MOCK TEST PAPER - II
FOUNDATION COURSE

PAPER 3: BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

Time: 2 Hours

Marks: 100

Part A: Business Mathematics and Logical Reasoning

1. If $x = 2 + \sqrt{3}$ and $y = 2 - \sqrt{3}$ then value of $x^2 + y^2 =$
 - (a) 14
 - (b) 4
 - (c) 2
 - (d) 6
2. If $(25)^{150} = (25x)^{50}$; then the value of x will be:
 - (a) 5^3
 - (b) 5^4
 - (c) 5^2
 - (d) 5
3. On solving the equation $\log t + \log (t-3) = 1$ we get the value of t as
 - (a) 5
 - (b) 2
 - (c) 3
 - (d) 0
4. 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
5. If four numbers $\frac{1}{2}, \frac{1}{3}, \frac{1}{5}, \frac{1}{x}$ are proportional then $x =$
 - (a) $\frac{6}{5}$
 - (b) $\frac{5}{6}$
 - (c) $\frac{15}{2}$
 - (d) none
6. A box contains 276 coins of 5 rupees, 2 rupees and 1 rupee. The value of each kind of coins are in the ratio 2:3:5 respectively. The number of 2 rupees coin is
 - (a) 52

- (b) 60
 (c) 76
 (d) 85
7. What must be added to each term of the ratio 49 : 68, so that it becomes 3 : 4 ?
 (a) 3
 (b) 5
 (c) 8
 (d) 9
8. If $u = 3t^4 + 5t^3 + 2t^2 + t + 4$, then the value of $\frac{du}{dt}$ at $t = -1$ is :
 (a) 0
 (b) 1
 (c) 2
 (d) 5
9. if $y = e^{a \log x} + e^{x \log a}$, then $\frac{dy}{dx} =$
 (a) $x^a + a^x$
 (b) $a x^{a-1} + a^x \log a$
 (c) $a x^{a-1} + x a^{x-1}$
 (d) $x^x + a^a$
10. $\int_1^4 (2x + 5) dx$ and the value is:
 (a) 10
 (b) 3
 (c) 30
 (d) None
11. Evaluate $\int x \cdot e^x dx$
 (a) $e^x(x + 1) + c$
 (b) $e^x(x - 1) + c$
 (c) $e^x + c$
 (d) $x - e^x + c$
12. Insert 4 A.M.'s between 3 and 18:
 (a) 12, 15, 9, 6
 (b) 6, 9, 12, 15
 (c) 9, 6, 12, 15
 (d) 15, 12, 9, 6
13. Find the sum to infinity of the following series:
 $1 - 1 + 1 - 1 + 1 - 1 + \dots \infty$

- (a) 1
 (b) ∞
 (c) $1/2$
 (d) Does not exist
14. Find the product of:
 $(243), (243)^{1/6}, (243)^{1/36}, \dots, \infty$
 (a) 1,024
 (b) 27
 (c) 729
 (d) 243
15. The sum of the series $1 + 11 + 111 + \dots$ to n terms is _____.
 (a) $\frac{1}{27}(10^{n+1} - 9n - 10)$
 (b) $10^{n+1} - 9n - 10$
 (c) $\frac{1}{81}(10^{n+1} - 9n - 10)$
 (d) None of these
16. The roots of the cubic equation $x^3 - 7x + 6 = 0$ are:
 (a) 1, 2 and 3
 (b) 1, -2 and 3
 (c) 1, 2 and -3
 (d) 1, -2 and -3
17. If $A = \{p, q, r, s\}$, $B = \{q, s, t\}$, $C = \{m, q, n\}$. Find $C - [A \cap B]$
 (a) $\{m, n\}$
 (b) $\{p, q\}$
 (c) $\{r, s\}$
 (d) $\{p, r\}$
18. 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.
19. 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
20. On an average, an experienced person does 5 units of work whereas an unexperienced does one 3 units work daily but the employer have to maintain the output of at least 30 units of work per day. The situation can be expressed as.
- (a) $5x + 3y \leq 30$
- (b) $5x + 3y \geq 30$
- (c) $5x + 3y = 30$
- (d) None of these
21. From a group of 200 persons, 100 are interested in music, 70 in photography and 40 in swimming, furthermore 40 are interested in both music and photography, 30 in both music and swimming, 20 in photography and swimming and 10 in all the three. How many are interested in photography but not in music and swimming?
- (a) 30
- (b) 15
- (c) 25
- (d) 20
22. If $f(x) = 2x + 2$ and $g(x) = x^2$, then the value of fog (4) is:
- (a) 18
- (b) 22
- (c) 34
- (d) 128
23. A Supreme Court Bench consists of 5 judges. In how many ways, the bench can give a majority decision?
- (a) 10
- (b) 5
- (c) 15
- (d) 16
24. The maximum number of points of intersection of 10 circles will be :
- (a) 2
- (b) 20
- (c) 90
- (d) 180
25. If ${}^{15}C_{3r} = {}^{15}C_{r+3}$, then 'r' is equal is
- (a) 2
- (b) 3
- (c) 4
- (d) 5

26. There are 5 books on English, 4 Books on Tamil and 3 books on Hindi. In how many ways can these books be placed on a shelf if the books on the same subjects are to be together?
- (a) 1,36,800
(b) 1,83,600
(c) 1,03,680
(d) 1,63,800
27. The simple interest on ₹600 for 9 months is ₹27. Find the interest rate.
- (a) 6%
(b) 12%
(c) 2.2 %
(d) None of these
28. Miss Liza lent ₹ 4,000 in such a way that some amount was given to Mr. A at 3% p.a. S.I. and rest amount to was given to B at 5% p.a. S.I., the annual interest from both is ₹ 144, Find the amount lent to Mr. A
- (a) ₹ 2,800
(b) ₹ 1,200
(c) ₹ 2,500
(d) None
29. A certain sum of money was put at S.I. for 2.5 years at a certain rate of S.I. p.a. Had it been put at 4% higher rate, it would have fetched ₹ 500 more. Find the sum of money.
- (a) ₹ 4000
(b) ₹ 5000
(c) ₹ 6000
(d) None
30. ₹ 1,25,000 is borrowed at compound interest at the rate of 2% for the 1st year, 3% for the second year and 4% for the 3rd year. Find the amount to be paid after 3 years.
- (a) ₹ 125678
(b) ₹ 136587
(c) ₹ 163578
(d) ₹ 136578
31. If the Compound Interest on a certain sum of money for 2 years at 4% p.a. be ₹510, then its simple Interest (S.I) of same time at same rate of interest is
- (a) ₹500
(b) ₹510
(c) ₹450
(d) None
32. How long will it take for a principal to double if money is worth 12% compounded monthly?
- (a) 4.25 years.
(b) 5.81 years

- (c) 6 years
(d) none of these
33. The difference between compound interest and simple interest on a certain sum for 2 years @ 10% p.a. is ₹ 100. Find the sum:
(a) ₹ 10,100
(b) ₹ 10,950
(c) ₹ 10,000
(d) ₹ 9,900
34. A debt of ₹5000 with interest at the rate of 8% compounded quarterly is to be discharged by 8 equal quarterly payments, the first payment being due today. Find the size of each payment.
(a) ₹ 573.86
(b) ₹ 669.17
(c) ₹ 399.26
(d) none of these
35. Find the future value of an annuity of ₹ 500 is made annually for 7 years at interest rate of 14% compounded annually. [Given that $(1.14)^7 = 2.5023$]
(a) ₹ 5365.25
(b) ₹ 5265.25
(c) ₹ 5465.25
(d) none
36. A machine can be purchased for ₹ 50,000. Machine will contribute ₹ 12000 per year for the next five years. Assume borrowing cost is 10% per annum compounded annually. Determine whether machine should be purchased or not.
(a) Purchased
(b) Not Purchased
(c) Information insufficient
(d) None of these
37. A ₹1000 bond paying annual dividends at 8.5% will be redeemed at par at the end of 10 years. Find the purchase price of this bond if the investor wishes a yield rate of 8%.
(a) ₹ 907.135
(b) ₹ 1033.54
(c) ₹ 945.67
(d) None of these
38. Assuming that the discount rate is 10% per annum, how much would you pay to receive ₹800, growing at 8%, annually, forever?
(a) ₹ 1000
(b) ₹ 1050
(c) ₹ 950
(d) None of these

39. How much amount is required to be invested every year as to accumulate ₹ 6,00,000 at the end of 10th year, if interest is compounded annually at 10% rate of interest?
- (a) ₹ 37,467
 - (b) ₹ 37,476
 - (c) ₹ 37,647
 - (d) ₹ 37,674
40. Paul borrows ₹ 20,000 on condition to repay it with compound interest at 5% p.a. in annual instalment of ₹ 2,000 each. Find the number of years in which the debt would be paid off.
- (a) 10 years
 - (b) 12 years
 - (c) 14 years
 - (d) 15 years
41. Find the missing term 9, 27, 31, 155, 161, 1127, ?
- (a) 316
 - (b) 1135
 - (c) 1288
 - (d) 2254
42. Find the missing term 5760, 960, ?, 48, 16,8
- (a) 120
 - (b) 160
 - (c) 192
 - (d) 240
43. If, in a code, MIND becomes KGLB and ARGUE becomes YPESC, then what will DIAGRAM be in that code?
- (a) BGYEPYK
 - (b) BGYPYEK
 - (c) GLPEYKB
 - (d) LKBGYPK
44. If A = 2, M = 26, Z = 52, then BET = ?
- (a) 44
 - (b) 54
 - (c) 64
 - (d) 72
45. If 'sky' is 'star', 'star' is 'cloud', 'cloud' is 'earth', 'earth' is 'tree' and 'tree' is 'book'. Then where do the birds fly?
- (a) Cloud
 - (b) Sky
 - (c) Star

- (d) Data inadequate
46. Neha walked 2 km west of her house and then turned south covering 4 km. Finally, she moved 3 km towards east and then again 1 km west. How far is she from her initial position?
- (a) 7 km
(b) 3 km
(c) 4 km
(d) 12 km
47. Pankaj is facing west. He turns 45° in the clockwise direction and then again another turns with 180° in the same direction i.e. clockwise direction, after that he turns 270° in the anticlockwise direction. Which direction is he facing now ?
- (a) North-West
(b) West
(c) South-West
(d) South
48. One day, Pranav took his car & commenced his journey from his home and drove 25 km towards north and turned to his left and drove another 12.5 km. After waiting to meet a friend Deepak, he turned to his right and continued to drive another 25 km. After covering a distance of 62.5 km till now, in which direction is he now?
- (a) North
(b) East
(c) South-east
(d) South
49. After 3 pm on a Sunny day when Vicky was returning from his college, he saw that his uncle was coming from the opposite direction. His uncle talked to him for sometime. Vicky saw that the shadow of his uncle was to his right side. Which direction was his uncle facing during their talk ?
- (a) North
(b) South
(c) East
(d) None
50. Five persons are standing in a line. One of the two persons at the extreme ends is a professor and the other a businessman. An advocate is standing to the right of a student. An author is to the left of the businessman. The student is standing between the professor and the advocate. Counting from the left, the advocate is at which place ?
- (a) 1st
(b) 2nd
(c) 3rd
(d) 5th

Directions: Read the following information carefully to answer questions 51 and 52 :

- (i) Six flats on a floor in two rows facing North and South are allotted to P, Q, R, S, T and U.
(ii) Q gets a North facing flat and is not next to S.

- (iii) S and U get diagonally opposite flats.
- (iv) R, next to U, gets a South facing flat and T gets a North facing flat.
51. The flats of which of the other pairs than SU, are diagonally opposite to each other ?
- QP
 - PT
 - QR
 - TS
52. Which of the following combinations gets South facing flats?
- UPT
 - URP
 - QTS
 - Data inadequate
53. A, B, C, D, E and F are sitting around a round table. A is between E and F, E is opposite to D, and C is not in either of the neighbouring seats of E. Who is opposite to B ?
- C
 - D
 - F
 - None of these
54. Four girls A, B, C, D are sitting around a circle facing the centre. B and C in front of each other, which of the following is definitely true ?
- A and D in front of each other
 - A is not between B and C
 - D is left of C
 - A is left of C
55. A is the sister of B. B is the brother of C, C is the son of D. How is D related to A?
- Son
 - Mother
 - Daughter
 - Uncle
56. C is wife of B. E is the son of C. A is the brother of B and father of D. What is the relationship of E to D?
- Cousin
 - Mother
 - Sister
 - Brother
57. (i) F is the brother of A.
(ii) G is the daughter of A.
(iii) K is the sister of F.
(iv) G is the brother of C.

Who is the uncle of G?

- (a) K
- (b) F
- (c) A
- (d) C

58 X and Y are the children of A. A is the father of X but Y is not his son. How is Y related to A?

- (a) Son
- (b) Daughter
- (c) Sister
- (d) Brother

59 If X is brother of son of Y's son, then how is X related to Y?

- (a) Brother
- (b) Cousin
- (c) Grandson
- (d) Son

60 Point P is 10 m west of point Q. Point R is 4 m north of point P. Point T is 3 m east of point S and point S is 5 m south of point Q. What is the direction of point R with respect to point T?

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

Part B – Statistics

61. For a moderately skewed distribution, which of the following relationship is correct

- (a) Mean - Mode = 3 (Mean - Median)
- (b) Median - Mode = 3 (Mean - Median)
- (c) Mean - Median = 3 (Mean - Mode)
- (d) Mean - Median = 3 (Median - Mode).

62. The weighted mean of first n natural numbers, if their weights are proportional to their corresponding numbers is

- (a) $\frac{2n + 1}{3}$
- (b) $\frac{n-1}{2}$
- (c) $\frac{(n + 1)(2n - 1)}{6}$
- (d) $\frac{3n(n+1)}{2}$

63. The average wages of a group of unexperienced labours is ₹ 1000 and that of a group of experienced labours is ₹ 1,500. If the combined wage is ₹ 1200, then what is the percentage of experienced labours?

- (a) 60%

- (b) 40%
 - (c) 50%
 - (d) None of these.
64. If the arithmetic mean of 1st n natural numbers is $\frac{6n}{11}$ then the value of 'n' is:
- (a) 10
 - (b) 11
 - (c) 14
 - (d) None of these
65. The graphical representation of Median is calculated :
- (a) Ogive Curve
 - (b) Frequency Curve
 - (c) Line diagram
 - (d) Histogram
66. If R_x and R_y denote ranges of x and y respectively where x and y are related by $4x + 5y + 12 = 0$, what would be the relation between R_x and R_y ?
- (a) $R_x = R_y$
 - (b) $4R_x = 5R_y$
 - (c) $5R_x = 4R_y$
 - (d) None of these
67. If the relation between x and y is $4y - 3x = 10$ and the mean deviation about mean for x is 12, then the mean deviation of y about mean is:
- (a) 9.00
 - (b) 7.80
 - (c) 12.5
 - (d) None of these
68. If the S.D. of x is 4, what is the variance of $(5 - 2x)$?
- (a) 64
 - (b) 36
 - (c) 16
 - (d) None of these
69. There were 200 employees in an office in which 150 were married. Total male employees were 160 out of which 120 were married. What was the number of female unmarried employees.
- (a) 30
 - (b) 10
 - (c) 40
 - (d) 50
70. The harmonic mean of 1, $\frac{1}{2}, \frac{1}{3}, \dots, \frac{1}{n}$ is

- (a) $1/(n + 1)$
 - (b) $2/(n+ 1)$
 - (c) $(n + 1)/2$
 - (d) $1/(n-1)$
71. The average age of a group of 10 students was 20 years. The average age is increased by two years when two new students joined the group. What is the average age of two new students who joined the group ?
- (a) 22 years
 - (b) 30 years
 - (c) 44 years
 - (d) 32 years
72. There were 50 students in a class. 10 failed whose average marks were 2.5. The total marks of class were 281. Find the average marks of students who passed?
- (a) 6.4
 - (b) 25
 - (c) 256
 - (d) 86
73. 100 students are classified into male/female and graduate/non-graduate classes. This data classification is
- (a) Cardinal data
 - (b) Ordinal data
 - (c) Spatial Series data
 - (d) Temporal data
74. 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 2nd years, then find new mean and S.D.
- (a) 1920,480
 - (b) 1920,580
 - (c) 1600,480
 - (d) 1600,400
75. The mode of data is 18 and mean is 24, then median is
- (a) 18
 - (b) 24
 - (c) 22
 - (d) 21
76. When 10 is subtracted from all the observations, the mean is reduced to 60% of its value. If 5 is added to all the observations, then the mean will be
- (a) 25
 - (b) 30

(c) 60

(d) 65

77. If 5 is subtracted from each observation of some certain item then its co-efficient of variation is 10% and if 5 is added to each item then its coefficient of variation is 6%. Find original coefficient of variation.

(a) 8%

(b) 7.5%

(c) 4%

(d) None of these

78. In how many ways can 'REGULATION' be arranged so that the vowels come at odd places

(a) $\frac{1}{252}$

(b) $\frac{1}{144}$

(c) $\frac{144}{252}$

(d) None of these

79. Exactly 3 girls are to be selected from 5 girls and 3 boys. The Probability of selecting 3 girls will be

(a) $\frac{5}{28}$

(b) $\frac{1}{56}$

(c) $\frac{15}{28}$

(d) None of these

80. A speaks truth in 75% cases and B in 60% of the cases. In what percentage of the cases are they likely to contradict each other, narrating the same incident?

(a) 0.60

(b) 0.45

(c) 0.65

(d) 0.35

81. The wages of workers of a factory follows

(a) Binomial distribution

(b) Poisson distribution

(c) Normal distribution

(d) Chi-square distribution

82. Which of the following is uni-parametric distribution

(a) Poisson

(b) Normal

(c) Binomial

(d) Hyper geometric

83. The probability that a man aged 45 years will die within a year is 0.012. What is the probability that of 10 men, at least 9 will reach their 46th birthday? [Given: $e^{-0.12} = 0.88692$]

(a) 0.0935

- (b) 0.9934
- (c) 0.9335
- (d) 0.9555

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. The quartile deviation of a normal distribution with mean 10 and standard deviation 4 is _____

- (a) 54.24
- (b) 23.20.
- (c) 0.275
- (d) 2.70

86. The standard deviation of Binomial distribution is

- (a) npq
- (b) \sqrt{npq}
- (c) np
- (d) \sqrt{np}

87. An approximate relation between quartile deviation (QD) and standard deviation (S.D.) of normal distribution is :

- (a) $5QD = 4 SD$
- (b) $4 QD = 5 SD$
- (c) $2 QD = SD$
- (d) $3 QD = 2 SD$

88. In Binomial distribution $n = 9$ and $P = 1/3$, what is the value of variance:

- (a) 8
- (b) 4
- (c) 2
- (d) 16

89. Which of the following is not a characteristic of a normal probability distribution?

- (a) Mean of the normally distributed population lies at the centre of its normal curve.
- (b) It is multi-modal
- (c) The mean, median and mode are equal
- (d) It is a symmetric curve.

90. If one regression coefficient is greater than one, then other will be:

- (a) More than one
- (b) Equal to one
- (c) Less than one

- (d) Equal to minus one
91. In a bivariate data $\sum X = 30$, $\sum Y = 40$, $\sum X^2 = 196$, $\sum XY = 850$ and $N = 10$. The regression coefficient of Y on X is :
- (a) -5.31
 (b) -8.23
 (c) 6.89
 (d) None
92. If the sum of squares of the rank difference in mathematics and physics marks of 10 students is 22, then the coefficient of rank correlation is :
- (a) 0.267
 (b) 0.897
 (c) 0.92
 (d) None of these
93. For a bivariate data, the two lines of regression are $4x + 5y - 137 = 0$ and $2x + 9y - 179 = 0$, the values of \bar{x} and \bar{y} are:
- (a) 13, 17.
 (b) 16, 13
 (c) 15, 11
 (c) None
94. Fisher's ideal formula for calculating index number satisfies the _____
- (a) Until Test
 (b) Factor Reversal Test
 (c) Both (a) and (b)
 (d) None of these
95. Shifted Price index = $\frac{\text{Original Price Index}}{\text{Price Index of the year on which it has to be shifted}} \times 100$
- (a) True
 (b) False
 (c) Partly True
 (d) Partly False
96. If $\sum P_1q_1 = 249$, $\sum P_0q_0 = 150$, Paasche's Index Number = 150 and Dorbish and Bowely's Index number = 145, then the Fisher's Ideal Index Number is
- (a) 175
 (b) 144.91
 (c) 145.97
 (d) None

97. If the 2018 index with base 2015 is 250 and 2015 index with base 2012 is 150, the index 2018 on base 2012 will be:
- 800
 - 375
 - 600
 - None
98. In 2017 the average price of a commodity was 20% more than in 2016 but 20% less than in 2015; and more over it was 50% more than in 2018 to price relatives using 2016 as base (2016 price relative 100) Reduce the data is:
- 140, 100, 120, 80 for (2015-18)
 - 150, 100, 120, 80 for (2015-18)
 - 135, 100, 125, 87 for (2015-18)
 - None of these.
99. From the following data
- | | | | | | | |
|-------------|-----|-----|----|-----|-----|----|
| Group | A | B | C | D | E | F |
| Group Index | 120 | 132 | 98 | 115 | 108 | 95 |
| Weight | 6 | 3 | 4 | 2 | 1 | 4 |
- The general Index (I) is given by:
- 123.25
 - 217.15
 - 111.30
 - None
100. Consumer price index number goes up from 110 to 200 and the Salary of a worker is also raised from ₹ 33,000 to ₹ 50,000. Therefore, in real terms, to maintain his previous standard of living he should get an additional amount of: -
- ₹ 8500
 - ₹ 10,000
 - ₹ 9825
 - None of these.