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

1

    (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 $\dfrac{du}{dt}$ at t = -1 is :

    (a) 0

    (b) 1

    (c) 2

    (d) 5

9.   if $y = e^{a \log x} + e^{x \log a}$, then $\dfrac{dy}{dx} =$

    (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 + ...∞

(a) 1

(b) ∞

(c) 1/2

(d) Does not exist

14. Find the product of:

(243), $(243)^{1/6}$, $(243)^{1/36}$, ...∞

(a) 1,024

(b) 27

(c) 729

(d) 243

15. The sum of the series 1 + 11 + 111 + ... 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

3

(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

6

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

7

(d) Data inadequate

46. Neha walked 2 lane 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 ?

   (a)   QP

   (b)   PT

   (c)   QR

   (d)   TS

52.   Which of the following combinations gets South facing flats?

   (a)   UPT

   (b)   URP

   (c)   QTS

   (d)   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 ?

   (a)   C

   (b)   D

   (c)   F

   (d)   None of these

54.   Four girls A, B, C, D are sitting around a circle facing the centre. B and C infront of each other, which of the following is definitely true ?

   (a)   A and D in front of each other

   (b)   A is not between B and C

   (c)   D is left of C

   (d)   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?

   (a)   Son

   (b)   Mother

   (c)   Daughter

   (d)   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?

   (a)   Cousin

   (b)   Mother

   (c)   Sister

   (d)   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) $\dfrac{2n + 1}{3}$

(b) $\dfrac{n-1}{2}$

(c) $\dfrac{(n + 1)(2n - 1)}{6}$

(d) $\dfrac{3\,n(n + 1)}{2}$

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 $\dfrac{6n}{11}$ 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 Rx and Ry denote ranges of x and y respectively where x and y are related by 4x + 5y + 12 = 0, what would be the relation between Rx and Ry?

    (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 employes were 160 out of which 120 were married. What was the umber of female unmarried employees.

    (a) 30

    (b) 10

    (c) 40

    (d) 50

70. The harmonic mean of 1, 1/2,1/3 ………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 be '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 than 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 he:

(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 $\overline{x}$ and $\overline{y}$ 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. $\text{Shifted Price index} = \dfrac{\text{Original Price Index}}{\text{Price Index of the year on which it has to be shifted}} \times 100$

(a) True

(b) False

(c) Partly True

(d) Partly False

96. If $\sum P_1 q_1 = 249$, $\sum P_o q_o = 150$, 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:

    (a) 800

    (b) 375

    (c) 600

    (d) 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:

    (a) 140, 100, 120, 80 for (2015-18)

    (b) 150, 100, 120, 80 for (2015-18)

    (c) 135, 100, 125, 87 for (2015-18)

    (d) 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:

    (a) 123.25

    (b) 217.15

    (c) 111.30

    (d) 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: -

    (a) ₹ 8500

    (b) ₹ 10,000

    (c) ₹ 9825

    (d) None of these.