

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. The monthly incomes of A & B are in the ratio 4 : 5 and their monthly expenditures are in the ratio 5 : 7. If each saves ₹ 150 per month, find their monthly incomes.
 - (a) (40; 50)
 - (b) (50; 40)
 - (c) (400; 500)
 - (d) None of these
2. Two vessels containing water and milk in the ratio 2 : 3 and 4 : 5 are mixed in the ratio 1 : 2. The ratio of milk and water in the resulting mixture.
 - (a) 58 : 77
 - (b) 77 : 58
 - (c) 68 : 77
 - (d) None of these
3. If $(x - 9) : (3x + 6)$ is the duplicate ratio of 4 : 9, find the value of x.
 - (a) $x = 9$
 - (b) $x = 16$
 - (c) $x = 36$
 - (d) $x = 25$
4. Value of $(a^{1/8} + a^{-1/8})(a^{1/8} - a^{-1/8})(a^{1/4} + a^{-1/4})(a^{1/2} + a^{-1/2})$ is :
 - (a) $a + \frac{1}{a}$
 - (b) $a - \frac{1}{a}$
 - (c) $a^2 + \frac{1}{a^2}$
 - (d) $a^2 - \frac{1}{a^2}$
5. If $(25)^{150} = (25x)^{50}$ then the value of x will be
 - (a) 5^3
 - (b) 5^4
 - (c) 5^2
 - (d) 5
6. $7\log\left(\frac{16}{15}\right) + 5\log\left(\frac{25}{24}\right) + 3\log\left(\frac{81}{80}\right)$ is equal to
 - (a) 0

- (b) 1
(c) $\log 2$
(d) $\log 3$
7. $\log_4(x^2+x) - \log_4(x+1) = 2$. find x
(a) 16
(b) 0
(c) -1
(d) None of these
8. Given $\log 2 = 0.3010$ and $\log 3 = 0.4771$ then the value of $\log 24$
(a) 1.3081
(b) 1.1038
(c) 1.3801
(d) 1.830
9. The value of y of fraction $\frac{x}{y}$ exceeds with x by 5 and if 3 be added to both the fraction becomes $\frac{3}{4}$. Find the fraction,
(a) $\frac{12}{17}$
(b) $\frac{13}{17}$
(c) $-\frac{1}{3}$
(d) None of these
10. Solve for x; y and z. $\frac{xy}{y-x} = 210$, $\frac{xz}{z-x} = 140$, $\frac{yz}{y+z} = 140$
(a) 105;210;420
(b) 100; 205;400
(c) 95;215; 395
(d) None of these
11. If difference between a number and its positive square root is 12; the numbers are
(a) 9
(b) 16
(c) 25
(d) None of these
12. On solving the inequalities $6x + y > 18$, $x + 4y > 12$, $2x + y > 10$, we get the following situation :
(a) (0, 18), (12, 0), (4, 2) & (7, 6)
(b) (3, 0), (0, 3), (4, 2), & (7, 6)
(c) (5, 0), (0, 10), (4, 2) & (7, 6)
(d) (0, 18), (12, 0), (4, 2), (0, 0) and (7, 6)

13. Mr. A invested ₹ x in an organisation, it amounts to ₹ 150 at 5% p.a. S.I. and to ₹ 100 at 3% p.a. S.I. Then the value of x is
- (a) ₹ 70
 - (b) ₹ 40
 - (c) ₹ 25
 - (d) None of these
14. Mrs. Sudha lent ₹ 4,000 in such a way that some amount to Mr. A at 3% p.a. S.I. and rest amount 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 of these
15. A certain sum of money becomes double at 5% rate of S.I. p.a. in a certain time, the time in years is
- (a) 10 years
 - (b) 20 years
 - (c) 25 years
 - (d) None of these
16. A certain sum of money amounts to ₹ 5,000 in 5 years at 10% p.a. In how many years will it amount to ₹ 6,000 at same rate of S.I p.a.
- (a) 10 years
 - (b) 8 years
 - (c) 6 years
 - (d) None of these
17. ₹ 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
18. A certain sum of money amounts to double in 5 years placed at a compound interest. In how many years will it amount to 16 times at same rate of interest?
- (a) 12 years
 - (b) 20 years
 - (c) 24 years
 - (d) None of these
19. If the compound interest on a certain sum of money for 3 years at 5% p.a. be ₹50.44, then the Simple Interest (S.I) is
- (a) ₹ 50

- (b) ₹ 49
(c) ₹ 48
(d) None of these
20. If the difference between C.I and S.I on a certain sum of money at 5% p.a. for 2 years is ₹ 1.50. Find the sum of money.
(a) ₹ 600
(b) ₹ 500
(c) ₹ 400
(d) None of these
21. Find the present value of an annuity which pays ₹ 200 at the end of each 3 months for 10 years assuming money to be worth 5% converted quarterly?
(a) ₹ 3473.86
(b) ₹ 3108.60
(c) ₹ 6265.38
(d) None of these
22. The amount of an annuity due consisting of 15 annual payments invested at 8% effective is ₹ 10,000. Find the size of each payment.
(a) ₹ 873.86
(b) ₹ 108.60
(c) ₹ 341.01
(d) None of these
23. A company is considering proposal of purchasing a machine full payment of ₹4000 or by leasing it for 4 years at an annual rate of ₹1250. Which course of action is preferable if the company can borrow money at 14% compounded annually?
(a) Purchasing
(b) Leasing
(c) Both are same
(d) None of these
24. Find the purchase price of a ₹ 1000 bond redeemable at the paying annual dividends at 4% if the yield rate is to be 5% effective.
(a) ₹ 884.16
(b) ₹ 984.17
(c) ₹ 1084.16
(d) None of these
25. The future value of an annuity of ₹ 5,000 is made annually for 8 years at interest rate of 9% compounded annually. [Given that $(1.09)^8 = 1.99256$]
(a) ₹ 55,142.22
(b) ₹ 65,142.22
(c) ₹ 65,532.22

- (d) ₹ 57,425.22
26. 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
27. How many numbers of 3 digits can be made by using digits 3, 5, 6, 7 and 8. No. digit being repeated.
- (a) 120
 (b) 60
 (c) 100
 (d) None of these
28. In how many ways of the word "MATHEMATICS" be arranged so that the vowels always occur together?
- (a) $11! (2!)^3$
 (b) $(8! \times 4!) + (2!)^3$
 (c) $12! + (2!)^3$
 (d) None of these
29. If ${}^{20}C_r = {}^{20}C_{r+6}$. Then the value of r is
- (a) 10
 (b) 7
 (c) 11
 (d) None of these
30. If 20 A.M.s. are inserted between 3 and 51 then sum of these 20 A.M.s is
- (a) 540
 (b) 1080
 (c) 270
 (d) None of these
31. The sum upto infinity of the series $S = \frac{1}{2} + \frac{1}{6} + \frac{1}{18} + \dots$ is
- (a) $\frac{5}{4}$
 (b) $\frac{3}{4}$
 (c) $\frac{7}{3}$
 (d) None of these
32. Find the sum to n terms of the series: $7+77+777+$ to n terms:
- (a) $\frac{7}{9}(10^{n+1}-10) - \frac{7n}{9}$

(b) $\frac{7}{9}(10^{n+1}-10)+\frac{7n}{9}$

(c) $\frac{7}{9}\left[\frac{10(10^n-1)}{9}-n\right]$

(d) $\frac{7}{81}(10^{n+1}-10)+\frac{7n}{9}$

33. Out of 20 members in a family, 11 like to take tea and 14 like coffee. Assume that each one likes at least one of the two drinks. Find how many like both coffee and tea:

(a) 2

(b) 3

(c) 4

(d) 5

34. If $f(x) = \frac{x}{\sqrt{1+x^2}}$ and $g(x) = \frac{x}{\sqrt{1-x^2}}$ Find fog?

(a) x

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

(c) $\frac{x}{\sqrt{1-x^2}}$

(d) $x\sqrt{1-x^2}$

35. The range of the relation $\{(1,0)(2,0)(3,0)(4,0)(0,0)\}$ is

(a) $\{1,2,3,4,0\}$

(b) $\{0\}$

(c) $\{1,2,3,4\}$

(d) None of these

36. The slope of the tangent at the point (2, -2) to the curve $x^2 + xy + y^2 - 4 = 0$ is given by :

(a) 0

(b) 1

(c) -1

(d) None of these

37. If $y = 2x + \frac{4}{x}$, then $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y$ then yields

(a) 3

(b) 1

(c) 0

(d) 4

38. $\int (\sqrt{x} + \frac{1}{\sqrt{x}}) dx$

(a) $2x^{\frac{1}{2}} \left(\frac{1}{3}x - 1\right)$

(b) $2x^{\frac{1}{2}} \left(\frac{1}{3}x + 1\right)$

- (c) $2\left(\frac{1}{3}x + x^{1/2}\right)$
- (d) None of these
39. $\int \frac{6x+4}{(x-2)(x-3)} dx$ is equal to
- (a) $22 \log(x-3) - 16 \log(x-2)$
- (b) $11 \log(x-3) - 8 \log(x-2)$
- (c) $22 \log(x-3) - 16 \log(x-2)$
- (d) $232 \log(x-3) + 161 \log(x-2)$
40. The 4th term of an A.P. is three times the first and the 7th term exceeds the third term by 1. Find the first term 'a' and common difference 'd'.
- (a) $a = 3, d = 2$
- (b) $a = 4, d = 3$
- (c) $a = 5, d = 4$
- (d) $a = 6, d = 5$
41. Find next term of the series 10, 69, 236, 595, ?
- (a) 1254
- (b) 1020
- (c) 1320
- (d) 1200
42. In certain code language, BOARD is coded as CQDVI, what is the code for the word CONSULTING?
- (a) DQQWZRARNQ
- (b) DQQWZARQWQ
- (c) DQQWZRAQWQ
- (d) None of these
43. In a certain code language if CAMP is written as 9, then in the same code how will the word TEAM be written?
- (a) 14
- (b) 19
- (c) 27
- (d) 33
44. Which number will come next in the following series? 675, 623, 573, 525?
- (a) 491
- (b) 479
- (c) 423
- (d) 456

45. Identify the sequence of letters and find out the missing number. AGM, DJP, HNT, ____

- (a) MSY
- (b) NTZ
- (c) LRX
- (d) KQW

46. 105, 115.5, 150, 162.5, 203, ?

- (a) 217
- (b) 217.5
- (c) 210.5
- (d) None of these

Directions (47-48) Read the following information carefully and answer that questions that follow.

Eight friends A, B, C, D, E, F, G and H are sitting in a circle facing the Centre, B is sitting between G and D. H is third to the left of B and second to the right of A. C is sitting between A and G and B and E are not sitting opposite to each other.

47. Who is third to the left of D ?

- (a) F
- (b) E
- (c) A
- (d) Cannot be determined

48. Which of the following statement is not correct ?

- (a) D and A are sitting opposite to each other
- (b) C is third to the right of D
- (c) E is sitting F and D
- (d) A is sitting C and F

49. Six friends A, B, C, D, E and F are sitting in a row facing East. C is between A and E. B is just to the right of E but left of D. F is not at the right end. Who is at the right end?

- (a) D
- (b) B
- (c) E
- (d) C

50. Ram walks 30 km East then turns right and walks for another 16 km. He then again turns right and walks for another 16 km. He then turns left & walks for another 14 km. Then he turns right & walks for 14 km. How far is he from his initial point?

- (a) 26 km
- (b) 24 km
- (c) 22 km

(d) None of these

Directions (Illustrations 51-52) Study the following information carefully and answer the questions given below.

Six friends A, B, C, D, E and F are sitting in a row facing towards North. C is sitting between A and E. D is not at the end. B is sitting at immediate right of E. F is not at the right end but D is sitting at 3rd left of E.

51. How many persons are there to the right of D?
- (a) One
 - (b) Two
 - (c) Three
 - (d) Four
52. Which of the following is sitting to the left of D?
- (a) F
 - (b) C
 - (c) E
 - (d) A
53. A man walks 5 km south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place?
- (a) East
 - (b) South
 - (c) North-East
 - (d) South-West
54. If South-East becomes North, North-East becomes West and so on. What will West become?
- (a) North-East
 - (b) North-West
 - (c) South-East
 - (d) North-East
55. One evening before sunset Rekha and Hema were talking to each other face to face. If Hema's shadow was exactly to the right of Hema, which direction was Rekha facing?
- (a) North
 - (b) South
 - (c) West
 - (d) East
56. If A+B means, "A is the son of B"
A-B means, "A is the daughter of B"
A*B means, "A is the wife of B"
A\$B means, "A is the sister of B".
If A\$B-C*D is true, how is D related to B?

- (a) Wife
 (b) Father
 (c) Grandmother
 (d) Grandfather
57. In a certain language, '+' means father of, '-' means daughter of, '*' means son of, and '/' means mother of. For example, X+Y-Z means that X is the father of Y and Y is the daughter of Z.
 A + F - K / G + L * H
 How is H related to A?
 (a) Sister-in-law
 (b) Daughter-in-Law
 (c) Daughter
 (d) Grand-Daughter
58. The brother of X's mother is the only son of Y's mother's father. How is Y's mother related to X.
 (a) Mother
 (b) Daughter
 (c) Grandmother
 (d) Cannot be determined
59. If X + Y means X is the mother of Y;
 X - Y means X is the brother of Y;
 X % Y means X is the father of Y and
 X x Y means X is the sister of Y,
 which of the following shows that O is the maternal uncle of L?
 (a) L - N + M x O
 (b) O + S x N - L
 (c) O - M + N x L
 (d) L - S % O
60. A man said to a woman, —Your mother's husband's sister is my aunt. How is the woman related to the man?
 (a) Granddaughter
 (b) Daughter
 (c) Sister
 (d) Aunt

Part B – Statistics

61. Which of the following is a correct statement?
 (a) Range is unaffected by the change in origin or change in scale

- (b) Range is affected by the change in origin or change in scale
 - (c) Range is unaffected by the change in origin but affected by change in scale
 - (d) Range is affected by the change in origin but unaffected by change in scale
62. In case of extreme sampling fluctuations, which is the best measure of dispersion?
- (a) Quartile Deviation
 - (b) Standard Deviation
 - (c) Mean Deviation
 - (d) Range
63. A shopkeeper wants to place an order for t-shirts with the wholesaler based on past sales data. The size he orders will be decided looking at the _____ of past sales data?
- (a) Mean
 - (b) Median
 - (c) Mode
 - (d) None of the above
64. The students of a class X^{th} have an average weight of 50 kg. The strength of the class is 49 students. On including the weight of the Principal, the average weight shoots up by 0.8 kg. Find the weight of the Principal?
- (a) 75
 - (b) 90
 - (c) 85
 - (d) None of these
65. The average of $(p+q)$ consecutive numbers starting from 1 is 'r'. If 's' is added to each of the numbers then the new average will be?
- (a) $r+s$
 - (b) $r+(s/2)$
 - (c) $\{r + (p+q+s)\}/(p+q)$
 - (d) None of these
66. The average weight of 40 people is increased by 2.4 kg when one man weight 73 kg is replaced by another man. Find the weight of the new man?
- (a) 121
 - (b) 169
 - (c) 154
 - (d) 149

67. The average salary of the whole employees in a company is ₹400 per day. The average salary of officers is ₹ 800 per day and that of clerks is ₹ 320 per day. If the number of officers is 40, then find the number of clerks in the company?
- 50
 - 100
 - 150
 - 200
68. The average of 6 numbers is 30. If the average of the first four is 25 and that of the last three is 35, the fourth number is
- 25
 - 30
 - 35
 - 40
69. Perpendicular is drawn from the point of intersection of 2 Ogives on the horizontal axis. The value of x denotes:
- First Quartile
 - Second Quartile
 - Third Quartile
 - Any of the above
70. In study of impact of novel Coronavirus in the world, a frequency graph is plotted for age on the x axis and fatalities on the y axis. Which frequency curve is most expected as the output?
- J shaped curve
 - U shaped curve
 - Bell shaped curve
 - Mixed shaped curve
71. AM and GM are both negative values, HM is equal to:
- $H = \frac{G}{A^2}$
 - $H = \frac{G^2}{A}$
 - $H = \frac{G^2}{\sqrt{A}}$
 - None of the above
72. Which of the following is the correct relation between mean, median and mode
- Median = mode + $\frac{2}{3}$ (mean – mode)
 - 2Mean = Mode - 3Median
 - 2Mean = Mode + 3Median

(d) $\text{Mode} = 3\text{Median} + 2\text{Mean}$

73. A student marks were wrongly entered as 85 instead of 45. Due to that the average marks for the whole class got increased by one-fourth. The no. of students in the class is?

- (a) 80
- (b) 160
- (c) 40
- (d) 20

74. Find the mean deviation about mean for the numbers: 2,6,7,4,8,3

- (a) 4
- (b) 6
- (c) 5
- (d) 2

75. If Quartile deviation is 7. Find the value of x from the arranged series: 2, x, 6, 7, 9, 16, 18.

- (a) 5
- (b) 2
- (c) 8
- (d) 6

76. There are two startups in ecommerce sector struggling to acquire the market. Following data is for Mean and Standard Deviation of billing amount of bought items per month on their website

Startup	No. of customers/ month	Mean billing amount	SD of billing amount
A	40	₹ 2500	₹10
B	30	₹2200	₹11

Which startup has a better consistency when it comes to sales numbers?

- (a) Startup A
- (b) Startup B
- (c) Both A and B
- (d) Need more information

77. If a card is drawn randomly from a deck, the probability of the card being neither a red card nor a face card?

- (a) $5/13$
- (b) $6/17$
- (c) $12/27$
- (d) $5/7$

78. From a deck of 52 cards, two cards are drawn at random. What is the probability that they are a king and a queen, if the cards are drawn one after the other without replacement?
- (a) $\frac{4}{52} \times \frac{4}{51}$
 (b) $2 \times \frac{4}{52} \times \frac{4}{51}$
 (c) $\frac{4}{52} \times \frac{3}{51} \times \frac{4}{52} \times \frac{3}{51}$
 (d) None of these
79. In a poker set there are 90 chips numbered from 1 to 90. Dan picks 3 chips at random, one after the other, without replacement. What is the probability that the numbers on the chips, in the order that he picks them are in descending order?
- (a) $\frac{1}{3}$
 (b) $\frac{1}{30}$
 (c) $\frac{1}{6}$
 (d) None of these
80. A number is selected at random from first 70 natural numbers. What is the chance that it is a multiple of either 5 or 14?
- (a) 6/35
 (b) 8/35
 (c) 10/35
 (d) None of these
81. If two dice are thrown then what is the probability that the sum of the faces of dice are square or cube number?
- (a) 1/4
 (b) 1/2
 (c) 1/3
 (d) None of these
82. Probability of Ramesh & Deepak speaking truth is 1/4, 3/5. Find the probability of atmost one of them speaks truth.
- (a) 0.60
 (b) 0.85
 (c) 0.75
 (d) None of these
83. To find the distribution of number of airplanes crashing every hour in the world, which of the following distribution is appropriate to apply:
- (a) Normal distribution
 (b) Binomial distribution

- (c) Poisson distribution
 - (d) Using any of the above will yield the same output
84. Which of the following is not a property of normal distribution?
- (a) There are two points of inflexion.
 - (b) Mean, median and mode coincide for normal distribution
 - (c) Skewness is zero
 - (d) All the above
85. For a continuous random variable following standard normal distribution, what is the value of standard deviation?
- (a) 1
 - (b) 0
 - (c) -1
 - (d) More than 1
86. The mean and variance are equal for which of the following:
- (a) Poisson Distribution
 - (b) Normal Distribution
 - (c) Gaussian Distribution
 - (d) None of these
87. if the inflexion points of a normal distribution are 6 and 14 . Find its Standard Deviation
- (a) 4
 - (b) 6
 - (c) 10
 - (d) 12
88. For the Poisson distribution:
- (a) Events are independent of each other.
 - (b) Average rate (events per time period) is constant
 - (c) Two events cannot occur simultaneously.
 - (d) All of the above
89. Normal distribution is also known as
- (a) Gaussian distribution
 - (b) Binomial distribution
 - (c) Poisson distribution
 - (d) None of these

90. In regression analysis, which of the following can be in the form of an index number?
- Only dependent variable
 - Only independent variable
 - Both A and B
 - Need more information
91. A scatter diagram of two variables developing a pattern of multiple circular rings represents which kind of correlation?
- Positive
 - Negative
 - Curvilinear
 - No correlation
92. Which of the following is the best measure to calculate the volatility of stock market?
- Covariance
 - Standard Deviation
 - Variance
 - All of the above
93. If both the regression coefficients are negative, what will be coefficient of correlation?
- Negative
 - Positive
 - Can be either positive or negative
 - Cannot be determined
94. Correlation between unrelated variables is not because of:
- Coefficient of non-determination
 - Existence of third variable related to both the variables
 - Spurious correlation
 - None of the above
95. If the regression equation of two variables are $5x - y = 4$ and $3x - 2y = 1$. Find the arithmetic means of x and y
- 2,1
 - 2,2
 - 1,1
 - Cannot be determined.
96. If Laspeyres index is A and Fisher's index is B . Find the value of Passche's index
- B^2 / A
 - A^2 / B

- (c) $A / 2B$
 - (d) $2B / A$
97. Which test should be considered necessarily to verify the consistency while we select an appropriate index formula
- (a) Circular test
 - (b) Time reversal test
 - (c) Factor reversal test
 - (d) Both b and c
98. Circular test is satisfied by which of the following index?
- (a) Laspeyres index
 - (b) Paasche's index
 - (c) Fisher's index
 - (d) Simple geometric mean of price relatives
99. The purchasing power of money is _____.
- (a) Not equal to the price index number
 - (b) Reciprocal of the price index number
 - (c) Equal to the price index number
 - (d) None of the above
100. Fisher's method of calculating the index number is based on the _____.
- (a) Geometric mean
 - (b) Arithmetic mean
 - (c) Harmonic mean
 - (d) None of the above