MOCK TEST PAPER SERIES -2

FOUNDATION COURSE

PAPER 3: BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

Time: 2 hours **Marks: 100**

SECTION A: BUSINESS MATHEMATICS AND LOGICAL REASONING

1. The ratio of the number of boys and girls in a school is 2:5. if there are 280 students in the school, find number of girls in the school

   (a) 200

   (b) 250

   (c) 150

   (d) 100

2. The third proportional to 9 and 25

   (a) 80/3

   (b) 80

   (c) 80/7

   (d) None of these

3. $\left(\frac{\sqrt{3}}{9}\right)^{5/2} \left(\frac{9}{3\sqrt{3}}\right)^{7/2} \times 9$ is equal to :

   (a) 1

   (b) $\sqrt{3}$

   (c) $3\sqrt{3}$

   (d) $\frac{3}{9\sqrt{3}}$

4. The value $\frac{\log_3 8}{\log_9 16.\log_4 10}$ is:

   (a) $3 \log_{10} 2$

   (b) $7 \log_{10} 3$

   (c) $3 \log_e z$

   (d) None.

5. If $\frac{p}{q} = -\frac{2}{3}$ then the value of $\frac{2p+q}{2p-q}$ is:

   (a) 1

   (b) -1/7

(c) 1/7

(d) 7

6. Roots of the equation $3x^2 – 14x + k = 0$ will be reciprocal of each other if :

(a) k = -3

(b) k = 0

(c) k = 3

(d) k = 14

7. If one root of the equation $x^2 – 3x + k = 0$ is 2, then value of k will be

(a) -10

(b) 0

(c) 2

(d) 10

8. On the average an experienced person does 7 units of work while a fresh one work 5 units of work daily but the employer has to maintain an output of atleast 35 units of work per day. The situation can be expressed as:

(a) $7x + 5y < 35$

(b) $7x + 5y \leq 35$

(c) $7x + 5y > 35$

(d) $7x + 5y \geq 35$

9. 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) $x^2 + 16x + 25 = 0$

(d) None of these

10. Solution space of the inequalities $2x + y \leq 10$ and $x-y \leq 5$:

(i) includes the origin

(ii) includes the point (4,3)

Which one is correct?

(a) Only (i)

(b) Only (ii)

(c) Both (i) and (ii)

(d) None of the above.

11. If A = $\frac{1}{\sqrt{2}}\begin{bmatrix}1 & -1\\ 1 & 1\end{bmatrix}$ then $A^T.A = A.A^T$ =

    (a) Identity matrix

    (b) Null matrix

    (c) A^2

    (d) none of these

12. Find the Inverse of matrix $\begin{vmatrix}a & b\\ c & d\end{vmatrix}$

    (a) $\begin{bmatrix}a & -b\\ -c & d\end{bmatrix}$

    (b) $\begin{bmatrix}d & -b\\ -c & a\end{bmatrix}$

    (c) $\frac{1}{ad-bc}\begin{bmatrix}d & -b\\ -c & a\end{bmatrix}$

    (d) $\frac{1}{ad-bc}\begin{bmatrix}a & -b\\ -c & d\end{bmatrix}$

13. Two equal sums were lent out at 7% and 5% simple interest respectively. The interest earned on the two loans adds upto Rs.960 for four years. Find the sum lent out.

    (a) Rs. 4000

    (b) Rs.3000

    (c) Rs. 5000

    (d) Rs. 6000

14. A sum of money amounts to Rs. 20,800 in 5 years and Rs. 22720 in 7 years. Find the principle and rate of interest.

    (a) Rs. 5000, 6%

    (b) Rs.16000, 6%

    (c) Rs.80000, 8%

    (d) Rs. 10000, 10%

15. A machine can be purchased for Rs. 50,000. Machine will contribute Rs. 12,000 per year for the next five years. Assume borrowing cost is 10% per annum. Determine whether machine should be purchased or not: (P(5,0.10) = 3.79079)

    (a) Should be purchased

    (b) Should not be purchased

    (c) Can't say about purchase

    (d) None of the above

16. The annual birth and death rates per 1000 are 39.4 and 19.4 respectively. The number of years in which the population will doubled assuming there is no immigration or emigration is:

    (a) 35 years

    (b) 30 years

    (c) 25 years

    (d) None of these.

17. The effective annual rate of interest corresponding to nominal rate 6% p.a. payable half yearly is

    (a) 6.06

    (b) 6.07

    (c) 6.08

    (d) 6.09

18. The cost of machinery Rs.1,25,000 if its useful life estimated to the 20 years and the rate of depreciation of its cost is 10% p.a . Then scrap value of machinery is (given that $(0.9)^{20} = 0.1215$)

    (a) Rs. 15,187

    (b) Rs. 15,400

    (c) Rs. 15,300

    (d) Rs. 15,250

19. How much amount is required to be invested every year so as to accumulate Rs. 3,00,000 at the end of 10 years, if interest is compounded annually at 10%?

    {Give $(1.1)^{10} = 2.5937$}

    (a) Rs. 18,823.65

    (b) Rs. 18,828.65

    (c) Rs. 18,832.65

    (d) Rs. 18,182.65

20. Rs. 5000 is paid every year for 10 years to pay off a loan. What is the loan amount if interest be 14% per annum compounded annually? (P(10,0.14) = 5,21611)

    (a) Rs.26000.33

    (b) Rs.26080.55

    (c) Rs.27080.55

    (d) Rs.28080.55

21. Rs.2000 is invested at the end of each month in account paying interest 6% per compounded monthly, What is the future value of this annuity after 10th payment ?

    (a) Rs. 20,440

    (b) Rs.52,200

    (c) Rs.53,300

    (d) Rs.54,500

22. If a simple interest on a sum of money at 6% p.a for 7 tears is equal to twice of simple interest on another Sum for 9 years at 5% p.a . The ratio will be

    (a) 2:15

    (b) 7: 15

    (c) 15: 7

    (d) 1:7

23. In what will be a sum of money double itself at 6.25% p.a . Simple interest?

    (a) 5 years

    (b) 8 years

    (c) 12 years

    (d) 16 years

24. What will be population after 3 years when present population is 25,000 and population increase at the rate of 3% in first year , at 4% in second year and at 5 % in third year ?

    (a) 28,119

    (b) 29,118

    (c) 30,100

    (d) 27,100

25. A sum amount to Rs. 1331 at a principal of Rs.1000 at 10% compounded annually. Find the time

    (a) 3.31 years

    (b) 4 years

    (c) 3 years

    (d) 2 years

26. A boy has 3 library tickets and 8 books of his interest in the library of these 8, he does not want to borrow mathematics part II unless mathematics part-1 is also borrowed? In how many ways can he choose the three books to be borrowed?

    (a) 41

    (b) 51

    (c) 61

    (d) 71

27. 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

28. A Supreme Court Bench consists of 5 judges. In how many ways, the bench can give a majority division?

(a) 10

(b) 5

(c) 15

(d) 16

29. Given : P (7 , k) = 60 P (7, k-3). Then:

(a) k = 9

(b) k = 8

(c) k = 5

(d) k = 0

30. If $a^{1/x} = b^{1/y} = c^{1/z}$ and a,b,c are in G.P; the x,y,z are in:

(a) A.P.

(b) G.P.

(c) Both (a) & (b)

(d) None of these

31. If the p^{th} term of a G.P. is x and the q^{th} term is y, then find the nth term:

(a) $\left[\frac{x^{(n-q)}}{y^{(n-p)}}\right]$

(b) $\left[\frac{x^{(n-q)}}{y^{(n-p)}}\right]^{(p-q)}$

(c) 1

(d) $\left[\frac{x^{(n-q)}}{y^{(n-p)}}\right]^{\frac{1}{p-q}}$

32. The sum of the series: 0.5+0.55+0.555+…….. to n term is:

(a) $\frac{5n}{9}+\frac{5}{9}\left[1-(0.1)^n\right]$

(b) $\frac{5n}{9}-\frac{5}{81}\left[1-(0.1)^n\right]$

(c) $\frac{5n}{9}+\frac{5}{81}\left[1-(0.1)^n\right]$

(d) $\frac{5n}{9}+\frac{5}{81}\left[1+(0.1)^n\right]$

33. Let R is the set of real numbers such that the function f : R $\rightarrow$ R and g : R $\rightarrow$ R are defined by by f(x) = x^2+3x+1 and g(x) = 2x-3. Find (fog):

(a) $4x^2$+6x+1

(b) x^2+6x+1

(c) $4x^2$-6x+1

(d) x^2- 6x+1.

34. In a survey of 300 companies, the number of companies using different Media-Newspapers (N), Radio (R) and Television (T) are as follows:

n(N) = 200, n (R)= 100, n(T) = 40, n(N $\cap$ R) = 50, n(R $\cap$ T) = 20, n(N $\cap$ R) = 25, and

n(N $\cap$ R $\cap$ T) = 5, Find the numbers of companies using none of these media:

(a) 20 companies

(b) 250 companies

(c) 30 companies

(d) 50 companies

35. If A = [1,2,3,4}, B = {2,4,6,8} , f(1) = 2, f(2) = 4, f(3) = 6 and f(4) = 8, and f: A $\rightarrow$B then f^{-1} is:

(a) {(2,1), (4,2), (6,3) (8,4)}

(b) {(1,2), (2,4), (3,6), (4,8)}

(c) {(1,4), (2,2), (3,6), (4,8)}

(d) None of these

36. $\int (x^2 - 1)$dx is equal to:

(a) $\frac{x^3}{5} - \frac{2}{3}x^3 + x + k$

(b) $\frac{x^3}{3} - x + k$

(c) 2x

(d) none of these

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

(a) 3

(b) 1

(c) 0

(d) 4

38. $\int x^2 e^{3x} dx$ is:

(a) $x^2.e^{3x}$-2xe^{3x}+2e^{3x}+C

(b) $\frac{e^{3x}}{3}-\frac{x.e^{3x}}{9}+2e^{3x}+C$

(c) $\frac{x^2.e^{3x}}{3}-\frac{2x.e^{3x}}{9}+\frac{2}{27}e^{3x}+C$

(d) None of these

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. Six seats of articled clerks are vacant in a 'Chartered Accountant Firm'. How many different batches of candidates can be chosen out of ten candidates?

(a) 216

(b) 210

(c) 220

(d) None

41. Find next number in the following series 7, 11, 13, 17, 19, 23, 25, 29,?

(a) 30

(b) 31

(c) 32

(d) 33

42. Find odd man out of the following series 15, 21, 63, 81, 69

(a) 15

(b) 21

(c) 63

(d) 81

43. If DELHI is coded as 73541 and CALCUTTA as 82589662, then CALICUT be coded as?

(a) 8251896

(b) 82518 69

(c) 8521896

(d) 8258196

44. Which of the following is odd one

(a) CEHL

(b) KMPT

(c) OQTX

(d) NPSV

45. Kiran walks 2 km towards North then he turns East and walks 10 km. After this he turns North and walks 3 km .Again he turns towards East and walks 2 km. How far from the starting point?

(a) 10 km

(b) 13km

(c) 15 km

(d) 17 km

46. Ramu moved a distance of 75 meters towards North. He then turned to left and walking for about 25 m, turned left again and walks 80m. Finally, he turned to the right at an angle of 45^0. In which direction was he moving finally?

(a) South-East

(b) South-West

(c) North-West

(d) North- East

47. If a man on motor bike starts from a point and rides 4 km South then turns left and rides 2 km and turn again to the right to ride in which direction is he moving?

(a) North

(b) West

(c) South

(d) North

48. I stand with my right hand extended side-ways towards south. Towards which direction will my back be?

(a) North

(b) West

(c) East

(d) South

49. Six flats on a floor in two rows facing North and South are allotted to P, Q, R, S, T and U. If Q gets a North facing flat and is not next to S. S and U get diagonally opposite flat. R is next to U gets a south facing flat and T gets North facing flat. Whose falt is between Q and S?

(a) T

(b) U

(c) R

(d) P

50. 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 either F or D, C does not stand next to D. F is between which of the following?

(a) B and E

(b) B and C

(c) B and D

(d) B and A

51. Five boys A, B, C, D and E are sitting in a row. A is to the right of B and E is to the left of B but to the right of C. A is to the left of D. Who is second from left end

(a) A

(b) B

(c) D

(d) E

52. Directions to solve

(a) P, Q, R, S, T, U, V and W are sitting round the circle and are facing the Centre

(b) P is second to the right of T who is the neighbor of R and V.

(c) S is not neighbour of P

(d) V is neighbour of U

(e) Q is not between S and W, W is not between U and S

Who is two of the following are not neighbour

(a) RV

(b) UV

(c) RP

(d) QW

53. Pointing to a photograph of a boy Ravi said, "He is son of the only son of my mother ". How is Ravi related to that boy?

(a) Brother

(b) Uncle

(c) Cousin

(d) Father

54. If 'A +B means A is brother of B', A-B means A is sister of B, and A × B means A is the father of B. Which of the following means that C is the son of M?

(a) M-N×C+F

(b) F-C+ N×M

(c) N+M-F×C

(d) M×N-C+F

55. If D is brother of B and B is related C. To answer this question which of the following statements are necessary?

I. The son of D is the grandson of C.

II. B is the sister of D.

(a) Only 1

(b) Only II

(c) Either I or II

(d) I and II

56. A, B, C, D, E and F are members of the family. B is the son A but A is not mother B, A and C are married couple. F is brother of A. D is the sister of B. E is son of C.

How many male members are in the family?

(a) 1

(b) 2

(c) 3

(d) 4

57. Statements I: Some actors are singers.

II: All singers are directors.

Conclusions I: Some actors are directors.

II: No singer is actor.

(a) If only Conclusion I follows.

(b) If only Conclusion II follow.

(c) If both I and II follow.

(d) If neither I nor II follow.

58. Statements I: All actors are girls.

II: All the girls are beautiful

Conclusions I All the actors are beautiful.

II. Some girls are actors.

(a) If only Conclusion I follows.

(b) If only Conclusion II follow.

(c) If both I and II follow.

(d) If neither I nor II follow.

59. Statement I: Some players are singers.

II: All singers are tall.

Conclusion I: Some players are tall.

II: All players are tall.

(a) If only Conclusion I follow

(b) If only conclusion II follow

(c) If either I or II follow.

(d) If neither I nor II follow.

60. Statement I: Some books are pens.

II: No pen is pencil.

Conclusion I: Some books are pencil.

II : No book is pencil

(a) If only Conclusion I follow

(b) If only conclusion II follow

(c) If either I or II follow.

(d) If neither I nor II follow.

PART B – STATISTICS

61. The best method to collect data in case of natural calamity is

(a) Personal interview.

(b) Telephone interview.

(c) Mailed questionnaire method.

(d) Indirect interview.

62. Which of the following statements is true?

(a) Usually mean is the best measure of central tendency.

(b) Usually median is the best measure of central tendency.

(c) Usually mode is the best measure of central tendency.

(d) Normally, GM is the best measure of central tendency

63. The mean salary for a group of 40 female workers is 5000 per month and that for a group of 60 male workers is 6000 per month. What is the combined mean salary?

(a) 6500

(b) 6200

(c) 6160

(d) 5600

64. The standard deviation of 10, 16, 10, 16, 10, 10, 16, 16 is

(a) 4

(b) 6

(c) 3

(d) 0

65. When mean is 3.57 and mode is 2.13 then the value of the median is

(a) 3.09

(b) 5.01

(c) 4.01

(d) None of these.

66. The variance of the data 3, 4 ,5 , 8 is

(a) 4.5

(b) 3.5

(c) 5.5

(d) 6.5

67. If the profits of a company remains the same for the last ten months, then the standard deviation of profits for these ten months would be ?

(a) Positive

(b) Negative

(c) Zero

(d) (a) or (c)

68. The point of intersection of less than ogive and greater than ogive curve is gives us

(a) Mean

(b) Mode

(c) Median

(d) Harmonic Mean

69. The following frequency distribution

x	12	17	24	36	45
F	2	5	3	9	8

Is classified as:

(a) Continuous distribution

(b) Discrete distribution

(c) Cumulative frequency distribution.

(d) None of the above

70. The median of the data 13, 8 ,11, 6, 4, 15, 2, 18 is

(a) 5

(b) 8

(c) 11

(d) 9.5

71. The A.M and H.M for two numbers are 5 and 3.2 respectively then the G.M will be

(a) 4.05

(b) 16

(c) 4

(d) 4.10

72. What is the value of the first quartile for observations 15, 18, 10, 20, 23, 28, 12, 16?

(a) 17

(b) 16

(c) 12.75

(d) 12

73. What is the coefficient of range for the following for the following distribution?

Class Interval	10-19	20-29	30-39	40-49	50-59
Frequency	11	25	16	7	3

(a) 22

(b) 50

(c) 75.82

(d) 72.46

74. Which measure of dispersion is based on all the observations?

(a) Mean deviation

(b) Standard deviation

(c) Quartile deviation

(d) (a) and (b) but not (c)

75. Interval Quartile Range is ____of Quartile Deviation

(a) Half

(b) Double

(c) Triple

(d) Equal

76. The Sum of the squares of the deviations from mean of 10 observations is 250. Mean of the data is 10. Find coefficient of variation.

(a) 10 %

(b) 25%

(c) 50 %

(d) 0 %

77. The mean of the variable x is 50, then the mean of u = 10+5x will be

(a) 250

(b) 260

(c) 265

(d) 273

78. The Standard Deviation of a variable x is known to be 10. The Standard deviation of 50+5x

(a) 50

(b) 100

(c) 10

(d) 500

79. The of mean and SD of a series is a + b, if we add 2 to each observations of the series then the sum of the mean and SD is

(a) a+b+2

(b) 6-a+b

(c) 4+a-b

(d) a+b+4

80. Which of the following is affected by shifting of scale

(a) SD

(b) MD

(c) QD

(d) All the above

81. P(A) = 0.45 , P(B) =0.36 and P(A $\cap$ B) = 0.25 then P(A/B) = ?

(a) 1.40

(b) 1.80

(c) 0.714

(d) 0.556

82. If a card is drawn at random from a pack of 52 cards, what is the chance of getting a Spade or an ace?

(a) 4/13

(b) 5/13

(c) 0.25

(d) 0.20

83. From the following probability distribution table, find E(x).

x:	1	2	3
f(x):	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$

(a) 1

(b) 1.50

(c) 1.67

(d) None of these

84. The mean of a binomial distribution with parameter n and p is

(a) n (1– p).

(b) np (1 – p).

(c) np.

(d) $\sqrt{np(1-p)}$.

85. The total area of the normal curve is

(a) One.

(b) 50 per cent.

(c) 0.50.

(d) Any value between 0 and 1.

86. For a normal distribution with mean 150 and SD is 45, Find Q1 and Q3

(a) 119.35 and 190.65

(b) 119.65 and 180 .35

(c) 180.35 and 119.65

(d) 123.45 and 183.65

87. The Binomial distribution n = 9 and p = 1/3 . What is the value of the variance?

(a) 8

(b) 4

(c) 2

(d) 16

88 A bag contains 12 balls of which 3 are red and 5 balls are drawn at random. Find the probability that 5 balls 3 are red

(a) 3/132

(b) 5/396

(c) 1/36

(d) 1/22

89. A card is drawn from a pack of playing cards at random. What is the probability that the card drawn a king or red colour?

(a) 1/4

(b) 4/13

(c) 7/13

(d) 1/2

90 If x & y are two independent variables such that x ~ B(n_1,P) and y~B(n_2,p) then the parameter of Z = x+y is

(a) (n_1+n_2), P

(b) (n_1–n_2), P

(c) (n_1+n_2), 2P

(d) None of these

91. If the coefficient of correlation between two variables is 0.8 then the percentage of variation unaccounted for is

(a) 70%

(b) 30%

(c) 51%

(d) 36%

92. The correlation coefficient (r) is the _____of the two regression coefficients

(a) AM

(b) GM

(c) HM

(d) Median

93. The coefficient of correlation between x and y is 0.6. If x and y values are multiplied by -1, then coefficient of correlation will be

(a) –0.6

(b) 1/0.6

(c) 0.6

(d) 0.4

94. The regression equation x and y is3x +2y = 100, the value of bxy

(a) -2/3

(b) 100/3

(c) 3/2

(d) 2/3

95. price and Demand are the example of

(a) No Correlation

(b) Positive Correlation

(c) Negative Correlation

(d) None of these

96. If an increase of 10% in prices. The rise in wages is 20% then the real wage has increased by An index time series is a list of _____ numbers for two or more periods of time.

(a) 20%

(b) 10 %

(c) Less than 10 %

(d) More than 20%

97. Purchasing power of money is

(a) Reciprocal of the Price Index Number.

(b) Equal to price index number.

(c) Unequal to price index number.

(d) None of these.

98. The cost of living index numbers in years 2015 and 2021 were 97.5 and 115 respectively. The salary of a worker in 2015 was Rs. 19,500. How much additional salary is required for him in 2021 to maintain living standard of 2015?

(a) Rs. 3,000

(b) Rs. 4,000

(c) Rs. 3,500

(d) Rs. 4,500

99. A time series has

(a) Two Components

(b) Three Components

(c) Four Components

(d) Five Components

100. In a time series seasonal variations can occur within a period of

(a) Four years

(b) Three years

(c) One year

(d) Nine years