Test Series: March, 2021

MOCK TEST PAPER SERIES -1

FOUNDATION COURSE

PAPER 3: BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

Time: 2 hours **Marks: 100**

Section A: Business Mathematics and Logical Reasoning

1. Two numbers are in the ratio 7: 8 if 3 is added to each of them, their ratio becomes 8:9, the numbers are

   (a) 14, 16

   (b) 24, 27

   (c) 21, 24

   (d) 16, 18

2. Which of the numbers are not in proportions?

   (a) 6,8,5,7

   (b) 7.3,14,6

   (c) 18,27,12,18

   (d) 8,6,12, 9

3. If $x^2 + y^2 = 7xy$, then $\log \frac{1}{3}(x + y) =$ then x is

   (a) (logx+logy)

   (b) ½(logx+logy)

   (c) 1/3(logx+logy)

   (d) 3(logx/logy)

4. The value of $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$ is

   (a) 1/2

   (b) 3/2

   (c) 2/3

   (d) 2

5. If $3^x = 5^y = 75^z$ then

   (a) x+y-z= 0

   (b) $\frac{2}{x} + \frac{1}{y} = \frac{1}{z}$

   (c) $\frac{1}{x} + \frac{2}{y} = \frac{1}{z}$

(d) $\frac{2}{x}+\frac{1}{z}=\frac{1}{y}$

6. The value of $\sqrt{6+\sqrt{6+\sqrt{6+.....\infty}}}$ is

(a) -3

(b) 2

(c) 3

(d) 4

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. 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

9. The transpose of a column matrix is a

(a) null matrix

(b) row matrix

(c) scalar matrix

(d) column matrix

10. $\begin{pmatrix} a & -b \\ b & a \end{pmatrix} \times \begin{pmatrix} -a & b \\ b & a \end{pmatrix}$

(a) $\begin{pmatrix} a^2+b^2 & 0 \\ 0 & a^2+b^2 \end{pmatrix}$

(b) $\begin{pmatrix} -a^2-b^2 & 0 \\ 0 & a^2+b^2 \end{pmatrix}$

(c) $\begin{pmatrix} a^2-b^2 & 0 \\ 0 & a^2+b^2 \end{pmatrix}$

(d) $\begin{pmatrix} a^2-b^2 & 0 \\ 0 & a^2-b^2 \end{pmatrix}$

11. The solution of the inequality $\frac{(5-2x)}{3} \leq \frac{x}{6} - 5$ is

    (a) $x \geq 8$

    (b) $x \leq 8$

    (c) $x = 8$

    (d) None of these

12. On the average, experienced person does 5 units of work while a fresh one 3 units work daily but the employer have to maintain the output of atleast 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

13. Rs. 8,000 becomes Rs. 10,000 in two years at simple interest. The amount that will become Rs. 6,875 in 3 years at the same rate of interest is:

    (a) Rs. 4,850

    (b) Rs. 5,000

    (c) Rs. 5,500

    (d) Rs. 5,275

14. The difference between the simple and compound interest on a certain sum for 3 year at 5% p.a. is Rs. 228.75. The compound interest on the sum for 2 years at 5% p.a. is:

    (a) Rs. 3,175

    (b) Rs. 3,075

    (c) Rs. 3,275

    (d) Rs. 2,975

15. A sum of money doubles itself in 10 years. The number of years it would treble itself is:

    (a) 25 years

    (b) 15 years

    (c) 20 years

    (d) None

16. The effective rate equivalent to nominal rate of 6% compounded monthly is:

    (a) 6.05

    (b) 6.17

    (c) 6.26

    (d) 6.07

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

    (a) Rs. 112.50

    (b) Rs. 125

    (c) Rs. 225

    (d) Rs. 167.50

18. Future value of an ordinary annuity

    (a) $A\ (n,i) = A\left[\frac{(1+i)^n - 1}{i}\right]$

    (b) $A\ (n,i) = A\left[\frac{(1+i)^n + 1}{i}\right]$

    (c) $A\ (n,i) = A\left[\frac{1-(1+i)^n}{i}\right]$

    (d) $A\ (n,i) = A\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$

19. The cost of machinery is Rs. 1,25,000/- if its useful life is estimated to be 20 years and the rate of depreciation of its cost is 10% p.a., then the scrap value of the Machinery is [given that $(0.9)^{20} = 0.12158$]

    (a) 15,197

    (b) 15,400

    (c) 15,300

    (d) 15,250

20. If A person invests Rs.5,000 in a three years' investment that pays you 12% per annum. Calculate the future value of the investment.

    (a) Rs.7024.64

    (b) Rs. 7124.78

    (c) Rs.7324.48

    (d) Rs.7526.48

21. A company is considering proposal of purchasing a machine either by making full payment of Rs.4000 or by leasing it for four years at an annual rate of Rs.1250. Which course of action is preferable if the company can borrow money at 14% compounded annually? [P (4,0.14) = 2.9137]

    (a) leasing is not preferable

    (b) leasing is preferable

    (c) Cannot determined

    (d) none of these

22. Anil bought a motor cycle costing Rs.1,50,000 by making a down payment of Rs.50, 000 and agreeing to make equal annual payment for five years. How much would be each payment if the interest on unpaid amount be 10% compounded annually? [P (5, 0.10) = 3.7908]

    (a) Rs.26379.66

    (b) Rs.26300.70

    (c) Rs.26500.70

    (d) Rs.26370.70

23. Shoba borrows Rs.50,00,000 to buy a house. If he pays equal instalments for 20 years and 10% interest on outstanding balance, what will be the equal annual instalment?

    [Given : P(20,0.10) =8.51356]

    (a) Rs.687298.4

    (b) Rs.685298.4

    (c) Rs.585298.4

    (d) Rs.587298.4

24. How much money is to be invested every year so to accumulate Rs. 3,00,000 at the end of 10 years if interest is compounded annually at 10% [A (10,0.1) = 15.9374)

    (a) Rs.18823.65

    (b) Rs.18833.64

    (c) Rs.18223.60

    (d) Rs.16823.65

25. The number of triangles 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

26. 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

27. In how many ways can the letters of the word FAILURE be arranged so that the consonants may occupy only odd positions?

    (a) 576

    (b) 476

    (c) 376

    (d) 276

28. Find the number of combinations of the letters of the word COLLEGE taken four together:

(a) 18

(b) 16

(c) 20

(d) 26

29. If A = {1, 2, 3, 4, 5} and B = {6, 7, 8,9}, then cardinal number of AXB is:

(a) 20

(b) 5

(c) 3

(d) 8

30. The number of subsets of the set A = {1, 2, 3, 4, 5, 6, 7, 8} is

(a) 36

(b) 128

(c) 256

(d) None of these

31. If f(x) = $\left(\frac{x^2-4}{x-2}\right)$, then f(2) is

(a) 0

(b) 2

(c) 4

(d) 1

32. Find the sum to n terms of the series : 7+77+777+…….. to n terms:

(a) $\frac{7}{9}\left(10^{n+1}-10\right)-\frac{7n}{9}$

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

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

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

33. If the sum of n terms of an A.P. is ($3n^2 - n$) and its common difference is 6, then its third term is:

(a) 10

(b) 12

(c) 14

(d) 16

34. 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

35. $\sum n^2$ defines:

(a) $\frac{n(n+1)(2n+1)}{6}$

(b) $\frac{n(n+1)}{2}$

(c) $\left[\frac{n(n+1)}{2}\right]^2$

(d) None of these

36. If A = (1,2,3,4,5) B = (2,4) and C = (1,3,5) then (A-C)×B is

(a) {(2,2,), (2,4), (4,2), (4,4), (5,2), (5,4)}

(b) {(1,2), (1,4), (3,2), (3,4), (5,2), (5,4)}

(c) {(2,2), (4,2), (4,4), (4,5)}

(d) {(2,2), (2,4), (4,2), (4,4)}

37. If $f(x) = x^k$ and f ` (1) = 10 then the value of k is

(a) 10

(b) - 10

(c) 1/10

(d) None

38. Given $x = 2t + 5$; $y = t^2-2$, then $\frac{dy}{dx}$ is calculated as:

(a) t

(b) 1/t

(c) -1/t

(d) None

39. Evaluate $\int \frac{2x+1}{x(x+1)} dx$

(a) $\log(x^2 - x) + c$

(b) $\log\left(x^2 + x\right) + c$

(c) $\log\left(x^2 + 1\right) + c$

(d) None of these

40. Evaluate $\int_0^2 x^5 dx$

(a) 32/3

(b) 1/3

(c) 1/2

(d) 1

41. Find the missing term of the series 27,32,30,35, 33, ?

(a) 28

(b) 31

(c) 36

(d) 38

42. Find out the letter series AZY, EXW, IVU, ?

(a) MTS

(b) MQR

(c) NRQ

(d) LST

43. Find wrong number of the series 22,37, 52,67, 84, 97

(a) 52

(b) 84

(c) 97

(d) 67

44. If TWENTY is written as 863985 and ELEVEN is written as 323039 , then TWELVE can be coded

(a) 863203

(b) 863302

(c) 863320

(c) 683302

45. If 'LOSE' is coded 1357 and 'GAIN' is coded as 2468 What do the figure 82146 for

(a) NGLAI

(b) NGLIA

(c) GNLIA

(d) GNLAI

46. If B = 2 and BAG = 10, then BOX = ?

(a) 36

(b) 39

(c) 41

(d) 52

47. A man stands on a point and starts walking towards north then turns left then turns right and then left in which direction he is moving.

(a) West

(b) North

(c) East

(d) South

48. One evening before sunset, two friends Ravi and Raj were talking to each other face to face. If Ravi's shadow was exactly to his left side, which direction was Raj facing ?

(a) West

(b) East

(c) North

(d) South

49. If South-West becomes North, then what will be the North-East be ?

(a) North

(b) South-East

(c) South

(d) East

50. Six children A, B, C, D, E and F are sitting in a row facing north. B is between F and D. E is between A and C. A does Not Stand next to F and D. C does not stand next to D. F is between which of the following pairs of children?

(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 facing north. A is to the immediate right of B and E is on the immediate left of B but on the right of C and A is on the left of D. Who is second from the left end?

(a) D

(b) A

(c) E

(d) B

(Q. No 52-53) Read the following information carefully and answer the questions that follow.

Eight friends A, B, C, D, E, F, G and H are sitting in circle facing the center . B is sitting 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 ?

52. who is third to left of D ?

(a) F

(b) E

(c) A

(d) Cannot be determined.

53. Who is sitting between H and D

(a) F

(b) E

(c) A

(d) Cannot be determined.

54. If A+B means A is the sister of B, A x B means A is the wife of B, A % B means A is the father of B and A – B means A is the brother of B. Which of the following means T is the daughter of P?

(a) P x Q % R + S – T

(b) P x Q % R – T + S

(c) P x Q % R + T – S

(d) P x Q % R – T + S

55. Anil said "This girl is the wife of the grandson of my mother". How is Anil related to the girl?

(a) Brother

(b) Grandfather

(c) Husband

(d) Father-in-law

56. P is the mother of K, K is the sister of D. D is the father of J. How is P related to j?

(a) Mother

(b) Grandmother

(c) Aunt

(d) Data is inadequate.

57. In a family, there are six members A, B, C, D, E and F. A and B are a married couple, A being the male member. D is the only son of C, who is the brother of A. E is the sister of D. B is the daughter-in-law of F, whose husband has died. How is E related to C ?

(a) Sister

(b) Daughter

(c) Cousin

(d) Mother

(58-60) Each of the following questions contains two statements followed by two conclusions numbered I and II. You have to consider the two statements to be true, even if they seen to be at variance at the commonly known facts. You have to decide which of the given conclusions definitely follows from the given statements.

58. Statements: I. Some banks are colleges.

II: All colleges are schools.

Conclusions: I. Atleast some banks are schools.

II. All schools are colleges

(a) only conclusion I follows

(b) only conclusion II follows

(c) either I or II follows

(d) neither I and II follows.

59. Statements: I. All bottles are glasses.

II: No cup is a glass.

Conclusions: I. No bottle is a cup.

II. Atleast some glasses are bottles.

(a) only conclusion I follows

(b) only conclusion II follows

(c) either I or II follows

(d) Both I and II follows.

60. Statements: I. Some cities are towns.

II: Some villagers are cities.

Conclusions: I. Aleast some villagers are towns.

II. No village is a town.

(a) only conclusion I follows

(b) only conclusion II follows

(c) either I or II follows

(d) Both I and II follows.

Part B Statistics (40 Marks)

61. Histogram is used for presentation of the following type of series

(a) Time Service

(b) Continuous Frequency Series

(c) Discrete Series

(d) Individual Series

62. The graphical representation of cumulative frequency distribution is called–

(a) Histogram

(b) Pie Chart

(c) Frequency Polygon

(d) Ogive

63.

No. of Accidents	0	1	2	3	4	5	6	7
Frequency	36	27	33	29	24	27	18	9

In how many cases 5 or more accidents occur?

(a) 96

(b) 133

(c) 78

(d) 54

64. The difference between upper limit and lower limit of a class is called:

(a) Class interval

(b) Class boundaries

(c) Mid-value

(d) Frequency

65. A man travels at a speed of 20km/hr and then returns at a speed of 30 km/ hr. His average speed of the whole journey is :

(a) 25 km/ hr

(b) 24.5 km/hr

(c) 24 km/hr

(d) None

66. The sum of the squares of deviations of a set of observations has the smallest value, when the deviations are taken from their:

(a) A.M.

(b) H.M.

(c) G.M.

(d) None

67. If two variables x and y are related by $2x + 3y - 7 = 0$ and the mean and mean deviation about mean of x are 1 and 0.3 respectively, then the co-efficient of mean deviation of y about mean is:

(a) -5

(b) 4

(c) 12

(d) 50

68. If 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

69. What is the coefficient of range 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

70. If there are two groups with 75 and 65 as harmonic means and containing 15 and 13 observations. Then the combined H.M. is given by:

(a) 70

(b) 80

(c) 70.35

(d) 69.48

71. If X and Y are two random variables then v(x+y), when x is independent of y

(a) v (x) + v(y)

(b) v(x) + v(y) – 2 v (x,y)

(c) v(x) + v(y) + 2 v (x,y)

(d) v (x) – v (y)

72. G.M is a better measure than others when,

(a) ratios and percentages are given

(b) interval of scale is given

(c) Both (a) and (b)

(d) Either (a) or (b)

73. The sum of squares of deviation from mean of 10 observations is 250. Mean of the data is 10. Find the co-efficient of variation.

(a) 10%

(b) 25%

(c) 50%

(d) 0%

74. The equation of a line is 5x + 2y = 17. Mean deviation of y about mean is 5. Calculate mean deviation of x about mean.

(a) -2

(b) 2

(c) -4

(d) None

75. If variance of is x is 5, then find the variance of (2- 3x)

(a) 10

(b) 45

(c) 5

(d) -13

76. Let the mean of the variable 'x' be 50, then the mean of u=10+5x will be:

(a) 250

(b) 260

(c) 265

(d) 273

77. If sum of squares of the values = 3390, N = 30 and standard deviation = 7, find out the mean.

(a) 113

(b) 210

(c) 8

(d) None of these

78. Which of the following measures of central tendency cannot be calculated by graphical method?

(a) Mean

(b) Mode

(c) Median

(d) Quartile

79. In a non-leap year, the probability of getting 53 Sundays or 53 Tuesday or 53 Thursday is :

(a) 4/7

(b) 2/7

(c) 3/7

(d) 1/7

80. If A and B are two events and P (A) = 2/3, P(B) =3/5, $P\left(AUB\right)$ = 5/6, then the value of $P\left(A^{'}/B^{'}\right)$ is :

(a) ¼

(b) 5/12

(c) 5/8

(d) 5/4

81. The odds are 9:5 against a person who is 50 years living till he is 70 and 8:6 against a person who is 60 living till he is 80. Find the probability that at least one of them will be alive after 20 years.

(a) 11/14

(b) 22/49

(c) 31/49

(d) 35/49

82. What is the chance of throwing at least 7 in a single cast with two dices?

(a) 5/12

(b) 7/12

(c) 1/4

(d) 17/36

83. Correlation coefficient r, bxy and byx are all have ___ signs

(a) different

(b) same

(c) both

(d) none

84. The covariance between two variables is

(a) Strictly Positive

(b) Strictly negative

(c) Always Zero

(d) Either Positive or Zero or Negative

85. If u+5x = 6 and 3y-7v = 20 and correlation coefficient between x and y is 0.58 then what be the correlation coefficient between U and V ?

(a) 0.58

(b) -0.58

(c) -0.84

(d) 0.84

86. The coefficient of two variables is 0.9, then coefficient of non-determination is

(a) 0.9

(b) 0.19

(c) 0.81

(d) 0.1

87. If y = 3x+4 is the regression line y on x and the arithmetic mean of x is -1, what is the arithmetic mean of y

(a) 1

(b) -1

(c) 7

(d) none of these

88. if the sum of squares in difference of ranks, given by two judges A and B of 8 students is 21, What is the value of rank correlation coefficient?

(a) 0.7

(b) 0.65

(c) 0.75

(d) 0.8

89. In normal distribution what is the ratio of QD:MD:SD

(a) 12:10:15

(b) 15:10:12

(c) 10:15;12

(d) 10:12:15

90. Area covered normal curve by $\mu \pm 3\sigma$

(a) 68.28%

(b) 95.96%

(c) 99.73%

(d) 99.23%

91. If x is binomial variate with parameter 15 and 1/3 what is the value of mode of the distribution.

(a) 5& 6

(b) 5.5

(c) 5

(d) 6

92. In Poisson distribution which of the following is same.

(a) Mean and variance.

(b) Mean and SD

(c) Both

(d) None of these

93. The Quartile Deviation of Normal Distribution with mean is 10 and variance is 16 is

(a) 54.24

(b) 23.20

(c) 0.275

(d) 2.70

94. What is the standard deviation of number recoveries among 48 patients when the probability of recovering is 0.75 ?

(a) 36

(b) 81

(c) 9

(d) 3

95. Fishers Price Index number is equal is

(a) G. M of Kelly's Price Index number and Paasche's Price Index number

(b) G.M of Laspyres and Paaches Price Index number

(c) G.M of Bowley's price index number and Paasche's Index number.

(d) None of these

96. The prices of commodity in the year 2015 and 2020 were 25 and 30 respectively taking 2015 as base year the price relative is

(a) 109.8

(b) 110.25

(c) 113.25

(d) 83.33

97. For year 2015, price index was 267% with base year 2005. The percentage increase in price index over base year 2005 is:

(a) 267%

(b) 67%

(c) 167%

(d) None of these

98. In time Series Seasonal variations can occur within a period of

(a) one year

(b) Three years

(c) Nine years

(d) Five years

99. Damages due to floods, droughts, strikes fires and political disturbances are called in time series

(a) Trend

(b) Seasonal

(c) Cyclical

(d) Irregular

100. The Multiplicative Time Series Model is

(a) $Y = T+S+C+I$

(b) $Y = T.S.C.I$

(c) $Y = a+bx$

(d) $Y = a+bx +Cx^2$