Mock Test Paper -2

Foundation Course

Paper 3: Business Mathematics, Logical Reasoning and Statistics

Time: 120 Minutes   **Maximum Marks: 100**

Part A : Business Mathematics and Logical Reasoning

1. If x:y:z = 2: 3:5 if x+ y+ z = 60 ,then the value of z

    (a) 30

    (b) 15

    (c) 9

    (d) 12

2. The ratio of two numbers is 15: 19. If a certain number is added to each term of the ratio it become 8: 9. What is the number added to each of the ratio?

    (a) 6

    (b) 15

    (c) 17

    (d) 23

3. If $\dfrac{a}{3} = \dfrac{b}{4} = \dfrac{c}{5}$ then $\dfrac{2a + 3b + 2c}{4a - b + 2c}$ is

    (a) $\dfrac{11}{19}$

    (b) $\dfrac{17}{9}$

    (c) $\dfrac{19}{9}$

    (d) $\dfrac{19}{7}$

4. Simplify $\dfrac{2^n + 2^{n-1}}{2^{n+1} + 2^n}$ =

    (a) 2^{n+2}

    (b) 2^n

    (c) 2

    (d) $\dfrac{1}{2}$

5. If. $2^a = 3^b = 12^c$ then $\dfrac{1}{a} + \dfrac{1}{b}$ =

    (a) $\dfrac{1}{c}$

(b) $\dfrac{1}{c} - \dfrac{1}{a}$

(c) $-\dfrac{1}{c}$

(d) 0

6. The value of $\log_{64} 512$ is

   (a) 9

   (b) 9/2

   (c) 9/4

   (d) 3/2

7. The value of of $(\log_b a \log_c b \log_a c)^3 =$

   (a) 1

   (b) 3

   (c) $(\log_b C)^3$

   (d) $(\log_c b)^3$

8. If α and β be the roots of the equation $2x^2-4x-3=0$ the value of $α^2+β^2$ is

   (a) 5

   (b) 7

   (c) 3

   (d) -4

9. If one root of the equation $x^2+ 7x+ p = 0$ be reciprocal of the other then the value of p is_____.

   (a) 1

   (b) -1

   (c) 7

   (d) -7

10. Let A = $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$; B= $\begin{pmatrix} 1 & 5 \\ 6 & 7 \end{pmatrix}$ then the value 3A-B

   (a) $\begin{pmatrix} -4 & -14 \\ 9 & 11 \end{pmatrix}$

   (b) $\begin{pmatrix} 4 & -14 \\ -9 & -11 \end{pmatrix}$

   (c) $\begin{pmatrix} 4 & -14 \\ 9 & 11 \end{pmatrix}$

   (d) $\begin{pmatrix} 5 & 4 \\ 6 & 8 \end{pmatrix}$

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

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

12. Mr. A plans to invest up to Rs. 30,000 in two stocks X and Y. Stock X(x) is priced at Rs.175 and Stock Y(y) at Rs.95 per share. This can be shown by

   (a) 175x+95y < 30,000

   (b) 175x+95y > 30,000

   (c) 175x+95y = 30,000

   (d) None of these

13. A sum of money doubles itself at compounded interest in 10 years in how many years will it becomes eight times?

   (a) 20

   (b) 30

   (c) 40

   (d) 35

14. A machine costs Rs .1,00, 000. The depreciation rate is 10% per annum. The scrap value of the machine at the end of 5 years is

   (a) Rs.49490

   (b) Rs. 59049

   (c) Rs.61029

   (d) Rs.51049

15. Rs. 10,000 is invested at annual rate of interest of 10% p.a. The amount after two years at annual compounding is

   (a) Rs. 21100

   (b) Rs. 12100

   (c) Rs. 12110

   (d) None of these

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

   (a) 40 years

3

(b) 30 years

(c) 36 years

(d) 25 years

17. If the effective rate of interest is 12% per annum and the interest is compounded quarterly, the nominal rate of interest per annum

(a) 11.78 %

(b) 11.21 %

(c) 11.89%

(d) 11.49 %

18. A machine can be purchased for Rs. 50, 000. Machine will be contributing Rs. 12, 000 per year for the next five years. Assuming borrowing cost is 10% per annum. Determine whether machine should be purchased or not

(a) Should be purchased

(b) Should not be purchased

(c) Can't say about purchase

(d) none of the above

19. X bought a TV costing 25,000 making down payment of Rs. 5000 and agreeing to make equal annual payment for four years. How much would be each payment if the interest on unpaid amount be 14% compounded annually? [P(4, 0.14) = 2.91371]

(a) Rs.6864.10

(b) Rs.6850.63

(c) Rs.6859

(d) Rs.6871

20. The future value of annuity on Rs. 5000 a year for 7 years at 14% per annum compound interest is given $(1.14)^7$= 2.5023

(a) Rs.5300

(b) Rs.53653.57

(c) Rs.5480

(d) Rs.5465.23

21. Rs.5000 paid for ten years to off a loan. What is the loan amount if interest rate be 14% per annum compounded annually? (Given P (10, 0.14) = 5.21611

(a) Rs.26080.55

(b) Rs.26580.55

(c) Rs.26280.55

(d) Rs.27080.55

22. Suppope your friend decided gift to you Rs. 10000 every year starting from today for the next five years. Your deposit this amount in a bank as and when you receive and get 10% per annum interest compounded annually. What is the present value of this annuity?

(a) Rs.42698.70

(b) Rs.43698.70

(c) Rs.45698.70

(d) Rs.41698.70

23. Rs.1000 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of annuity after 10th payment? (Given that $(1.005)^{10} = 1.0511$)

(a) Rs.10220

(b) Rs.1022

(c) Rs.20000

(d) Rs.1020

24. The difference between CI and SI on a certain money invested for three years at 6% per annum is Rs. 110.16. The sum is

(a) Rs. 3000

(b) Rs.3700

(c) Rs.12000

(d) Rs.10000

25. Simple interest on Rs.3500 for 3 years at 12% per annum is

(a) Rs.1200

(b) Rs.1260

(c) Rs.2260

(d) Rs. 2000

26. A function f(x) is an even function, if

(a) $-f(x) = f(x)$)

(b) $f(-x) = f(x)$

(c) $f(-x) = -f(x)$

(d) None of these

27. If A = {1, 2, 3, 4} and B = {5, 6, 7,6}, then cardinal number of the set A×B is _____

(a) 7

(b) 1

(c) 16

(d) None of these

28. Find the f o g for the functions f (x) =x^3, g (x) = x+ 1

(a) x^2 (x+1)

(b) x^2

(c) x+1

(d) $(x+1)^3$

29. if $nP_4 = 12nP_2$ then n=

(a) 2

(b) 3

(c) 4

(d) 6

30. The number of sub sets of function {2, 3, 5, 6}

    (a) 3

    (b) 8

    (c) 16

    (d) none of these

31. A man has 5 friends'. In how many ways can be invite one or more of his friends to dinner?

    (a) 30

    (b) 31

    (c) 32

    (d) 10

32. The sum of the first two terms of a GP is 5/3 and the sum of infinity of the series is 3. The common ratio is

    (a) 1/3

    (b) 2/3

    (c) -1/3

    (d) none of these

33. The sum of the infinite series   1+2/3+4/9+………is

    (a) 1/3

    (b) 3

    (c) 2/3

    (d) none of these

34. Which term of the AP 64,60,56,52….is Zero

    (a) 16

    (b) 17

    (c) 15

    (d) 14

35. if $x=at^2$, $y=2at$ then $\left[\dfrac{dy}{dx}\right]_{t=2}$ is equal to

    (a) 1/2

    (b) -2

    (c) -1/2

    (d) none of these

36. The gradient of the curve $y = 4x^2 – 2x$ at $x =1$ is

    (a) 4

    (b) 6

    (c) 8

    (d) None of these

37. $\int \dfrac{1}{a^2 - x^2} \, dx$

   (a) $\dfrac{1}{2a} \log \left| \dfrac{a+x}{a-x} \right| + c$

   (b) $\dfrac{-1}{2a} \log \left| \dfrac{a-x}{a+x} \right| + c$

   (c) $\dfrac{1}{2a} \log \left| \dfrac{x-a}{x+a} \right| + c$

   (d) None of these

38. $\int \left\{ \dfrac{1}{\log x} - \dfrac{1}{(\log x)^2} \right\} dx$

   (a) $\dfrac{1}{\log x} + c$

   (b) $\dfrac{x}{\log x} + c$

   (c) $-\dfrac{x}{\log x} + c$

   (d) None of these

39. $\int x^2 e^x \, dx$

   (a) $e^x(x^2-2x+2)$ +c
   (b) $e^x(x^2-2)$ +c
   (c) $e^x(x^2+2x+2)$ +c
   (d) $e^x(x^2-2x)$ +c

40. If $x = at^3$, $y = \dfrac{a}{t^3}$, $\dfrac{dy}{dx}$ at t = 1 is

   (a) 1
   (b) -1
   (c) 3
   (d) 2/3

41. Find odd one out of the series 7, 9, 11, 12, 14, 15
   (a) 15
   (b) 14
   (c) 9
   (d) 7

42. Find odd one out of the series   37, 45, 49, 65, 79
   (a) 37

(b) 45

(c) 49

(d) 65

43. Find the missing number of the series 22, 24, 28, ? , 52, 84

    (a) 36

    (b) 38

    (c) 42

    (d) 46

44. Find the missing number of series 1, 5, 13, 25, 41, ?

    (a) 51

    (b) 57

    (c) 61

    (d) 63

45. If SUMMER is coded as RUNNER the code for WINTER will be

    (a) SUITER

    (b) VIOUER

    (c) WALKER

    (d) SUFFER

46. In a certain code KAVERI is written as VAKIRE. How is MYSORE written in that code?

    (a) EROSYM

    (b) SYMORE

    (c) SMYERP

    (d) SYMERO

47. A man is facing East, then he turns left and goes 10m then turns right and goes 5 m then goes 5 m to the South and from there 5 m to West. In which direction is be from his original place?

    (a) East

    (b) West

    (c) North

    (d) South

48. From her home Prerna wishes to go to school. From home she goes towards North and then turns left and then turns right, and finally she turns left and reaches school. In which direction her school is situated with respect to her home?

    (a) North-East

    (b) North-West

    (c) South-East

    (d) South-West

49. A child walks 25 feet towards North, turns right and walks 40 feet, turns right again and walks 45 feet. He then turns left and walks 20 feet. He turns left again walks 20 feet. Finally, he turns to his left to walks another 20 feet. In which direction is the child from his starting point?

    (a) North

    (b) South

    (c) West

    (d) East

50. In a college party, 5 girls are sitting in a row. F is to the left of M and to the right of O. R is sitting to the right of N but to the left of O. Who is sitting in the middle?

    (a) O

    (b) R

    (c) P

    (d) M

51. Five friends P, Q, R, S and T are sitting in a row facing North. Here, S is between T and Q and Q is to the immediate left of R. P is to the immediate left of T. Who is in the middle?

    (a) S

    (b) T

    (c) Q

    (d) R

(52.-54) Study the following information carefully to answer the given questions. Eight person's P to W are sitting in front of one another in two rows. Each row has four persons. P is between U and V and facing North. Q, who is to the immediate left of M is facing W. R is between T and M and W is to the immediate right of V.

52. Who is sitting in front of R?

    (a) U

    (b) Q

    (c) V

    (d) P

53. Who is to the immediate right of R?

    (a) M

    (b) U

    (c) M or T

    (d) None of these

54. In which of the following pairs, persons are sitting in front of each other?

    (a) MV

    (b) RV

    (c) TV

    (d) UR

55. X is the husband of Y. W is the daughter of X. Z is husband of W. N is the daughter of Z. What is the relationship of N to Y?

    (a) Cousin

(b) Niece

(c) Daughter

(d) Grand-daughter

56. 'A' reads a book and find the name of the author familiar. The author 'B' is the paternal uncle of 'C'. 'C' is the daughter of 'A'. How is 'B' related to 'A'?

(a) Brother

(b) Sister

(c) Father

(d) Uncle

57. 'A' s mother is sister of B and she has a daughter C who is 21 years old. How is B related to D?

(a) Uncle

(b) Maternal Uncle

(c) Niece

(d) Daughter

(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

Give answer ((a) if only I follows; ((b) if only conclusion II follows; ((c) if either I or II follows and ((d) if neither I nor II follows

58. Statements: I. All pots are cups.

II. All cups are bowls.

Conclusions: I. All pots are bowls.

II. All cups are pots.

59. Statements: I. All roads are poles

II. No poles are bungalows

Conclusions: I. Some roads are bungalows

II. Some bungalows are poles

60. Statements: I. Some cats are kittens.

II. All goats are kittens.

Conclusions: I. Some cats are goats

II. Some goats are cats.

Part B: Statistics

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

(a) Personal interview

(b) Indirect interview

(c) Questionnaire method

(d) Direct observation method.

62. The entire upper part of a table is known as

(a) Caption

(b) Stub

(c) Box head

(d) Body

63. A frequency distribution

(a) Arranges observations in an increasing order

(b) Arranges observation in terms of a number of groups

(c) Relaters to a measurable characteristic

(d) all these.

64. Mode of a distribution can be obtained from

(a) Histogram

(b) Less than type ogives

(c) More than type ogives

(d) Frequency polygon

65. The presence of extreme observations does not affect

(a) AM

(b) Median

(c) Mode

(d) Any of these

66. For a moderately skewed distribution, which of the following relationship holds?

(a) Mean – Mode = 3 (Mean – Median)

(b) Median – Mode = 3 (Mean – Median)

(c) Mean – Median = 3 (Mean – Mode)

(d) Mean – Median = 3 (Median – Mode)

67. Quartiles can be determined graphically using

(a) Histogram

(b) Frequency Polygon

(c) Ogive

(d) Pie chart

68. If there are 3 observations 15, 20, 25 then the sum of deviation of the observations from their AM is

(a) 0

(b) 5

(c) –5

(d) None of these.

69. The third decile for the numbers 15, 10, 20, 25, 18, 11, 9, 12 is

(a) 13

(b) 10.70

(c) 11

(d) 11.50

70. Which measures of dispersions is not affected by the presence of extreme observations?

  (a) Range

  (b) Mean deviation

  (c) Standard deviation

  (d) Quartile deviation

71. Which measure is based on only the central fifty percent of the observations?

  (a) Standard deviation

  (b) Quartile deviation

  (c) Mean deviation

  (d) All these measures

72. If the profits of a company remain 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)

73. The range of 15, 12, 10, 9, 17, 30 is

  (a) 5

  (b) 12

  (c) 13

  (d) 21

74. If the range of x is 2, what would be the range of $-3x + 50$?

  (a) 2

  (b) 6

  (c) -6

  (d) 44

75. If x and y are related by $2x + 3y + 4 = 0$ and SD of x is 6, then SD of y is

  (a) 22

  (b) 4

  (c) 40

  (d) 9

76. If x and y are related by $y = 2x + 5$ and the SD and AM of x are known to be 5 and 10 respectively, then the coefficient of variation is

  (a) 25

  (b) 30

  (c) 40

  (d) 20

77. If for two events A and B, $P(A \cap B) = P(A) \times P(B)$, then the two events A and B are

   (a) Independent

   (b) Dependent

   (c) Not equally likely

   (d) Not exhaustive.

78. Addition Theorem of Probability states that for any two events A and B,

   (a) $P(A \cup B) = P(A) + P(B)$

   (b) $P(A \cup B) = P(A) + P(B) + P(A \cap B)$

   (c) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

   (d) $P(A \cup B) = P(A)\, P(B)$

79. If a random variable x assumes the values x_1, x_2, x_3, x_4 with corresponding probabilities p_1, p_2, p_3, p_4 then the expected value of x is

   (a) $p_1 + p_2 + p_3 + p_4$

   (b) $x_1 p_1 + x_2 p_3 + x_3 p_2 + x_4 p_4$

   (c) $p_1 x_1 + p_2 x_2 + p_3 x_3 + p_4 x_4$

   (d) none of these.

80. If an unbiased die is rolled once, the odds in favour of getting a point which is a multiple of 3 is

   (a) 1:2

   (b) 2:1

   (c) 1:3

   (d) 3:1

81. A, B, C are three mutually independent with probabilities 0.3, 0.2 and 0.4 respectively. What is P (ABC)?

   (a) 0.400

   (b) 0.240

   (c) 0.024

   (d) 0.500

82. What is the chance of throwing at least 7 in a single cast with 2 dice?

   (a) 5/12

   (b) 7/12

   (c) 1/4

   (d) 17/36

83. A binomial distribution is

   (a) never symmetrical

   (b) never positively skewed

   (c) never negatively skewed

   (d) symmetrical when p = 0.5

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84. The maximum value of the variance of a binomial distribution with parameters n and p is

    (a) n/2

    (b) n/4

    (c) np (1 – p)

    (d) 2n

85. Which one is uniparametric distribution?

    (a) Binomial

    (b) Poisson

    (c) Normal

    (d) Hyper geometric

86. The mean deviation about median of a standard normal variate is

    (a) 0.675 σ

    (b) 0.675

    (c) 0.80 σ

    (d) 0.80

87. If the points of inflexion of a normal curve are 40 and 60 respectively, then its mean deviation is

    (a) 40

    (b) 45

    (c) 50

    (d) 60

88. What is the first quartile of X having the following probability density function?

$$f(x) = \frac{1}{\sqrt{72\pi}} e^{\frac{-(x-10)^2}{72}} \qquad \text{for } -\infty < x < \infty$$

    (a) 4.

    (b) 5.

    (c) 5.95.

    (d) 6.75.

89. Correlation analysis aims at

    (a) Predicting one variable for a given value of the other variable

    (b) Establishing relation between two variables

    (c) Measuring the extent of relation between two variables

    (d) Both (b) and (c).

90. The two lines of regression become identical when

    (a) r = 1

    (b) r = –1

    (c) r = 0

    (d) (a) or (b).

91. If the coefficient of correlation between two variables is 0.7 then the percentage of variation unaccounted for is

    (a) 70%

    (b) 30%

    (c) 51%

    (d) 49%

92. If the regression coefficient of y on x is 2.5, the correlation coefficient 0.6 and the SD is y of is 4, the SD of x is

    (a) 0.64

    (b) 0.24

    (c) 0.96

    (d) 1.44

93. If the regression coefficient of y on x is 1.5 and the variances of x and y is 4/9 then the correlation coefficient is

    (a) 1

    (b) -1

    (c) 2.25

    (d) 1

94. If the coefficient of determination is 0.64 and the regression coefficient of x on y is 4 then then the regression coefficient of y on x is

    (a) 0.32

    (b) 0.16

    (c) 0.48

    (d) 0.96

95. Chain index is equal to

    (a) $\dfrac{\text{Link relative of current year} \times \text{chain index of the current year}}{100}$

    (b) $\dfrac{\text{Link relative of previous year} \times \text{chain index of the current year}}{100}$

    (c) $\dfrac{\text{Link relative of current year} \times \text{chain index of the previous year}}{100}$

    (d) $\dfrac{\text{Link relative of previous year} \times \text{chain index of the previous year}}{100}$

96. The formula should be independent of the unit in which or for which price and quantities are quoted in

    (a) Unit Test

    (b) Time Reversal Test

    (c) Factor Reversal Test

    (d) none

97. The formula for conversion to current value

(a) Deflated value = $\dfrac{\text{Price Index of the current year}}{\text{previous value}}$

(b) Deflated value = $\dfrac{\text{Price Index of the current year}}{\text{current value}}$

(c) Deflated value = $\dfrac{\text{Price Index of the previous year}}{\text{previous value}}$

(d) Deflated value = $\dfrac{\text{Price Index of the previous year}}{\text{previous value}}$

98. Damages due to floods, droughts, strikes fires and political disturbances are:
(a) Trend
(b) Seasonal
(c) Cyclical
(d) Irregular

99. The rise and fall of a time series over periods longer than one year is called:
(a) Secular trend
(b) Seasonal variation
(c) Cyclical Variation
(d) irregular variations

100. A time series has:
(a) Two components
(b) Three Components
(c) Four Components
(d) Five Components