Test Series: October, 2018

FOUNDATION COURSE

MOCK TEST PAPER - 2

PAPER – 3: BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

Time Allowed 3 Hours **Maximum Marks: 100**

PART A: BUSINESS MATHEMATICS

QUESTIONS

1. For a, b, c > 0 the value of each ratio is

   $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b}$, then find the value of each ratio if $a + b + c \neq 0$

   (a) ½

   (b) 1/3

   (c) ¼

   (d) 1

2. If $\frac{x}{b+c-a} = \frac{y}{c+a-b} = \frac{z}{a+b-c}$, then find the value of $(b - c)x + (c - a)y + (a - b)z =$

   (a) 0

   (b) -1

   (c) +1

   (d) ½

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

   (a) 30

   (b) 15

   (c) 9

   (d) 12

4. Simplify $\log_2 3 \log_3 4 \log_4 5 \log_5 6 \log_6 7 \log_7 8$

   (a) 2

   (b) 3

   (c) 4

   (d) 3/2

5. The roots of the equation $x^3 + x^2 - 20x = 0$

   (a) 0, 4,5

   (b) 0,-4,5

   (c) 0,4, -5

   (d) 0, -4, -5

6. Find the quadratic equation Sum of whose roots is 3 and the Sum of the cubes of roots is 7

   (a) $21x^2 - 147x + 20 = 0$

   (b) $21x^2 + 147x + 20 = 0$

   (c) $21x^2 - 147x - 20 = 0$

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(d) $-21x^2 - 147x + 20 = 0$

7. Find the quadratic equation given that $5+\sqrt{3}$ is one root

(a) $x^2 - 10x + 22 = 0$

(b) $x^2 + 10x - 22 = 0$

(c) $x^2 - 10x - 22 = 0$

(d) $-x^2 - 10x + 22 = 0$

8. If α and β are the roots of the equation $3x^2 - 5x + 3 = 0$ then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

(a) 7/9

(b) -7/9

(c) 8/9

(d) -8/9

9. Find the truth set of $3x - 6 < 3$

(a) $\{x : x < 5\}$

(b) $\{x : x > 5\}$

(c) $\{x : x < 3\}$

(d) $\{x : x \leq 3\}$

10. Find the value of $\frac{x}{3} - \frac{1}{4}(x+2) > 3x - 1\frac{1}{3}$

(a) $x < 2/7$

(b) $x > 2/7$

(c) $x < 3/7$

(d) $x > 4/7$

11. A manufacturer produces two items A and B. He has Rs.10,000 to invest and a space to store 100 items. A table costs him Rs.400 and a chair Rs.100. Express this in the form of linear inequalities.

(a) $x + y \leq 100,\ 4x + y \leq 100,\ x \geq 0,\ y \geq 0$

(b) $x + y \leq 1000,\ 2x + 5y < 1000,\ x \geq 0,\ y \geq 0$

(c) $x + y > 100,\ 4x + y \geq 100,\ x \geq 0,\ y \geq 0$

(d) none of these

12. A sum of money placed at compound interest double itself in 3 years. In how many years will it amount to eight times itself?

(a) 5 years

(b) 9 years

(c) 8 years

(d) 7 years

13. The difference between the compound interest and simple interest on Rs. 1,000 for 2 years at the rate of 10% per annum is

(a) Rs.40

(b) Rs.20

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(c) Rs.30

(d) Rs.10

14. Sanjana borrows Rs.5,00,000 to buy a house. If she pays equal instalments for 20 years and 10% interest on outstanding balance what will be the equal annual installment? ([P(20,0.10) = 8.51356)

(a) Rs. 58,729.84

(b) Rs. 58,792.54

(c) Rs. 85,729.54

(d) Rs. 85,792.45

15. 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) = 2.91731]

(a) Rs.6855.63

(b) Rs.6850.63

(c) Rs.6859

(d) Rs.6871

16. In how many ways can the letters of words "ACCOUNTANT" be arranged if vowels always occur together?

(a) 7560

(b) 7650

(c) 7660

(d) 7550

17. From a committee of 8 persons, in how many ways can we choose a chairman and a vice chairman assuming one person cannot hold more than one position?

(a) 50

(b) 56

(c) 62

(d) none of these

18. $\int \frac{1}{x \log x}\, dx$ =?

(a) log|x| + c

(b) log |logx| + c

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

(d) none of these

19. If $x = at^2$ and $y = 2at$ then $\frac{dy}{dx}$ at t = 1

(a) 2

(b) 1

(c) 1/2

(d) $\frac{1}{2a}$

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20. $\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}}dx$ is equal to

(a) -1

(b) 0

(c) 2

(d) 1

21. The marginal cost function for production is $10+24x-3x^2$. If the total cost of producing one unit is Rs. 25 find the total cost function.

(a) $4+10x+12x^2-x^3$

(b) $4+10x-12x^2+x^3$

(c) $4+10x-12x^2-x^3$

(d) $4-10x-12x^2-x^3$

22. If $y = e^x - e^{-x}$ then $\frac{dy}{dx} - \sqrt{y^2+4}$ is equal to

(a) 1

(b) 0

(c) -1

(d) none of these

23. Evaluate: $\int \frac{1}{x(x+1)}dx$

(a) x+log (x+1)+c

(b) x–log (x+1)+c

(c) $\log x - \log(x+1) + c$

(d) none of these

24. The domain of {(1,7),(2.6)} is

(a) (1,6)

(b) (7,6)

(c) (1,2)

(d) {6,7}

25. The point of Intersection between the straight lines 3x+2y=6 and 3x-y=12 lie in

(a) 1st quadrant

(b) 2nd quadrant

(c) 3rd quadrant

(d) 4th quadrant

26. An employer recruits experienced (x) and fresh work men (y) for his firm under the condition that he can't employ more than 9 people .x and y can be related by the inequality

(a) $x+y\neq 9$

(b) $x+y\leq 9, x\geq 0, y\geq 0$

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(c) $x+y \geq 9, x \geq 0, y \geq 0$

(d) none of these

27. 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 compounded annually. Determine whether machine would be purchased or not?

(a) Purchased

(b) Not purchased

(c) Profitable

(d) None of the above

28. If the effective interest is 12% per annum and the interest is compounded quarterly, the nominal interest per annum is.

(a) 11.78 %

(b) 11.21%

(c) 11.89%

(d) 11.49%

29. A machine depreciated at the rate of 20% on reducing balance. The original lot of the machine was Rs. 1,00,000 and ultimate scarp value is Rs. 30,000. The effective life of the machine in years is.

(a) 4.5

(b) 5.4

(c) 4.9

(d) 5

30. 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

31. Rs, 5,000 is paid every year for ten years to pay off a loan , what is the loan amount the loan amount if interest rate be 14% per annum compounded annually is (Given P(10, 0.14) = 5.21611)

(a) Rs.26080.55

(b) Rs.1917.13

(c) Rs. 52,161.1

(d) Rs. 19,171, 3

32. $A \cap A$ is equal to

(a) A

(b) φ

(c) Universal Set

(d) none of these

33. If $f(x) = x+3$, $g(x) = x^2$, then fog(x)

(a) x^2+3

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(b) x^2+x+3

(c) $(x+3)^2$

(d) none of these

34. ${}^{n+2}C_n = 45$ find the value of n

(a) 7

(b) 8

(c) 9

(d) 6

35. Assuming that the discount rate is 7% per annum , how much would you pay to receive Rs.50 , growing at 5% annually forever ?

(a) 2,600

(b) 2,000

(c) 2,500

(d) 3,000

36. Transpose of a rectangular Matrix is

(a) Rectangular Matrix

(b) Diagonal Matrix

(c) Square matrix

(d) Scalar Matrix

37. What's a, if A = $\begin{pmatrix} 2 & 3 \\ 4 & a \end{pmatrix}$ is a singular matrix ?

(a) 5

(b) 6

(c) 7

(d) 8

38. The two arithmetic means between 4 and 13 are

(a) 7,10

(b) 3,14

(c) 5,12

(d) 6,11

39. The Sum of First n terms of an A.P is $5n^2+7n$. The 10^{th} term is

(a) 101

(b) 96

(c) 84

(d) 102

40. Four letters are written and 4 envelopes are addressed. The number of ways in which all the 4 letters do not go into correct envelopes is

(a) 511

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(b) 1023

(c) 23

(d) 15

Part B : Logical Reasoning

41. 10, 18, 28, 40, 54, ?, 88

(a) 70

(b) 86

(c) 87

(d) 98

42. 18, 24, 21, 27, ?, 30, 27

(a) 33

(b) 30

(c) 24

(d) 21

43. If F=6, MAT=34, then how much is CAR?

(a) 21

(b) 22

(c) 25

(d) 28

44. If in a certain language NAME is written as 4258 then what is coded as MEAN?

(a) 2458

(b) 5842

(c) 8524

(d) 5824

45. 52, 51, 48, 43, 34, 27, 16

(a) 27

(b) 34

(c) 43

(d) 48

46. 1, 4, 9, 16, 24, 25, 36

(a) 9

(b) 24

(c) 25

(d) 36

47. A man is facing East, then he turns left and goes 10 m, 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 to be from his original place?

(a) East

(b) West

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(c) North

(d) South

48. A rat run 20 feet towards East and turns to right runs 10 feet and turns to right runs 9 feet and again turns to left runs 5 feet and then turns to left runs 12 feet and finally turns to left and runs 6 feet . Now what direction is the rat facing.

(a) East

(b) North

(c) West

(d) South

Six persons P, Q, R, S, T and U are sitting in two rows, three in each.

T is not at the end of any row

S is the second to the left of U

R the neighbour of T, is sitting diagonally opposite to S.

Q is the neighbour of U

49. Which of the following are sitting diagonally opposite to each other?

(a) U and R

(b) S and P

(c) P and R

(d) P and U

(e) P and Q

50. Which of the following are in the same row?

(a) P and T

(b) T and S

(c) R and Q

(d) P and Q

(e) R and T

51. Which of the following are in one of the two rows?

(a) UQR

(b) RTQ

(c) SQU

(d) PTU

(e) PQU

52. After interchanging seat with T, who will be the neighbours of S in the new position?

(a) R and P

(b) U and Q

(c) Only Q

(d) Only P

(e) Only R

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53. P and Q are brothers. R and S are sister. P's son is S's brother. How is Q related to R?
    (a) Uncle
    (b) Brother
    (c) Father
    (d) Grandfather
54. A is B's daughter. B is C's mother. D is C's brother. How is D is related to A?
    (a) Father
    (b) Brother
    (c) Son
    (d) Grandfather
55. A and B are brothers. E is the daughter of F. F is the wife of B. What is the relation of E to A?
    (a) Sister
    (b) Daughter
    (c) Niece
    (d) Cousin
56. 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) Sister
    (b) Brother
    (c) Son
    (d) Daughter
57. Statement: All pens are cups.
    All cups are bowls.
    Conclusions: I. All pens are bowls.
    II. All cups are pots.
    (a) If only I follows
    (b) If only conclusion II follows
    (c) If either I and II follows
    (d) If neither I nor II follows
    (e) If both I and II follow
58. Statement: All tables are rats.
    Some rats are chairs.
    Conclusions: I. All rats are tables.
    II. Some chairs are not rats.
    (a) If only I follows
    (b) If only conclusion II follows
    (c) If either I and II follows
    (d) If neither I nor II follows
    (e) If both I and II follow

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59. Statement: Some cats are kittens.

All rats are kittens.

Conclusions: I. Some cats are rats.

II. Some rats are cats.

(a) If only I follows

(b) If only conclusion II follows

(c) If either I and II follows

(d) If neither I nor II follows

(e) If both I and II follow

60. Statement: Some chairs are caps.

No cap is red.

Conclusions: I. Some caps are chairs.

II. No chair is red.

(a) If only I follows

(b) If only conclusion II follows

(c) If either I and II follows

(d) If neither I nor II follows

(e) If both I and II follow

Part C : Statistics

61. Correlation Co-efficient is _____ of the units of measurements

(a) Independent

(b) Dependent

(c) Both

(d) none of these

62. If for two variable x and y, the covariance, variance of x and variance of y are 40, 16 and 256 respectively, what is the value of the correlation coefficient?

(a) 0.01

(b) 0.625

(c) 0.4

(d) 0.5

63. Two lines of regression are given by 5x+7y–22=0 and 6x+2y–22=0. If the variance of y is 15, find the standard deviation of x?

(a) $\sqrt{5}$

(b) $\sqrt{7}$

(c) $\sqrt{6}$

(d) $\sqrt{8}$

64. In a normal distribution skewness is ___

(a) 0

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(b) >3

(c) <3

(d) <1

65. The mean of 1,2,3, ……. n is $\frac{6x}{11}$; then the value of x is

(a) 14

(b) 13

(c) 126

(d) 11

66) Two variables x and y satisfy the relation 3x - 2y - 25 = 0 the mode of x is 25. Then the mode of y is:

(a) 25

(b) 30

(c) 37.5

(d) 52/3

67. for two numbers "a" and "b", Standard Deviation given by

(a) $\frac{|a-b|}{2}$

(b) $\sqrt{\frac{a-b}{2}}$

(c) $\frac{a+b}{2}$

(d) $\sqrt{\frac{a+b}{2}}$

68. Which measure of dispersion is not affected in the presence of extreme observations?

(a) Range

(b) Mean deviation

(c) Standard deviation

(d) Quartile deviation

69. If x and y are related as 3x + 4y = 20 and the quartile deviation of x in 12. Then the Quartile deviation of y is:

(a) 16

(b) 14

(c) 10

(d) 9

70. For the two of towns, the co-efficient of rank correlation between the people living below the poverty line and increase population in 0.50. The sum of the squares difference in ranks awarded to their factors is 82.50, find the number of towns:

(a) 10

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(b) 11

(c) 12

(d) 9

71. For a bivariate frequency table having (p + q) classification the total number of cells is

(a) P

(b) P + q

(c) q

(d) pq

72. The two lines of regression becomes identical when

(a) r = 1

(b) r = -1

(c) r = 0

(d) (a) or (b)

73. If x and y are two correlated variables with correlation coefficient 0.60. If u =3x +5 and V = 5y-7. The correlation coefficient of U and V is:

(a) - 0.60

(b) 0.60

(c) 1

(d) 0.36

74. If the two regression co-efficient are 4 and 16 the percentage of unexplained variation is:

(a) 64

(b) 36

(c) 54

(d) 46

75. _____ in the entire upper part of the table which includes columns and sub-column numbers, unit(s) measurement

(a) Stub

(b) Box-head

(c) Body

(d) Caption

76. r, bxy, byx all have_____sign.

(a) Different

(b) Same

(c) Both

(d) None of them

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77. For a random variable x; the probability deviatory function is given by:

$f(x) = \frac{e^{-(x-4)^2}}{\sqrt{\Pi}}$ for $-\infty < x < \infty$ Find the mean and variance of its distribution

(a) $\mu = 2;\ \sigma^2 = \frac{1}{4}$

(b) $\mu = 4;\ \sigma^2 = \frac{1}{2}$

(c) $\mu = \frac{1}{4};\ \sigma^2 = \frac{1}{2}$

(d) None of them

78. Find the points of inflexion of the normal curve

$f(x) = \frac{1}{4\sqrt{2\pi}} . e^{\frac{-(x-10)^2}{32}}$ for $-\infty < x < \infty$

(a) 6 and 14

(b) 6 and 12

(c) 7 and 10

(d) 10 and 12

79. If x and y are independent normal variably with mean 100 and 80 respectively and Standard deviation as 4 and 3 respectively. What is the Standard deviation of (x+y) ?

(a) (180, 5)

(b) (180, 25)

(c) (100, 15)

(d) None of them

80. The value of e is

(a) 2.7183

(b) 2.1786

(c) 2.1643

(d) 0

81. ____is an extent of time reverted test

(a) Factor reversal test

(b) Circular Test

(c) Both

(d) None of them

82. The ideal average particular suitable for the construction of Index number is

(a) AM

(b) GM

(c) HM

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(d) None

83. Consumer price Index number from a year 2004 to 2010 changed 100 to 200. The salary of an employee has changed from Rs.3,000 to

(a) Rs.3,500

(b) Rs.2,500

(c) Rs.6,000

(d) Rs.3,500

84. A, B and C are three mutually exclusive and exhaustive events such that P(A)=2P(B)=3P(C). What is P(B)?

(a) 6/11

(b) 3/11

(c) 1/6

(d) 1/3

85. The odds in favour of an event is 2:3 and the odds against another event is 3:7. Find the probability that only one of the two events occurs.

(a) $\frac{27}{50}$

(b) $\frac{17}{50}$

(c) $\frac{37}{50}$

(d) none of these

86. Given that P(A) =1/2 and P(B) =1/3 ,P(A∩B)=1/4,what is P(A'/B')

(a) 1/2

(b) 7/8

(c) 5/8

(d) 2/3

87. The probability distribution of a random variable is as follows

X	1	2	4	6	8
P	k	2k	3k	3k	k

The variance of x is

(a) 2.1

(b) 4.41

(c) 2.32

(d) 2.47

88. If x is a Poisson variate such that P(x=2) = 9P(x=4) + 90P(x=6), find mean of x.

(a) m = 2

(b) m = 1

(c) m = ± 1

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(d) m = –4

89. The probability of A solving a problem is $\frac{7}{12}$ the odds against solving a problem

(a) 5:7

(b) 4:7

(c) 5:8

(d) 4:5

90. If variance of random variable x is 23, then what's the variance of 2x+10

(a) 56

(b) 33

(c) 46

(d) 92

91. The coefficient of Mean deviation about mean for the first 9 natural numbers?

(a) 200/9

(b) 80

(c) 400/9

(d) 50

92. Mode of distribution can be obtained from

(a) Histogram

(b) Less than type of ogives

(c) More than type of ogives

(d) Frequency polygon

93. If cov (x, y) = 25, what restrictions should put for the standard deviations of x and y?

(a) No restriction

(b) The product of Standard deviations should be more than 25

(c) The product of Standard deviations should be less than 25

(d) The sum of Standard deviations should be less than 25

94. What is the coefficient of variation of x, characterised by the following probability density function: f(x) = $\frac{1}{4\sqrt{2\pi}}\, e^{\frac{-(x-10)^2}{32}}$ for $-\alpha < x < \alpha$

(a) 50

(b) 60

(c) 40

(d) 30

95. A binomial distribution has n= 48, p = ¼. Then SD

(a) 12

(b) 3

(c) 6

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(d) 8

96. Median of a distribution can be obtained from

(a) Frequency polygon

(b) Histogram

(c) Less than type ogives

(d) None of these.

97. Using the following table for trend values taken three year Moving Averages using a, b and C are

Year	Profit	3 Yearly Moving Averages
2002	40	----
2003	60	a
2004	68	b
2005	70	c
2006	90	-----

(a) AP

(b) HP

(c) GP

(d) Neither AP or nor HP or GP

98. 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 of these

99. An areophane flies from A to B at the rate of 500 Km/hr and comes back from B to A at the rate of 700 km/ hr. The average speed of the areophane

(a) 600 km/hr

(b) 583.33km/hr

(c) $100\sqrt{35}$ km/hr

(d) 620 km / hr

100. ____& _____ are called ratio averages

(a) H.M and G.M

(b) H.M and A.M

(c) A.M and G.M

(d) None

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