

FOUNDATION COURSE

MOCK TEST PAPER

PAPER –3: BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS

Maximum Marks: 100

QUESTIONS

PART A: BUSINESS MATHEMATICS AND LOGICAL REASONING

1. On simplification would reduce to $\frac{1}{1+Z^{a-b}+Z^{a-c}}$ $\frac{1}{1+Z^{b-c}+Z^{b-a}}$ $\frac{1}{1+Z^{c-a}+Z^{c-b}}$ would reduce to

a) $\frac{1}{Z^2(a+b+c)}$

b) $\frac{1}{Z(a+b+c)}$

c) 1

d) 0

2. For any three consecutive integers x y z the equation $\log(1+xz) - 2\log y = 0$ is

(a) True

(b) False

(c) Sometimes true

(d) Cannot be determined in the cases of variables with cyclic order

3. If $x = \sqrt{2 - \sqrt{2 - \sqrt{2} \dots}} \infty$ the value of x is given by

(a) -2

(b) 1

(c) 2

(d) 0

4. If $a^p = b^q = c^r = d^s$ and $ab = cd$ then the value of $\frac{1}{p} + \frac{1}{q} - \frac{1}{r} - \frac{1}{s}$ reduces to

(a) $1/a$

(b) $1/b$

(c) 0

(d) 1

5. Show that $\left(\frac{x^b}{x^c}\right)^a \times \left(\frac{x^c}{x^a}\right)^b \times \left(\frac{x^a}{x^b}\right)^c$ reduces to

(a) 1

(b) 3

(c) 0

(d) 2

6. The cubic equation $x^3 + 2x^2 - x - 2 = 0$ has 3 roots namely.

- a) (1, -1, 2) b) (-1, 1, -2) c) (-1, 2, -2) d) (1, 2, 2)

7. Solve $x^3 - 5x^2 + 2x + 24 = 0$ given that two of its roots being in the ratio of 3:4

- (a) -2, 4, 3 (b) -1, 4, 3 (c) 2, 4, 3 (d) -2, -4, -3

8. $\begin{bmatrix} -3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix} \times \begin{bmatrix} 2 & -3 \\ 1 & 0 \\ 3 & 1 \end{bmatrix}$

- a) $\begin{bmatrix} 14 & -6 \\ 4 & -5 \end{bmatrix}$ b) $\begin{bmatrix} 14 & -6 \\ 4 & 5 \end{bmatrix}$ c) $\begin{bmatrix} 14 & -6 \\ -4 & 5 \end{bmatrix}$ d) $\begin{bmatrix} -14 & -6 \\ 4 & 5 \end{bmatrix}$

9. if $A = \begin{bmatrix} 6 & 10 \\ 3 & 5 \end{bmatrix}$

- (a) Is a singular matrix (b) Non-singular matrix (c) Identity matrix
(d) Symmetric matrix

10. If $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ and $A = A^T$, then

- (a) $x = 0, y = 5$ (b) $x = y$ (c) $x + y = 5$ (d) none of these

11. The rules and regulations demand that the employer should employ not more than 5 experienced hands to 1 fresh one and this fact can be expressed as

- (a) $y \geq x/5$ (b) $5y \leq x$ (c) $5y \geq x$ (d) none of these

12. A company borrows Rs 10,000 on condition to repay it with compound interest at 5% p.a. by annual installments of Rs 1000 each. The number of years by which the debt will be clear is

(a) 14.2 years (b) 10 years (c) 12 years (d) none of these

13. A man deposited Rs. 8, 000 in a bank for 3 years at 5% per annum compound interest, after 3 years he will get

(a) Rs. 9,000 (b) Rs.8, 800 (c) Rs. 9,200 (d) Rs. 9261

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

(a)16 (b)17 (c)15 (d)1

15. A man purchased a house valued at Rs 3,00,000. He paid Rs 2,00,000 at the time of purchase and agreed to pay the balance with interest at 12% per annum compounded half yearly in 20 equal half yearly installments. If the first installment is paid after six months from the date of purchase then the amount of each installment is [Given $\log 10.6 = 1.0253$ and $\log 31.19 = 1.494$]

(a) Rs 8,719.66 (b) Rs 8,769.21 (c) Rs 7,893.13 (d) none of these.

16. The time by which a sum of money would treble itself at 8% p. a C. I is

(a) 14.28 years (b) 14 years (c) 12 years (d) none of these

17. A person bought a house paying Rs 20,000 cash down and Rs 4,000 at the end of each year for 25 yrs. at 5% p.a. C.I. The cash down price is

(a) Rs 75,000 (b) Rs 76,000 (c) Rs 76,392 (d) none of these.

18. A person has 8 friends. The number of ways in which he may invite one or more of them to a dinner is.

(a) 250 (b) 255 (c) 200 (d) none of these

19. How many numbers greater than a million can be formed with the digits: One 0 Two 1 One 3 and Three 7?

- (a) 360 (b) 240 (c) 840 (d) 20

20. Find the number of ways in which an arrangement of 4 letters can be made from the word 'MATHEMATICS'.

- (a) 1680 (b) 756 (c) 18 (d) 2,454

21. The sum of all natural numbers from 100 to 300 which are exactly divisible by 4 and 5 is

- (a) 2,200 (b) 2,000 (c) 2,220 (d) none of these

22. If S_n the sum of first n terms in a series is given by $2n^2 + 3n$ the series is in _____.

- (a) A.P. (b) G.P. (c) H.P. (d) None

23. Find three numbers in A.P. whose sum is 6 and the sum of whose square is 44

- (a) -2, 2, 6 (b) -1, 1, 3 (c) 1, 3, 5 (d) 1, 4, 7

24. The numbers $x, 8, y$ are in G.P. and the numbers $x, y, -8$ are in A.P. The values of x, y are_____.

- (a) 16, 4 (b) 4, 16 (c) both (d) None

25. Out of 1000 students 658 failed in the aggregate, 166 in the aggregate and in group-I 434 in aggregate and in group-II, 372 in group-I, 590 in group-II and 126 in both the groups.

Find out how many failed in all the three.

- (a) 106 (b) 224 (c) 206 (d) 464.

26. As per question No.(25) how many failed in the aggregate but not in group-II?

- (a) 106 (b) 224 (c) 206 (d) 464

27. As per question No.(25) how many failed in group-I but not in the aggregate?

- (a) 106 (b) 224 (c) 206 (d) 464.

28. As per question No.(25) how many failed in group-II but not in group-I?

- (a) 106 (b) 224 (c) 206 (d) 464.

29. As per question No.(25) how many failed in aggregate or group-II but not in group-I?

- (a) 206 (b) 464 (c) 628 (d) 164.

30. As per question No.(25) how many failed in aggregate but not in group-I and group-II?

- (a) 206 (b) 464 (c) 628 (d) 164

31. Integrate w.r.t x , xe^x

- a) $e^x(x-1)+k$ (b) $e^x(x+1)$ (c) $xe^x(x-1)+k$ (d) none

32. Find the fourth derivative of $\log[(3x+4)]^{1/2}$

- (a) $-243(3x+4)^{-4}$ (b) $243(3x+4)^{-4}$ (c) $-243(4x+3)^{-4}$ (d) None

33. If RAMAN is written as 12325 and DINESH as 675489 how HAMAM is written?

- (a) 92323 (b) 92233 (c) 93233 (d) 93292

34. If DELHI is coded as CCIDD, how would you encode BOMBAY?

- (a) AJMTVT (b) AMJXVS (c) MJXVSU (d) WXYZAX

35. In a certain code '256' means 'you are good', '637' means 'we are bad' and '358' means 'good and bad'. Which of the following represents 'and' in that code?

- (a) 2 (b) 5 (c) 8 (d) 3

36. You go North, turn right, then right again and then go to the left. In which direction are you now?

- (a) South (b) East (c) West (d) North

37. Roy walks 2 km to East, then turns North-West and walks 3 km. Then he turns South and walks 5 km. Then again he turns West and walks 2 km. Finally he turns North and walks 6 km. In which direction, is he from the starting point?

- (a) South-West (b) South-East (c) North-West (d) North-East

38. Five boys A, B, C, F, E, are sitting in a park in a circle. A is facing South-West, D is facing South-East, B and E are right opposite A and D respectively and C is equidistant between D and B. Which direction is C facing?

- (a) West (b) South (c) North (4) East

Directions (No: 39-43): Study the following information carefully to answer the given questions. A to H are seated in straight line facing North. C sits fourth left of G. D sits second to right of G. Only two people sit between D and A. B and F are immediate neighbours of each other. B is not an immediate neighbour of A. H is not neighbour of D.

39. Who amongst the following sits exactly in the middle of the persons who sit fifth from the left and the person who sit sixth from the right?

- (a) C (b) H (c) E (d) F

40. Who amongst the following sits third to the right of C?

(a) B (b) F (c) A (d) E

41. Which of the following represents persons seated at the two extreme ends of the line?

(a) C, D (b) A, B (c) B, G (d) D, H

42. What is the position of H with respect to F?

(a) Third to the left (b) Immediate right (c) Second to right (d) Fourth to left

43. How many persons are seated between A and E?

(a) One (b) Two (c) Three (d) Four

44. There are eight books kept one over the other. Two books are on Organisation Behaviour, two books on TQM, three books on Industrial Relations and one book is on Economics. Counting from the top, the second, fifth and sixth books are on Industrial Relations. Two books on Industrial Relations are between two books on TQM. One book of Industrial Relations is between two books on Organizational Behaviour while the book above the book of Economics is a book of TQM. Which book is the last book from the top?

(a) Economics (b) TQM (c) Industrial Relations (d) Organizational Behaviour

45. Pointing to a photograph Vikas said "She is the daughter of my grandfather's only son". How is she related to Vikas in the photograph?

(a) Father (b) Brother (c) Sister (d) Mother

46. Rahul and Robin are brothers. Promod is Rohin's father. Sheela is Pramod's sister. Prema is Promod's niece. Shubha is Sheela's grand-daughter. How is Rahul related to Shubha?

(a) Brother (b) Cousin (c) Uncle (d) Nephew

47. C is mother of A and B. If D is the husband of B, then what is C to D

(a) Mother (b) Aunt (c) Mother-in Law (d) Sister

48. A, Q, Y and Z are different persons. Z is the father of Q. A is the daughter of Y and Y is the son of Z. If P is the son of Y and B is the brother of P, then

- (a) B and Y are brothers
- (b) A is sister of B
- (c) Z is the uncle of B
- (d) Q and Y are brothers

49. Sita is the niece of Ashok. Ashok's mother is Lakshmi. Kalyani is Lakshmi's mother. Kalyani's husband is Gopal. Parvathi is the mother-in-law of Gopal. How is Sita related to Gopal?

- (a) Great grandson's daughter
- (b) Gopal's Sita's father
- (c) Sita is Gopal's great grand-daughter
- (d) Grand niece

50. Given that: A is the mother of B. C is the son of A. D is the brother of E. E is the daughter of B. Who is grandmother of D?

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

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 seem 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; (d) if neither I nor II follows and (e) if both I and II follow.

51. Statement:

- i. No man is a lion.

ii. Ram is a man.

Conclusions:

I. Ram is not a lion.

II. All men are not Ram.

52. Statements: I. All roads are poles

II. No poles are bungalows

Conclusions: I. Some roads are bungalows

II. Some bungalows are poles

53. Statements: I. All Pens are ink.

II. No ink is an eraser.

Conclusions:

I. No pen is an eraser.

ii. Some erasers are pens.

54. GO = 32, SHE = 49, then SOME will be equal to

(a) 56

(b) 58

(c) 62

(d) 64

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

(a) SUITER

(b) VIOUER

(c) WALKER

(d) SUFFER

56. The number of ways in which 8 examination papers be arranged so that the best and worst papers never come together

(a) $8! - 2 \times 7!$

(b) $8! - 7!$

(c) $8!$

(d) $7!$

57. The sum of the infinite series $1 + 2/3 + 4/9 + \dots$ is

(a) $1/3$

(b) 3

(c) $2/3$

(d) none of these

58. Find the three numbers in G.P, whose sum is 19 and product is 216.

(a) 9,6,4 or 4,6,9

(b) 9,6,3 or 3,6,9

(c) 9,3,1 or 1,3,9

(d) 9,3, -1 or -1,3,9

59. If $\frac{p}{q} = \frac{r}{s} = \frac{p-r}{q-s}$ the process is called

(a) Subtrahendo

(b) Componendo

(c) Alternendo

(d) none of these

60. Nominal Rate of Return =

(a) Real Rate of Return – Inflation

- (b) Real Rate of Return + Inflation
- (c) Inflation - Real Rate of return
- (d) None of the above

PART-B STATISTICS

1. Vertical bar chart may appear somewhat alike

- (a) Histogram
- (b) Frequency Polygon
- (c) both
- (d) none

2. For overlapping class-intervals the class limit & class boundary are

- (a) same
- (b) not same
- (c) zero
- (d) none

3. Tally marks determines

- (a) class width
- (b) class boundary
- (c) class limit
- (d) class frequency

4. Age of a person is

- (a) An attribute
- (b) A discrete variable
- (c) A continuous variable
- (d) A variable.

5. The UCB is

- (a) An upper limit to UCL
- (b) A lower limit to LCL
- (c) Both (a) and (b)
- (d) (a) or (b).

6. 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.

7. For open-end classification, which of the following is the best measure of central tendency?

- (a) AM
- (b) GM
- (c) Median
- (d) Mode

8. For the following incomplete distribution of marks of 100 pupils, median mark is known to be 32.

Marks:	0–10	10–20	20–30	30–40	40–50	50–60
No. of Students:	10	–	25	30	–	10

What is the mean mark?

- (a) 32
- (b) 31
- (c) 31.30
- (d) 31.50

9. What is the value of mean and median for the following data:

Marks:	5–14	15–24	25–34	35–44	45–54	55–64
No. of Students:	10	18	32	26	14	10

(a) 30 and 28

(b) 29 and 30

(c) 33.68 and 37.94

(d) 34.21 and 33.18

10. The coefficient of mean deviation about mean for the first 9 natural numbers is

(a) $200/9$

(b) 80

(c) $400/9$

(d) 50.

11. The mean and SD for a group of 100 observations are 65 and 7.03 respectively. If 60 of these observations have mean and SD as 70 and 3 respectively, what is the SD for the group comprising 40 observations?

(a) 16

(b) 25

(c) 4

(d) 2

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

(a) $\text{Mean} - \text{Mode} = 3 (\text{Mean} - \text{Median})$

(b) $\text{Median} - \text{Mode} = 3 (\text{Mean} - \text{Median})$

(c) $\text{Mean} - \text{Median} = 3 (\text{Mean} - \text{Mode})$

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

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

(a) Range

(b) Mean deviation

(c) Standard deviation

(d) Quartile deviation

14. Statistics is applied in

(a) Economics

(b) Business management

(c) Commerce and industry

(d) All these

15. 'Stub' of a table is the

(a) Left part of the table describing the columns

(b) Right part of the table describing the columns

(c) Right part of the table describing the rows

(d) Left part of the table describing the rows

16. If for two events A and B, $P(A \cup B) = 1$, then A and B are

(a) Mutually exclusive events

(b) Equally likely events

(c) Exhaustive events

(d) Dependent events.

17. 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

18. For a group of students, 30%, 40% and 50% failed in Physics, Chemistry and at least one of the two subjects respectively. If an examinee is selected at random, what is the probability that he passed in Physics if it is known that he failed in Chemistry?

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{6}$

19. For three events A, B and C, the probability that only A occur is

- (a) $P(A)$
- (b) $P(A \cup B \cup C)$
- (c) $P(A' \cap B \cap C)$
- (d) $P(A \cap B' \cap C')$

20. 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

21. If x is a binomial variable with parameters n and p , then x can assume

- (a) any value between 0 and n .
- (b) any value between 0 and n , both inclusive
- (c) any whole number between 0 and n , both inclusive.
- (d) any number between 0 and infinity.

22. If the weekly wages of 5000 workers in a factory follows normal distribution with mean and SD as Rs 700 and Rs 50 respectively, what is the expected number of workers with wages between Rs 660 and Rs 720?

- (a) 2,050
- (b) 2,200
- (c) 2,218
- (d) 2,300

23. For a normal distribution with mean as 500 and SD as 120, what is the value of k so that the interval $[500, k]$ covers 40.32 per cent area of the normal curve? Given $\phi(1.30) = 0.9032$.

- (a) 740
- (b) 750
- (c) 656
- (d) 800

24. X is a binomial variable such that $2P(X = 2) = P(X = 3)$ and mean of X is known to be $10/3$. What would be the probability that X assumes at most the value 2?

- (a) $16/81$ (b) $17/81$ (c) $47/243$ (d) $46/243$

25. The interval $(\mu - 3\sigma, \mu + 3\sigma)$ covers

- (a) 95% area of a normal distribution.
(b) 96% area of a normal distribution
(c) 99% area of a normal distribution.
(d) all but 0.27% area of a normal distribution.

26. For a $p \times q$ classification of bivariate data, the maximum number of conditional distributions is

- (a) p (b) $p + q$ (c) pq (d) p or q

27. The two lines of regression are given by $8x + 10y = 25$ and $16x + 5y = 12$ respectively. If the variance of x is 25, what is the standard deviation of y?

- (a) 16 (b) 8 (c) 64 (d) 4

28. The following data relate to the heights of 10 pairs of fathers and sons:

(175, 173), (172, 172), (167, 171), (168, 171), (172, 173), (171, 170), (174, 173), (176, 175), (169, 170), (170, 173)

The regression equation of height of son on that of father is given by

- (a) $y = 100 + 5x$
(b) $y = 99.708 + 0.405x$
(c) $y = 89.653 + 0.582x$

(d) $y = 88.758 + 0.562x$

29. While computing rank correlation coefficient between profit and investment for the last 6 years of a company the difference in rank for a year was taken 3 instead of 4. What is the rectified rank correlation coefficient if it is known that the original value of rank correlation coefficient was 0.4?

- (a) 0.3 (b) 0.2 (c) 0.25 (d) 0.28

30. For 10 pairs of observations, No. of concurrent deviations was found to be 4. What is the value of the coefficient of concurrent deviation?

- (a) $\sqrt{0.2}$ (b) $-\sqrt{0.2}$ (c) $1/3$ (d) $-1/3$

31. Fisher's index number is based on

- (a) The Arithmetic mean of Laspeyre's and Paasche's index numbers
(b) The Median of Laspeyre's and Paasche's index numbers.
(c) The Mode of Laspeyre's and Paasche's index numbers
(d) The GM of Laspeyre's and Paasche's index numbers.

32. Purchasing Power of Money is

- (a) Reciprocal of price index number
(b) Equal to price index number.
(c) Unequal to price index number
(d) None of these.

33. Time Reversal Test is represented symbolically by :

- (a) $P_{01} \times P_{10}$

(b) $P_{01} \times P_{10} = 1$

(c) $P_{01} \times P_{10} \neq 1$

(d) None of these

34. During a certain period the cost of living index number goes up from 110 to 200 and the salary of a worker is also raised from Rs 330 to Rs 500. The worker does not get really gain. Then the real wages decreased by :

(a) Rs 45.45

(b) Rs 43.25

(c) Rs 100

(d) None of these

35. The average price of certain commodities in 1980 was ` 60 and the average price of the same commodities in 1982 was ` 120. Therefore, the increase in 1982 on the basis of 1980 was 100%. 80. The decrease in 1980 with 1982 as base is: using 1982, comment on the above statement is :

(a) The price in 1980 decreases by 60% using 1982 as base.

(b) The price in 1980 decreases by 50% using 1982 as base.

(c) The price in 1980 decreases by 90% using 1982 as base.

(d) None of these

36. The value index is equal to :

(a) The total sum of the values of a given year multiplied by the sum of the values of the base year.

(b) The total sum of the values of a given year Divided by the sum of the values of the base year.

(c) The total sum of the values of a given year plus by the sum of the values of the base year.

(d) None of these.

37. The trend values in freehand curve method are obtained by:

- (a) Equation of straight line
- (b) Graph
- (c) Second degree parabola
- (d) All of the above

38. The additive model of Time Series

- (a) $Y = T + S + C + I$
- (b) $Y = TSCI$
- (c) $Y = a + bx$
- (d) $y = a + bx + C \times 2$

39. A time series consists of:

- (a) No mathematical model
- (b) One mathematical model
- (c) Two mathematical models
- (d) Three mathematical models

40. The unsystematic sequence which follows irregular pattern of variations is called:

- (a) Noise
- (b) Signal
- (c) Linear
- (d) Non-linear