

**Question Paper**  
**Quantitative Methods – I (MB151): July 2008**

- Answer all 77 questions.
- Marks are indicated against each question.

**Total Marks : 100**

1. Which of the following quantitative methods helps managers predict the unknown value of a variable from the known variables? <Answer>
- (a) Correlation
  - (b) Regression
  - (c) Linear programming
  - (d) Index numbers
  - (e) Operations research.
- (1 mark) <Answer>
2. The decimal equivalent of  $(110010)_2$  is <Answer>
- (a)  $(50)_{10}$
  - (b)  $(60)_{10}$
  - (c)  $(70)_{10}$
  - (d)  $(80)_{10}$
  - (e)  $(90)_{10}$ .
- (1 mark) <Answer>
3. The values of x, y by solving the equations  $x + 2y = 12$  and  $3x + 2y = 18$  are <Answer>
- (a)  $x = 1, y = \frac{7}{2}$
  - (b)  $x = 2, y = \frac{9}{2}$
  - (c)  $x = 3, y = \frac{9}{2}$
  - (d)  $x = 4, y = \frac{7}{2}$
  - (e)  $x = 5, y = \frac{9}{2}$ .
- (1 mark) <Answer>
4. The roots of the quadratic equation  $2x^2 - 5x - 7 = 0$  are <Answer>
- (a)  $\frac{1}{2}, \frac{1}{2}$
  - (b)  $\frac{1}{4}, \frac{1}{2}$
  - (c)  $\frac{1}{4}, \frac{7}{4}$
  - (d)  $-1, \frac{7}{2}$
  - (e)  $-1, \frac{9}{4}$ .
- (1 mark) <Answer>
5. If  $p = x - 3y + z$  and  $q = 7x + 5y + 6z$ , then  $p + q = ?$  <Answer>
- (a)  $8x + 2y + 7z$
  - (b)  $8x - 2y + 7z$
  - (c)  $8x - 8y + 7z$
  - (d)  $8x + 2y + 5z$
  - (e)  $8x - 2y + 5z$ .
- (1 mark) <Answer>
6. The simplified form of the expression  $(p^2 q^8 r^{-2})^{\frac{3}{2}} \div (p^{-4} q^8 r^{-2})^{\frac{3}{4}}$  is <Answer>
- (1 mark)

- (a)  $p^3 q^6 r^{-\frac{3}{2}}$
- (b)  $p^6 q^6 r^{-\frac{3}{2}}$
- (c)  $p^6 q^6 r^{-\frac{1}{2}}$
- (d)  $p^6 q^2 r^{-\frac{3}{2}}$
- (e)  $p^2 q^6 r^{-\frac{3}{2}}$

7. What is the possible number of permutations of 8 different things taking 5 things at a time?

<Answer>

- (a) 2,006
- (b) 3,554
- (c) 6,720
- (d) 7,653
- (e) 8,620.

(1 mark)

<Answer>

8. The value of x in  $\log_{8\sqrt{2}} 256\sqrt[3]{4} = x$  is

- (a) 1.2356
- (b) 1.5642
- (c) 2.1368
- (d) 2.4762
- (e) 3.2564.

(1 mark)

<Answer>

9. The sum of the series 1, 4, 16, 64, ..... up to the 10<sup>th</sup> term is

- (a) 1,25,878
- (b) 1,50,569
- (c) 2,25,365
- (d) 2,45,126
- (e) 3,49,525.

(1 mark)

<Answer>

10. In an Arithmetical Progression (A.P) the first term is 4 and the last term is 24. The sum of all the terms in the A.P is 154. What is the common difference of the A.P?

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) 5.

(2 marks)

<Answer>

11. The y-intercept of the line passing through the points (5, 3) and (6, 4) is

- (a) -2
- (b) 6
- (c) 8
- (d) 10
- (e) 15.

(1 mark)

<Answer>

12. What is the value of 'x' if  $\log_3 x + \log_9 x + \log_{27} x + \log_{81} x + \log_{243} x = \frac{137}{60}$  ?

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) 5.

(1 mark)

<Answer>

13. Which of the following statement(s) is/are **true** regarding the characteristics of an ideal average?

- I. It should be mathematically expressed.
- II. It should be readily comprehensible and easy to calculate.
- III. It should be calculated based on all observations.
- IV. It should be least effected by extreme fluctuations in sampling data.

- (a) Only (I) above
- (b) Only (II) above

(1 mark)

- (b) Only (II) above
- (c) Only (III) above
- (d) Both (I) and (IV) above
- (e) All (I), (II), (III) and (IV) above.

14. What is the harmonic mean for the following quantities?

[<Answer>](#)

20, 15, 30, 22, 12, 25, 18, 16.

- (a) 16.3256
- (b) 17.2551
- (c) 18.3150
- (d) 25.7812
- (e) 30.2564.

(1 mark)

[<Answer>](#)

15. The value of mean and median of a distribution are 12.6 and 15.12 respectively. Then empirical mode will be

- (a) 20.1600
- (b) 25.3612
- (c) 30.4300
- (d) 31.2212
- (e) 50.1531.

(1 mark)

[<Answer>](#)

16. Which of the following is/are considered as positional average(s)?

- I. Arithmetic mean.
- II. Geometric mean.
- III. Harmonic mean.
- IV. Median.
- V. Mode.

- (a) Only (I) above
- (b) Only (II) above
- (c) Only (III) above
- (d) Only (IV) above
- (e) Both (IV) and (V) above.

(1 mark)

[<Answer>](#)

17. Consider the data given below:

Weight (kg)	No. of students
35 – 40	2
40 – 45	5
45 – 50	12
50 – 55	17
55 – 60	14
60 – 65	6
65 – 70	3
70 – 75	1

The modal weight for the above data is

- (a) 50.2561 kg
- (b) 52.3698 kg
- (c) 53.1250 kg
- (d) 56.1158 kg
- (e) 61.1158 kg.

(2 marks)

[<Answer>](#)

18. During a period of decline in stock market prices a stock is sold at Rs.50 per share on first day Rs.40 on the second day and Rs.25 on the third day. If an investor bought 100, 120 and 180 shares on the respective three days. The average price per share of his holdings is

- (a) Rs.10.75
- (b) Rs.11.75
- (c) Rs.25.75
- (d) Rs.35.75
- (e) Rs.45.75.

(1 mark)

[<Answer>](#)

19. The range for the dataset 20, 34, 11, 9, 45, 78, 90, 110, 234 is

(1 mark)

- (a) 100
- (b) 105
- (c) 110
- (d) 115
- (e) 225.

20. Which of the following measures of central tendency is appropriate for computing the average rate of change of quantities which vary over a period of time?

[<Answer>](#)

- (a) Arithmetic mean
- (b) Geometric mean
- (c) Harmonic mean
- (d) Median
- (e) Mode.

(1 mark)

21. The following data related to the sales figures of 5 companies for the year 2007:

[<Answer>](#)

Companies	Sales(in units)
Tata hydro	1,580
Tata power	1,325
Tata tea	1,625
Voltas	1,827
Andhra valley	1,954

The median sales for the data is

- (a) 1325
- (b) 1580
- (c) 1625
- (d) 1662
- (e) 1827.

(1 mark)

22. Which of the following is defined as the value of the variable which occurs most frequently in the data set?

[<Answer>](#)

- (a) Mean
- (b) Median
- (c) Mode
- (d) Range
- (e) Variance.

(1 mark)

23. The following table shows the wage distribution in a certain factory:

[<Answer>](#)

Daily wages (Rs.)	Number of employees
80-90	45
90-100	35
100-110	16
110-120	55
120-130	25
130-140	18
140-150	20

The quartile deviation for the wage distribution is

- (a) 15.6857
- (b) 19.6857
- (c) 19.7572
- (d) 20.7572
- (e) 29.7572.

(3 marks)

24. The first and third quartiles of a frequency distribution are 12.56 and 22.36 respectively. Then, the inter quartile range is

[<Answer>](#)

- (a) 6.25
- (b) 8.45
- (c) 9.80
- (d) 10.26
- (e) 11.26.

(1 mark)

[<Answer>](#)

25. Which of the following statement(s) is/are **true** with regard to the absolute mean deviation?

- I. Absolute mean deviation is simple and easy to understand.
- II. Absolute mean deviation is a more comprehensive measure of dispersion as it is dependent on all observations.
- III. As it is obtained by taking the average of the deviations of every observation from the mean, it is a true measure of dispersion.

- (a) Only (I) above
- (b) Only (II) above
- (c) Only (III) above
- (d) Both (I) and (II) above
- (e) All (I), (II) and (III) above.

(1 mark)

[<Answer>](#)

26. A security analyst studied 100 companies and obtained the following dividends of those companies during the year 2006:

Dividends declared (in %)	Number of companies
0 – 8	12
8 – 16	25
16 – 24	20
24 – 32	28
32 – 40	15

What is the standard deviation for the dividends?

- (a) 10.1252
- (b) 12.5461
- (c) 13.5892
- (d) 14.2053
- (e) 16.3244.

(2 marks)

[<Answer>](#)

27. The mean height of 25 male workers in a factory is 61 inches and the mean height of 45 female workers in the same factory is 58 inches. The combined mean of heights of 70 workers in the factory is

- (a) 55.6311 inches
- (b) 59.0714 inches
- (c) 61.2512 inches
- (d) 62.3616 inches
- (e) 65.6618 inches.

(1 mark)

[<Answer>](#)

28. If the variance of a data set is 4 and the mean is 20, then the coefficient of variation is

- (a) 5%
- (b) 8%
- (c) 10%
- (d) 20%
- (e) 30%.

(1 mark)

[<Answer>](#)

29. According to Bienayme - Chebyshev's rule what percentage of the observations in the population fall within  $\pm 1$  standard deviation from the mean approximately?

- (a) 68%
- (b) 75%
- (c) 85%
- (d) 95%
- (e) 99%.

(1 mark)

[<Answer>](#)

30. If  $A = \begin{bmatrix} 2 & 6 & 4 \\ 7 & 2 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 5 \\ 4 & 9 \\ 1 & 0 \end{bmatrix}$ , then the value of  $A \times B$  is

- (a)  $\begin{bmatrix} 34 & 64 \\ 30 & 53 \end{bmatrix}$
- (b)  $\begin{bmatrix} 30 & 68 \\ 30 & 54 \end{bmatrix}$

(1 mark)

(c)  $\begin{bmatrix} 27 & 54 \\ 31 & 43 \end{bmatrix}$

(d)  $\begin{bmatrix} 22 & 44 \\ 30 & 23 \end{bmatrix}$

(e)  $\begin{bmatrix} 22 & 46 \\ 30 & 24 \end{bmatrix}$ .

<Answer>

31. The co-factor of the element 5 in the matrix  $\begin{bmatrix} 2 & 9 & 1 \\ 4 & 0 & 5 \\ 7 & 8 & 3 \end{bmatrix}$  is given as

(a) 17

(b) 27

(c) 31

(d) 37

(e) 47.

(1 mark)

<Answer>

32.  $A = \begin{bmatrix} 5 & 4 & 2 \\ 2 & -8 & 0 \\ 3 & -4 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 4 & 1 & 3 \\ 8 & -1 & 4 \\ 2 & -7 & 6 \end{bmatrix}$  and  $C = \begin{bmatrix} 7 & 2 & 9 \\ 1 & -1 & 3 \\ 2 & 0 & 6 \end{bmatrix}$ , then  $(A + B) \times C =$

(a)  $\begin{bmatrix} 78 & 13 & 126 \\ 69 & 29 & 87 \\ 36 & 21 & 48 \end{bmatrix}$

(b)  $\begin{bmatrix} 78 & 13 & 126 \\ 63 & 21 & 87 \\ 36 & 21 & 48 \end{bmatrix}$

(c)  $\begin{bmatrix} 78 & 13 & 126 \\ 69 & 29 & 87 \\ 39 & 21 & 47 \end{bmatrix}$

(d)  $\begin{bmatrix} 78 & 12 & 136 \\ 69 & 29 & 88 \\ 36 & 26 & 48 \end{bmatrix}$

(e)  $\begin{bmatrix} 78 & 10 & 126 \\ 68 & 20 & 87 \\ 36 & 21 & 48 \end{bmatrix}$ .

(2 marks)

<Answer>

33. Which of the following matrix is non-singular?

(a)  $\begin{bmatrix} 1 & 2 \\ 3 & 6 \end{bmatrix}$

(b)  $\begin{bmatrix} 1 & 1 \\ 3 & 6 \end{bmatrix}$

(c)  $\begin{bmatrix} 3 & 6 \\ 3 & 6 \end{bmatrix}$

(d)  $\begin{bmatrix} 12 & 4 \\ 3 & 1 \end{bmatrix}$

(e)  $\begin{bmatrix} 6 & 12 \\ 3 & 6 \end{bmatrix}$ .

(1 mark)

<Answer>

34. If  $A = \begin{bmatrix} 8 & 1 & 6 \\ 9 & 2 & 8 \\ 8 & 1 & 6 \end{bmatrix}$ , then determinant of A is

- (a) 0
- (b) 2
- (c) 4
- (d) 6
- (e) 8.

(1 mark)

<Answer>

35. The inverse of matrix  $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$  is

(a)  $\begin{bmatrix} \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ \frac{5}{2} & 0 & \frac{1}{2} \end{bmatrix}$

(b)  $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ 4 & 3 & 1 \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$

(c)  $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ \frac{5}{2} & \frac{3}{2} & \frac{1}{2} \end{bmatrix}$

(d)  $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$

(e)  $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ 2 & 2 & 2 \\ -4 & 2 & 1 \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2} \end{bmatrix}$

(3 marks)

<Answer>

36. A matrix  $P = \begin{bmatrix} 7 & 0 & 0 \\ 8 & 2 & 0 \\ 1 & 5 & 3 \end{bmatrix}$  is called as a

- (a) Upper triangular matrix
- (b) Lower triangular matrix
- (c) Rectangular matrix
- (d) Diagonal matrix
- (e) Scalar matrix.

(1 mark)

<Answer>

37. Which of the following method(s) is/are used to solve linear equations by matrix method?

- I. Matrix inversion method.
- II. Cramer's rule method.
- III. Gauss-Jordan elimination method.

- (a) Only (I) above

(1 mark)