

Reg. No. :

Code No. : 31007 E Sub. Code : CMCO 41

B.Com. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2025.

Fourth Semester

Commerce — Core

QUANTITATIVE TECHNIQUES

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. The name of the vertical line in the Cartesian plane which determines the position of a point is called _____.

(a) Y-axis

(b) X-axis

(c) Origin

(d) Quadrants

2. Abscissa of all the points on the x -axis is _____.

- (a) 0
- (b) 1
- (c) 2
- (d) Any number

3. For any two matrices A and B , we have _____.

- (a) $AB = BA$
- (b) $AB \neq BA$
- (c) $AB = O$
- (d) None of these

4. If A is a skew-symmetric matrix, then A^2 is a _____.

- (a) Skew symmetric matrix
- (b) Null matrix
- (c) Symmetric matrix
- (d) Cannot be determined

5. When the values in a series do not have equal importance, we calculate the _____.

- (a) Mode
- (b) Weighted mean
- (c) Arithmetic mean
- (d) None of these

6. The sum of deviations from the _____ is always zero.

- (a) Mean
- (b) Mode
- (c) Median
- (d) None of these

7. Which of the following statements is true for correlation analysis?

- (a) It is a univariate analysis
- (b) It is a multivariate analysis
- (c) It is a bivariate analysis
- (d) Both (a) and (c)

8. The original hypothesis is known as _____.

- (a) Alternate hypothesis
- (b) Null hypothesis
- (c) Both (a) and (b) are incorrect
- (d) Both (a) and (b) are correct

8. Welche Variable ist in $2x^2 + 3x - 5 = 0$?

- a) Disjunktion b) $\wedge$ -Verknüpfung
c) Konjunktion d) Negation

9. In einem Kartenspiel gibt es 52 Karten. Wie viele Karten gibt es in einem Kartenspiel?

- a) 13 b) 26
c) 52 d) 104

10. Wie viele Karten gibt es in einem Kartenspiel?

11. Wie viele Karten gibt es in einem Kartenspiel?

12. Wie viele Karten gibt es in einem Kartenspiel?

13.

14. Wie viele Karten gibt es in einem Kartenspiel?

15. Wie viele Karten gibt es in einem Kartenspiel?

16. Wie viele Karten gibt es in einem Kartenspiel?

$$x = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

17.

18. Wie viele Karten gibt es in einem Kartenspiel?

$$x = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

19. Wie viele Karten gibt es in einem Kartenspiel?

20. Wie viele Karten gibt es in einem Kartenspiel?

21. Wie viele Karten gibt es in einem Kartenspiel?

22.

23. Wie viele Karten gibt es in einem Kartenspiel?

24. Wie viele Karten gibt es in einem Kartenspiel?

25. Wie viele Karten gibt es in einem Kartenspiel?

26. Wie viele Karten gibt es in einem Kartenspiel?

27. Wie viele Karten gibt es in einem Kartenspiel?

28. Wie viele Karten gibt es in einem Kartenspiel?

29. Wie viele Karten gibt es in einem Kartenspiel?

30.

31. Wie viele Karten gibt es in einem Kartenspiel?

- (b) The data below shows the age of workers (X in years) and their productivity score (Y).

X (Age)	25	30	35	40	45
Y (Score)	70	65	60	55	60

Obtain the regression line of Y on X .

15. (a) Find the weighted aggregate price index :

Commodity	P_0	P_1	Q_0
X	8	10	15
Y	6	8	20

Or

- (b) The yearly production of a factory is :

Year	Production (Units)
2016	100
2017	120
2018	140
2019	160
2020	180

Fit a linear trend using the least squares method and find the trend value for 2021.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions by choosing (a) or (b).

Each answer should not exceed 600 words.

16. (a) Derive the equation of a hyperbola whose transverse axis lies on the x -axis. Discuss its foci, vertices and eccentricity.

Or

- (b) Explain the method of finding the image of a point in a given line using analytical geometry.

17. (a) Solve the system of equations using matrix inversion method :

$$2x + y + z = 3, \quad x - y + 2z = 3, \quad 3x + y + z = 4.$$

Or

- (b) Find the transpose of a matrix :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & -1 \\ 5 & 0 \end{bmatrix}$$

18. (a) The marks obtained by 100 students in an examination are given below :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	5	10	25	30	20	10

Find the mode of marks.

Or

- (b) The following data give the marks obtained by students in a test :

Marks	10	20	30	40	50
No. of Students	4	6	10	8	2

Find the variance and standard deviation of the distribution.

19. (a) The following data shows the relationship between height (X in cm) and weight (Y in kg) of 8 individuals :

Height (X)	160	162	165	167	170	172	175	177
Weight (Y)	55	57	58	59	60	63	65	66

Compute the correlation coefficient between height and weight.

Or

- (b) The following data represents the age (X in years) and blood pressure (Y) of 10 persons :

X (Age)	32	34	36	38	40	42	44	46	48	50
Y (B.P.)	120	125	128	130	133	135	137	140	142	145

Fit a regression line of Y on X and estimate the blood pressure for a person aged 45 years.

20. (a)

Commodity	P0	P1	Q0	Q1
A	10	12	20	22
B	8	10	15	18
C	12	15	10	12

- (i) Compute Laspeyres Price Index
(ii) Compute Paasche Price Index
(iii) Compute Fisher's Ideal Index

Or

- (b) The monthly production (in tons) of a factory is given below :

Month	1	2	3	4	5	6	7	8	9	10	11	12
Production	80	85	90	95	100	110	120	125	130	135	140	150

- (i) Calculate the 3 monthly moving average.
 - (ii) Identify the trend values.
 - (iii) Plot the original series and trend series.
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