(8 pages)

Reg. No. : ....

Code No. : 32087 E   Sub. Code : CMCO 41

B.Com. (CBCS) DEGREE EXAMINATION,
APRIL 2024

Fourth Semester

Commerce – Core

QUANTITATIVE TECHNIQUES

(For those who joined in July 2021-2022)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. If C is distance between two points $(0,0)$ and $(1,2)$ and D is distance between two points $(1,2)$ and $(2,1)$, then:

   (a) $C > D$

   (b) $C = D$

   (c) $C < D$

   (d) $D = C$

2. X-component of $P(x, y)$ is known as

   (a) Abscissa of P

   (b) Ordinate

   (c) Coordinates of P

   (d) Distance of P from origin

3. If A is $m \times n$ matrix such that AB and BA both are defined, then B is a matrix of order

   (a) $n \times n$ (b) $m \times m$

   (c) $m \times n$ (d) $n \times m$

4. If M is a 7×5 matrix of rank 3 and N is a 5×7 matrix of rank 5, then rank (MN) is

   (a) 5   (b) 3

   (c) 2   (d) 1

5. Which measure of central tendency includes the magnitude of scores?

   (a) Mean   (b) Median

   (c) Mode   (d) Range

6. ——————— divides the data into four equal parts.

   (a) Quartiles   (b) Median

   (c) Mode   (d) Mean

7. What are the limits of the correlation coefficient?

(a) − 1 to +1

(b) 0 to 1

(c) − 0 to −1

(d) + 0 to + 1

8. Which of the following techniques is an analysis of the relationship between two variables to help provide the prediction mechanism?

(a) Standard error

(b) Correlation

(c) Regression

(d) None of the above

9. The time period for which an index number is determined is known as

(a) Base period

(b) Normal period

(c) Current period

(d) None of the above

10. Which of the following methods is used to calculate the Consumer Price Index?

(a) Laspeyres's formula

(b) Fisher's formula

(c) Palgrave's formula

(d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Find the slope of a line between the points $P = (0, -1)$ and $Q = (4, 1)$.

Or

(b) Find the slope of a line between $P(-2, 3)$ and $Q(0, -1)$.

12. (a) What are the different types of matrices with examples?

Or

(b) If the matrix $A = \begin{bmatrix} -18 \\ -15 \\ 21 \end{bmatrix}$ then what is the scalar multiple $(-1/3) A$?

13. (a) Explain the mean, median and mode with examples.

Or

(b) Calculate the coefficient of skewness for the following data :

1, 2, 3, 4, 5, 6, 7, 8, 9, 9.

14. (a) Calculate the rank correlation co-efficient between 'X' and 'Y' variables.

    X: 10 20 35 14 18 21 16

    Y: 15 25 18 19 20 26 27

    Or

    (b) Calculate the regression coefficients for the following data:

    $(X = 247, Y = 486, XY = 20485, X^2 = 11409, Y^2 = 40022)$

15. (a) Find the value index number for the given data:

Items	Base Year		Current Year	
	Quality	Price	Quality	Price
A	3	5	2	8
B	7	4	5	6
C	4	7	3	10
D	6	6	5	7

    Or

    (b) Calculate Price Index Number for 2016 from the following data by simple aggregate method, taking 2016 as base year.

Commodities	Price kg	
	2015	2016
Apple	100	140
Orange	30	40
Pomegranate	120	130
Guava	40	50

16. (a) Using point of intersection formula, find the point of intersection of two lines $2x + 4y + 2 = 0$ and $2x + 3y + 5 = 0$.

    Or

    (b) Find the intersection point of the straight lines: $3x + 5y - 6 = 0$ and $5x - y - 10 = 0$.

17. (a) Solve the following equation using matrix method

    $5x - 6y + 4z = 15$

    $7x - 4y - 3z = 19$

    $2x + y + 6z = 46$

    Or

    (b) Let $A = \begin{pmatrix} 2 & -1 \\ 3 & 6 \end{pmatrix}$. Find the matrix X such that : $2A + 3X = -4A$.

18. (a) A garden contains 39 plants. The following plants were chosen at random, and their heights were recorded in cm: 38, 51, 46, 79, and 57. Calculate their heights' standard deviation.

    Or

(b) Let's take the same idea as the previous example. However, this time, let's compare it to last year's test scores. Calculate the standard deviation and state whether the data is more or less spread than this year's test scores.

Last Year's Test Taker:	1	2	3	4	5	6	7	8	9	10
Score:	45	50	67	68	75	80	70	65	70	90

19. (a) Determine the Coefficient of Correlation between X and Y.

Items	Series X	Series Y
Number of items	30	30
Standard deviation	4	3

The summation of the product of deviations of Series X and Y from their respective means is 200.

Or

(b) Find linear regression equation for the following two sets of data:

x: 2 4 6 8

y: 3 7 5 10

20. (a) The sales of a commodity in tones varied from January 2010 to December 2010 as follows:

In year 2010:	Jan	Feb	Mar	Apr	May	Jun
Sales (in tones):	280	240	270	300	280	290

In year 2010:	Jul	Aug	Sep	Oct	Nov	Dec
Sales (in tones):	210	200	230	200	230	210

Fit a trend line by the method of semi-average.

Or

(b) Calculate four-yearly moving averages of number of students studying in a higher secondary school in a particular city from the following data.

Year:	2001	2002	2003	2004	2005	2006	2007	2008
Sales:	124	120	135	140	145	158	162	170

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