2023/TDC(CBCS)/EVEN/SEM/ COMDSC-202T/397

TDC (CBCS) Even Semester Exam., 2023

COMMERCE

(2nd Semester)

Course No. : COMDSC-202T

(Business Mathematics and Statistics)

Full Marks : 70 Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION-A

Answer any *twenty* questions :

1×20=20

1. Find the minor of 1 in the determinant

2. What is triangular matrix?

3. If
$$f(x) = 2x^2 + 3x + 2$$
, find $f(0)$.

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4. Evaluate :

$$\lim_{x \to 2} \frac{2x^2 - 8}{x - 2}$$

- **5.** Distinguish between $\lim_{x \to a} f(x)$ and f(a).
- **6.** Find the derivatives w.r.t. x of \sqrt{x} .

7. Define demand function.

8. Define continuity of f(x) at x = a.

9. If
$$y = 2x$$
, find $\frac{d^2y}{dx^2}$.

- 10. Define extreme values.
- 11. Define arithmetic mean.
- 12. Calculate the mode of4, 3, 2, 5, 3, 4, 5, 1, 7, 3, 2, 1
- 13. What is positive skewness?

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- 14. What is the range of correlation coefficient?
- **15.** What is index number?
- 16. What is least square method of measuring trend?
- 17. What is meant by dispersion?
- **18.** Fill up the blank : $(GM)^2 = AM \times$
- 19. Calculate the AM of

32, 36, 35, 37, 39, 41, 43

- 20. Write one example of linear correlation.
- 21. State the formula of Laspeyre's index.
- 22. What is deflating of index number?
- **23.** Differentiate between correlation and regression.
- 24. Calculate the range of

47, 50, 49, 70, 63, 55, 81

25. Find GM of 3, 9, 27.

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SECTION-B

Answer any five questions :

 $2 \times 5 = 10$

26. If

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

find BA.

27. If

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$$

show that $A^2 - 3I = 2A$.

28. What is meant by 'central tendency'?

29. Compute correlation coefficient :

$$n = 25$$
, $\Sigma x = 125$, $\Sigma y = 100$,
 $\Sigma x^2 = 650$, $\Sigma y^2 = 460$, $\Sigma xy = 508$

30. Write two uses of index numbers.

- **31.** What do you understand by 'time series analysis'?
- 32. Mention two merits of arithmetic mean.
- **33.** Find the median of 10, 6, 15, 2, 3.

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- 34. Explain secular trend.
- **35.** The average weekly pocket money of 5 students in rupees are as follows :

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45, 50, 70, 30, 55

Calculate harmonic mean.

SECTION-C

Answer any five questions :

36. (a) If

$$A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{bmatrix}$$

show that $A^2 - 3A + 2I = 0$.

(b) Find the adjoint and inverse of

[1	3	3]
1	4	3
1	3	4

4+4=8

8×5=40

37. (a) If

$$A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -1 & 4 \end{bmatrix}$$
find AA^{T} and $A^{T}A$.

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(b) Solve the following systems of equations matrix method :

$$2x + 4y + z = 5$$

 $x + y + z = 6$
 $2x + 3y + z = 6$ $3+5=8$

38. (a) Find $\frac{dy}{dx}$ (any two) : 2+2=4 (i) $y = x \log x$ (ii) $y = x^3 + y^3 - 3axy$ (iii) $y = (x+6)^3 dx$

- (b) For what values of x, the function $x^3 9x^2 + 24x 12$ is a maximum or a minimum?
- **39.** (a) Evaluate :

$$\lim_{x \to 0} \frac{2 - \sqrt{4 - x^2}}{x^2}$$

(b) If

$$f(x) = \begin{cases} 4x + 3 & \text{for } x \neq 4\\ 3x + 7 & \text{for } x = 4 \end{cases}$$

find whether the function is continuous at x=4. 4+4=8

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- 40. (a) From the following table, find mode : Age (in years) : 20-25 25-30 30-35 35-40 40-45 No. of persons : 50 70 100 180 150
 - (b) Mention two merits and demerits of median. 4+4=8
- **41.** (a) Find the standard deviation from the following data : 5, 8, 7, 11, 9, 10, 8, 2, 4, 6
 - (b) Find out the mean deviation about median of the following :
 31, 35, 29, 63, 55, 72, 37 4+4=8
- **42.** (a) Obtain the lines of regression : x : -10 -5 0 5 10 y : 5 9 7 11 13
 - (b) Write two properties of correlation coefficients. 6+2=8
- **43.** (a) Fit a linear trend by the method of least squares :

Year : 2015 2016 2017 2018 2019 2020 Production

(in crores) : 7 10 12 14 17 24

(b) What are the uses of time series? 5+3=8

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- **44.** (a) Write a short note on time reversal test and factor reversal test.
 - (b) What is cost living index number? 6+2=8
- **45.** For the variables X and Y, the two lines of regression are given by 3x + 2y 25 = 0 and 6x + y 30 = 0.
 - (a) Identify the lines of regression of X on Y and Y on X.
 - (b) Find the correlation coefficient between X and Y. 4+4=8

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