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: $1 \times 20 = 20$

1. Find the minor of 1 in the determinant

$$\begin{vmatrix}
2 & -3 & 5 \\
5 & 2 & -7 \\
-4 & 2 & 1
\end{vmatrix}$$

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?

J23/554

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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 :

$$(GM)^2 = AM \times \underline{\hspace{1cm}}$$

19. Calculate the AM of

- 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

25. Find GM of 3, 9, 27.

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SECTION_B

Answer any five questions :

2×5=10

26. If

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

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.

J23/554 (Continued)

(5)

34. Explain secular trend

35. The average weekly pocket money of 5 students in rupees are as follows:

Calculate harmonic mean.

SECTION-C

Answer any five questions:

8×5=40

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

37. (a) If

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

find AA^T and A^TA .

J23/**554**

(Turn Over)



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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) $y = x \log x$

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- (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.

J23/554

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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

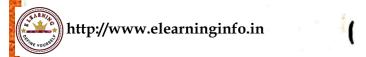
- (b) Write two properties of correlation coefficients. 6+2=8
- **43.** (a) Fit a linear trend by the method of least squares:

 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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