SRI RAGHAVENDRA TUITION CENTER

Unit -7

11th Standard

Maths

Date : 28-06-24

Reg.No. :

Exam Time : 01:30 Hrs Total Marks : 50

T

EACHER NAME: P.DEEPAK M.Sc.,M.A.,B.Ed.,DCA.,TET-1.,TET-2.,

PHONE NUMBER : 9944249262

EMAIL: darthi99ktp@gmail.com

I. ANSWER ALL QUESTION 10 x 1 = 10

1) Which one of the following is not true about the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{bmatrix}$?

(a) a scalar matrix (b) a diagonal matrix (c) an upper triangular matrix (d) a lower triangular matrix

2) If A = $\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, B = $\begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then the values of a and b are

(a) a = 4, b = 1 (b) a = 1, b = 4 (c) a = 0, b = 4 (d) a = 2, b = 4

3) If A is a square matrix, then which of the following is not symmetric?

(a) $A + A^T$ (b) AA^T (c) $A^T A$ (d) $A - A^T$

4) If $\begin{vmatrix} 2a & x_1 & y_1 \\ 2b & x_2 & y_2 \\ 2c & x_3 & y_3 \end{vmatrix} = \frac{abc}{2} \neq 0$, then the area of the triangle whose vertices are $\left(\frac{x_1}{a}, \frac{y_1}{a}\right)$, $\left(\frac{x_2}{b}, \frac{y_2}{b}\right)$, $\left(\frac{x_3}{c}, \frac{y_3}{c}\right)$ is

(a) $\frac{1}{4}$ (b) $\frac{1}{4}abc$ (c) $\frac{1}{8}$ (d) $\frac{1}{8}abc$

5) If the points (x,−2), (5, 2), (8, 8) are collinear, then x is equal to

(a) -3 (b) $\frac{1}{3}$ (c) 1 (d) 3

6) If A = $\begin{vmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 4 & 2 \end{vmatrix}$ and B = $\begin{vmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \\ -2 & 4 & 8 \end{vmatrix}$, then B is given by

(a) B = 4A (b) B = -4A (c) B = -A (d) B = 6A

7) If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in geometric progression with the same common ratio, then the points (x_1, y_1), (x_2, y_2), (x_3, y_3) are

(a) vertices of an equilateral triangle (b) vertices of a right angled triangle (c) vertices of a right angled isosceles triangle

(d) collinear

8) If $\triangle = \begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix}$, then $\begin{vmatrix} ka & kb & kc \\ kx & ky & kz \\ kp & kq & kr \end{vmatrix}$ is

(a) $\triangle$ (b) $k\triangle$ (c) $3k\triangle$ (d) $k^3\triangle$

9) If $\lfloor . \rfloor$ denotes the greatest integer less than or equal to the real number under consideration and $-1 \leq x < 0$, $0 \leq y < 1$, $1 \leq z < 2$, then the value of the determinant $\begin{vmatrix} \lfloor x \rfloor + 1 & \lfloor y \rfloor & \lfloor z \rfloor \\ \lfloor x \rfloor & \lfloor y \rfloor + 1 & \lfloor z \rfloor \\ \lfloor x \rfloor & \lfloor y \rfloor & \lfloor z \rfloor + 1 \end{vmatrix}$ is

(a) $\lfloor z \rfloor$ (b) $\lfloor y \rfloor$ (c) $\lfloor x \rfloor$ (d) $\lfloor x \rfloor + 1$

10) If A + I = $\begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$, then (A + I)(A - I) is equal to

(a) $\begin{bmatrix} -5 & -4 \\ 8 & -9 \end{bmatrix}$ (b) $\begin{bmatrix} -5 & 4 \\ -8 & 9 \end{bmatrix}$ (c) $\begin{bmatrix} 5 & 4 \\ 8 & 9 \end{bmatrix}$ (d) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$

II. ANSWER ANY 5 QUESTION 5 x 2 = 10

11) Construct an m × n matrix A = $[a_{ij}]$, where a_{ij} is given by
$a_{ij} = \frac{(i-2j)^2}{2} with\ m = 2, n = 3$

12) Find |A| if A = $\begin{bmatrix} 0 & sin\alpha & cos\alpha \\ sin\alpha & 0 & sin\beta \\ cos\alpha & -sin\beta & 0 \end{bmatrix}$.

13) Evaluate : $\begin{vmatrix} cos\theta & sin\theta \\ -sin\theta & cos\theta \end{vmatrix}$

14) Express the following matrices as the sum of a symmetric matrix and a skew-symmetric matrix:
$\begin{bmatrix} 4 & -2 \\ 3 & -5 \end{bmatrix}$

15) Without expanding, evaluate the following determinants:
$\begin{vmatrix} 2 & 3 & 4 \\ 5 & 6 & 8 \\ 6x & 9x & 12x \end{vmatrix}$

16) Evaluate $\begin{vmatrix} 2014 & 2017 & 0 \\ 2020 & 2023 & 1 \\ 2023 & 2026 & 0 \end{vmatrix}$

17) If the area of the triangle with vertices (- 3, 0), (3, 0) and (0, k) is 9 square units, find the values of k.

18) Show that $\begin{vmatrix} b+c & bc & b^2c^2 \\ c+a & ca & c^2a^2 \\ a+b & ab & a^2b^2 \end{vmatrix} = 0$

III. ANSWER ANY 5 QUESTION 5 x 3 = 15

19) Compute |A| using Sarrus rule if A= $\begin{bmatrix} 3 & 4 & 1 \\ 0 & -1 & 2 \\ 5 & -2 & 6 \end{bmatrix}$.

20) Prove that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix}$ = (x - y) (y - z) (z - x).

21) Find the value of x if $\begin{vmatrix} x-1 & x & x-2 \\ 0 & x-2 & x-3 \\ 0 & 0 & x-3 \end{vmatrix} = 0$

22) Prove that $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2$

23) If A is a square matrix and | A | = 2, find the value of | AA^T | .

24) Verify that | AB | = | A | | B | if A = $\begin{bmatrix} cos\theta & -sin\theta \\ sin\theta & cos\theta \end{bmatrix}$ and B = $\begin{bmatrix} cos\theta & sin\theta \\ -sin\theta & cos\theta \end{bmatrix}$

25) Find the area of the triangle whose vertices are (0, 0), (1, 2) and (4, 3).

IV. ANSWER ALL QUESTION 3 x 5 = 15

26) a) Solve the following problems by using Factor Theorem :

Show that $\begin{vmatrix} b+c & a-c & a-b \\ b-c & c+a & b-a \\ c-b & c-a & a+b \end{vmatrix} = 8abc$

(OR)

b) Prove that $\begin{vmatrix} 1 & x^2 & x^3 \\ 1 & y^2 & y^3 \\ 1 & z^2 & z^3 \end{vmatrix}$ = (x - y)(y - z)(z - x)(xy + yz + zx).

27) a)

Without expanding the determinants, show that | B | = 2| A |.

Where B = $\begin{bmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{bmatrix}$ and A = $\begin{bmatrix} a & b & c \\ b & c & a \\ c & a & b \end{bmatrix}$

(OR)

b)

Show that $\begin{vmatrix} 2bc-a^2 & c^2 & b^2 \\ c^2 & 2ca-b^2 & a^2 \\ b^2 & a^2 & 2ab-c^2 \end{vmatrix} = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}^2$.

28) a)

Prove that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$.

(OR)

b)

Solve the following problems by using Factor Theorem :

Solve $\begin{vmatrix} 4-x & 4+x & 4+x \\ 4+x & 4-x & 4+x \\ 4+x & 4+x & 4-x \end{vmatrix} = 0$.

ALL THE BEST

****