TIPS & TIRCKS
Study Centre *for fundamental studies*
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MATHS

CLASS: XII   **Determinants**

Time: 1Hr. 15 Min.   **M.M.: 38**

Attempt all the questions.

1. Find the value of λ , so that may $\begin{bmatrix} 7 & 1 \\ 2 & \lambda \end{bmatrix}$ be singular. [1]

2. Solve for x, $\begin{vmatrix} x & 3 \\ 5 & 2x \end{vmatrix} = \begin{vmatrix} 5 & -4 \\ 5 & 3 \end{vmatrix}$ [1]

3. If $|A| = 5$, find $\left|(A^{-1})\right|^t$. [1]

4. For what value of k, the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ has no inverse. [1]

5. Using properties of determinants show that: [4]

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}) = abc + bc + ca + ab$$

6. If x,y,z are different and [4]

$$\Delta = \begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0 , \text{ then show that 1+xyz=0}$$

7. Using properties of determinants prove that [4]

$$\begin{vmatrix} x+y+2z & x & y \\ z & y+z+2x & y \\ z & x & z+x+2y \end{vmatrix} = 2(x+y+z)^3$$

8. Using properties of determinants, prove that: [4]

$$\begin{vmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ca \\ (a+b)^2 & c^2 & ab \end{vmatrix} = (a^2+b^2+c^2)(a+b+c)(b-c)(c-a)(a-b)$$

9. The cost of 4 kg onions, 3kg wheat and 2 kg rice is 60. The cost of 2 kg onions, 4kg wheat and 6 kg rice is 90. The cost of 6 kg onions, 2kg wheat and 3 kg rice is 70. Find the per kg cost of each of the three commodities. [6]

10. Solve the following system of equations: [6]

$$x+y+z=6$$
$$x+2y+3z=14$$
$$x+4y+7z=30$$

11. Find the product of the matrices $A = \begin{bmatrix} -5 & 1 & 3 \\ 7 & 1 & -5 \\ 1 & -1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 2 & 1 \\ 2 & 1 & 3 \end{bmatrix}$ and use it for solving the equations [6]

$$x + y + 2z = 1$$
$$3x + 2y + z = 7$$
$$2x + y + 3z = 2$$

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