

Class – 12<sup>th</sup>

Chapter-4

Subject Maths

Worksheet-17

Determinant

1. If  $p + q + r = 0$  then prove that

$$\begin{vmatrix} pa & qb & rc \\ qc & ra & pb \\ rb & pc & qa \end{vmatrix} = pqr \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & a \end{vmatrix}$$

2. If  $a + b + c = 0$  then solve the following equation

$$\begin{vmatrix} a-x & c & b \\ c & b-x & a \\ b & a & c-x \end{vmatrix} = 0.$$

3. Prove that one root of the equation is  $x = 2$  and hence find the remaining roots

$$\begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{vmatrix} = 0.$$

4. Prove that:  $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ca & cb & -c^2 \end{vmatrix} = 4a^2b^2c^2.$

5. Evaluate the determinant:  $\begin{vmatrix} 1+a & b & c \\ a & 1+b & c \\ a & b & 1+c \end{vmatrix}$

6. If  $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$  and cofactors corresponding to elements  $a_{11}, a_{12}, a_{13}, \dots$  are  $F_{11}, F_{12}, F_{13}, \dots$

then the correct statement is

(a)  $a_{12}F_{12} + a_{22}F_{22} + a_{32}F_{32} = 0$

(b)  $a_{12}F_{12} + a_{22}F_{22} + a_{32}F_{32} \neq \Delta$

(c)  $a_{12}F_{12} + a_{22}F_{22} + a_{32}F_{32} = \Delta$

(d)  $a_{12}F_{12} + a_{22}F_{22} + a_{32}F_{32} = -\Delta.$