

Chapter 6 Determinants Ex 6.2 Q2(i)

Apply: 
$$R_3 \to R_3 - R_2$$
  
=  $\begin{vmatrix} 8 & 2 & 7 \\ 12 & 3 & 5 \\ 4 & 1 & -2 \end{vmatrix}$ 

Apply: 
$$R_2 \rightarrow R_2 - R_1$$
  
=  $\begin{vmatrix} 8 & 2 & 7 \\ 4 & 1 & -2 \\ 4 & 1 & -2 \end{vmatrix}$ 

Since,  $R_3 = R_2$ , the value of the determinant is zero.

Chapter 6 Determinants Ex 6.2 Q2(ii)

Taking (-2) common from  $C_1$ , we get

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

= 0

 $\odot$   $C_1$  and  $C_2$  are identical.

Chapter 6 Determinants Ex 6.2 Q2(iii)

$$\therefore R_3 = R_1$$

Chapter 6 Determinants Ex 6.2 Q2(iv)

of Determinants
$$\begin{vmatrix} \frac{1}{a} & a^2 & bc \\ \frac{1}{b} & b^2 & ca \\ \frac{1}{c} & c^2 & ab \end{vmatrix}$$

 $\mathsf{Multiply:} R_1, R_2 \text{ and } R_3 \text{ by } \mathit{a,b} \text{ and } \mathit{c} \text{ respectively, we get}$ 

$$= \frac{1}{abc} \begin{vmatrix} 1 & a^3 & abc \\ 1 & b^3 & bca \\ 1 & c^3 & cab \end{vmatrix}$$

Take abc common from  $C_3$ , we get,

$$\begin{vmatrix} 1 & a^3 & 1 \\ 1 & b^3 & 1 \\ 1 & c^3 & 1 \end{vmatrix} = 0$$

$$C_1 = C_3$$

Chapter 6 Determinants Ex 6.2 Q2(v)

Apply:
$$C_2 \rightarrow C_2 - C_1$$

$$\begin{vmatrix} a+b & a & a \\ 2a+b & a & a \\ 4a+b & a & a \end{vmatrix}$$

$$C_3 = C_2$$

Chapter 6 Determinants Ex 6.2 Q2(vi)

$$\begin{vmatrix} 1 & a & a^{2} - bc \\ 1 & b & b^{2} - ac \\ 1 & c & c^{2} - ab \end{vmatrix}$$

$$= \begin{vmatrix} 1 & a & a^{2} \\ 1 & b & b^{2} \\ 1 & c & c^{2} \end{vmatrix} \begin{vmatrix} 1 & a & bc \\ 1 & b & ac \\ 1 & c & ab \end{vmatrix}$$

$$= \begin{vmatrix} 1 & a & a^{2} \\ 0 & b - a & b^{2} - a^{2} \\ 0 & c - a & c^{2} - a^{2} \end{vmatrix} - \begin{vmatrix} 1 & a & bc \\ 0 & b - a & (a - b)c \\ 0 & c - a & (a - c)b \end{vmatrix}$$

$$= (b - a)(c - a) \begin{vmatrix} 1 & a & a^{2} \\ 0 & 1 & b + a \\ 0 & 1 & c + a \end{vmatrix} - (b - a)(c - a) \begin{vmatrix} 1 & a & bc \\ 0 & 1 & -c \\ 0 & 1 & -b \end{vmatrix}$$

$$= (b - a)(c - a)(c + a - b - a) - (b - a)(c - a)(-b + c)$$

$$= (b - a)(c - a)(c - b) - (b - a)(c - a)(-b + c)$$

$$= 0$$

Chapter 6 Determinants Ex 6.2 Q2(vii)

Apply: 
$$C_1 \rightarrow C_1 + (-8)C_3$$

$$\begin{vmatrix} 1 & 1 & 6 \\ 7 & 7 & 4 = 0 \\ 2 & 2 & 3 \end{vmatrix}$$

$$C_1 = C_2$$

Chapter 6 Determinants Ex 6.2 Q2(viii)

Multiply  $\mathrm{C_1}$ ,  $\mathrm{C_2}$  and  $\mathrm{C_3}$  by z, y, and x respectively

$$= \frac{1}{xyz} \begin{vmatrix} 0 & xy & yx \\ -xz & 0 & zx \\ -yz & -zy & 0 \end{vmatrix}$$

Take y, x, and z common from  $R_1$ ,  $R_2$  and  $R_3$  respectively

$$= \begin{vmatrix} 0 & x & x \\ -z & 0 & z \\ -y & -y & 0 \end{vmatrix}$$

Apply: 
$$C_2 \rightarrow C_2 - C_3$$

$$\begin{vmatrix} 0 & 0 & x \\ -z & -z & z \\ -y & -y & 0 \end{vmatrix}$$

$$= 0$$

$$\because C_1 = C_2$$

Chapter 6 Determinants Ex 6.2 Q2(ix)

$$\begin{vmatrix} 1 & 43 & 6 \\ 7 & 35 & 4 \\ 3 & 17 & 2 \end{vmatrix}$$
Apply:  $C_2 \rightarrow C_2 + (-7)C_3$ 

$$\begin{vmatrix} 1 & 1 & 6 \\ = & 7 & 7 & 4 \\ & & 3 & 2 \end{vmatrix}$$

$$= 0$$

$$C_1 = C_2$$

Chapter 6 Determinants Ex 6.2 Q2(x)

$$\begin{vmatrix}
1^2 & 2^2 & 3^2 & 4^2 \\
2^2 & 3^2 & 4^2 & 5^2 \\
3^2 & 4^2 & 5^2 & 6^2 \\
4^2 & 5^2 & 6^2 & 7^2
\end{vmatrix}$$

 $Apply: C3 \rightarrow C3 - C2, C4 \rightarrow C4 - C1$ 

$$= \begin{vmatrix} 1^2 & 2^2 & 3^2 - 2^2 & 4^2 - 1^2 \\ 2^2 & 3^2 & 4^2 - 3^2 & 5^2 - 2^2 \\ 3^2 & 4^2 & 5^2 - 4^2 & 6^2 - 3^2 \\ 4^2 & 5^2 & 6^2 - 5^2 & 7^2 - 4^2 \end{vmatrix}$$

$$= \begin{vmatrix} 1^2 & 2^2 & 5 & 15 \\ 2^2 & 3^2 & 7 & 21 \\ 3^2 & 4^2 & 9 & 27 \\ 4^2 & 5^2 & 11 & 33 \end{vmatrix}$$

Take 3 common from C4

$$= 3 \begin{vmatrix} 1^2 & 2^2 & 5 & 5 \\ 2^2 & 3^2 & 7 & 7 \\ 3^2 & 4^2 & 9 & 9 \\ 4^2 & 5^2 & 11 & 11 \end{vmatrix}$$

Chapter 6 Determinants Ex 6.2 Q2(xi)

terminants Ex 6.2 Q2(xi)

$$\begin{vmatrix} a & b & c \\ a+2x & b+2y & c+2z \\ x & y & z \end{vmatrix}$$
 $\begin{vmatrix} a & b & c \\ 2a+2x & 2b+2y & 2c+2z \\ x+a & y+b & z+c \end{vmatrix}$ 
 $\begin{vmatrix} a & b & c \\ a+x & b+y & c+z \\ x+a & y+b & z+c \end{vmatrix}$ 
 $= 0$ 

\*\*\*\*\*\*\* END \*\*\*\*\*\*\*\*