Class 12th (maths) H.W for 25/05/2020, Chap- Determinant

Q. Evaluate $\Delta = \begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$

Sol Given that

$$\Delta = \begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$$

$R_2 \to R_2 - R_1$ & $R_3 \to R_3 - R_1$

$$\Delta = \begin{vmatrix} 1 & a & bc \\ 0 & b-a & ca-bc \\ 0 & c-a & ab-bc \end{vmatrix}$$

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

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

Expanding along C_1

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

$$= (b-a)(c-a)\{1(-b+c)\}$$

$$\Delta = (b-a)(c-a)(c-b)$$

$$\Delta = (a-b)(b-c)(c-a)$$ Ans

Note: Solve 12 question, such as. by using Properties of determinant.