

SECTION-1

ANS-1

ANSWER-

$$\vec{AC} = -a\hat{i} + c\hat{k}$$

$$\vec{AB} = -a\hat{i} + b\hat{j}$$

$$\text{Area of } \triangle ABC = \frac{1}{2} |\vec{AB} \times \vec{AC}|$$

$$\vec{AB} \times \vec{AC} = \begin{bmatrix} \hat{i} & \hat{j} & \hat{k} \\ -a & 0 & c \\ -a & b & 0 \end{bmatrix}$$

$$= -(bc)\hat{i} - (ac)\hat{j} - (ab)\hat{k}$$

$$|\vec{AB} \times \vec{AC}| = \sqrt{b^2c^2 + a^2c^2 + a^2b^2}$$

$$\text{Area} = \frac{1}{2} \sqrt{a^2b^2 + b^2c^2 + c^2a^2}$$

Hence, the Area of $\triangle ABC$ is $\frac{1}{2} \sqrt{a^2b^2 + b^2c^2 + c^2a^2}$