Previous Year Question with Solution :

Let A(a,0), B(b,2b +1) and C(0,b), b∈ 0, |b|≠1, be points such that the area of triangle ABC is 1 sq. unit, then the sum of all possible values of a is :

(1) $\frac{-2b}{b+1}$

(2) $\frac{2b}{b+1}$

(3) $\frac{2b^2}{b+1}$

(4) $\frac{-2b^2}{b+1}$

Soln :

Consider in metric form

$$\left|\frac{1}{2}\begin{vmatrix} a & 0 & 1 \\ b & 2b+1 & 1 \\ 0 & b & 1 \end{vmatrix}\right| = 1$$

$$\Rightarrow \begin{vmatrix} a & 0 & 1 \\ b & 2b+1 & 1 \\ 0 & b & 1 \end{vmatrix} = \pm 2$$

$$\Rightarrow a\,(2b + 1 - b) - 0 + 1\,(b^2 - 0) = \pm 2$$

$$\Rightarrow a = \frac{\pm 2 - b^2}{b+1}$$

$$\therefore \quad a = \frac{2 - b^2}{b+1} \text{ and } a = \frac{-2 - b^2}{b+1}$$

sum of possible values of 'a' is

= $\frac{-2b^2}{b+1}$