If area of the triangle on the complex plane formed by the points z, z+iz and iz is 50 sq. unit, then |z| is,

(A) 1 (B) 5 (C) 10 (D) 15

Solution

Let z = x+iy

Then, z+iz = (x-y) + i(x+y)

And, iz = -y+ix

So, the three vertices have the coordinates (x, y), (x-y, x+y), (-y, x)

Area of triangle is given by the formula, $A = \frac{1}{2} \left| \sum x_1 (y_2 - y_3) \right|$

$$\therefore A = \frac{1}{2} |(x)(y) + (x - y)(x - y) + (-y)(-x)| = 50$$

$$\therefore |xy + (x - y)^{2} + xy| = 100$$

$$\therefore x^{2} + y^{2} = |z|^{2} = 100$$

$$\therefore |z| = 10$$

Hence, (C)