

**Question: -**

Consider a  $\Delta ABC$  and let  $a$ ,  $b$  and  $c$  denote the lengths of the sides opposite to vertices  $A$ ,  $B$  and  $C$ , respectively.  $a = 6$ ,  $b = 10$  and the area of the triangle is  $15\sqrt{3}$ . If  $\angle ACB$  is obtuse and if  $r$  denotes the radius of the incircle of the triangle, then  $r^2$  is equal to.....

**Solution: -**

$\sin C = \frac{\sqrt{3}}{2}$  and  $C$  is given to be obtuse.

$$\begin{aligned}\Rightarrow C &= \frac{2\pi}{3} = \sqrt{a^2 + b^2 - 2ab \cos C} \\ &= \sqrt{6^2 + 10^2 - 2 \times 6 \times 10 \times \cos \frac{2\pi}{3}} = 14\end{aligned}$$

$$\therefore r = \frac{\Delta}{s} \Rightarrow r^2 = \frac{225 \times 3}{\left(\frac{6 + 10 + 14}{2}\right)^2} = 3$$