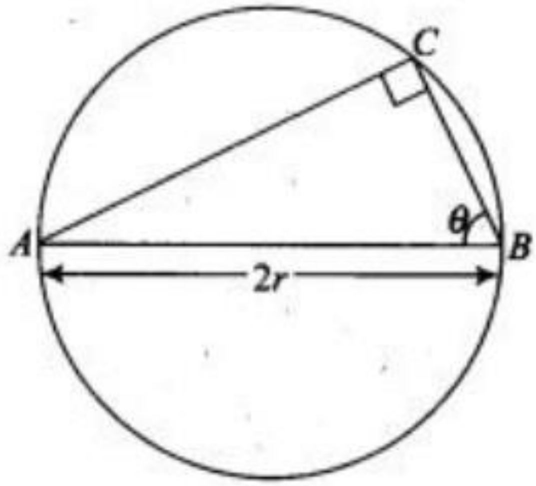
32. AB is a diameter of a circle and C is any point on the circle. Show that the area of ΔABC is maximum, when it is isosceles.

Sol. We have, $AB = 2r$

And $\angle ACB = 90°$

Let $\angle ABC = \theta$

$\Rightarrow AC = 2r \sin\theta$ and $BC = 2r\cos\theta$



$\therefore$ Area of ΔABC, $\Delta = \frac{1}{2}(2r\sin\theta)(2r\cos\theta)$

$= r^2 \sin 2\theta$

Clearly, Δ is maximum when $\sin 2\theta$ is maximum.

$\therefore \Delta_{max.} = r^2$, when $\sin 2\theta = 1$

or $\quad 2\theta = \frac{\pi}{2} \quad \Rightarrow \quad \theta = \frac{\pi}{4}$

$\Rightarrow$ Triangle is isosceles.