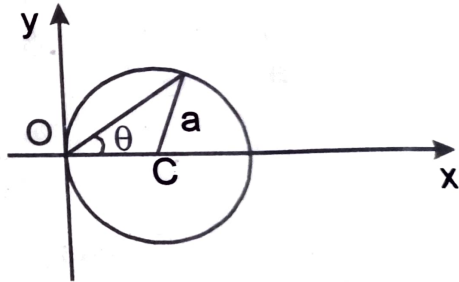**5.** A particle of mass m is moving in a circular path of radius a, with a constant velocity v as shown in the figure. The center of circle is marked by 'C'. The angular momentum from the origin O can be written as:

(A) $va(1+\cos 2\theta)$

(B) $va(1+\cos \theta)$

(C) $va\cos 2\theta$

(D) va

Solution

ΔOPC

$$\frac{x}{\sin(\pi - 2\theta)} = \frac{a}{\sin\theta}$$

$x = 2R\cos\theta$

$|\vec{L}| = mvx\sin\phi \quad (\phi = 90° - \theta)$

$= M\,3a\cos\theta\, c\cos\theta = Mva[1 + \cos 2\theta]$