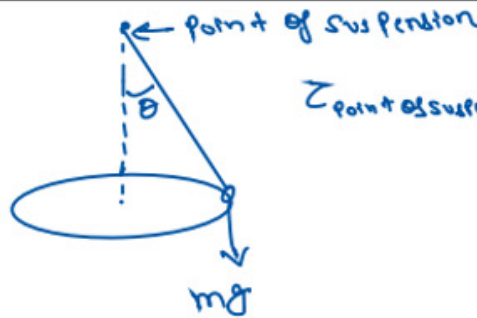## QUES 05:-

A bob of mass m attached to an inextensible string of length ℓ is suspended from a vertical support. The bob rotates in a horizontal circle with an angular speed ω rad/s about the vertical. About the point of suspension :
[JEE Mains-2014]

(1) Angular momentum changes in direction but not in magnitude

(2) Angular momentum changes both in direction and magnitude

(3) Angular momentum is conserved

(4) Angular momentum changes in magnitude but not in direction.

Soln

← Point of Suspension

$$\tau_{\text{point of suspension}} = R \times F$$
$$= \left(R\sin\theta \,\hat{i} + R\cos\theta(-\hat{j}) \right) \times$$
$$\left(mg(-\hat{j}) \right)$$
$$= (mgR\sin\theta)(-\hat{k})$$

inwards

By Calculating τ at any point; you will find that τ will always point inwords; hence will change dirn of Angular momentum!