(15)

Angular velocity $\theta^\circ = \frac{d\theta}{dt} = c$ (given)

Change in polar form put

$x = r\cos\theta \quad , \quad y = r\sin\theta$ in (1)

$r^2\cos^2\theta + r^2\sin^2\theta = a^2$

$r^2 = a^2 \Rightarrow r = a$

$r^\circ = \frac{dr}{dt} = 0 \quad , \quad r^{\circ\circ} = \frac{d^2r}{dt^2} = 0$

As $\theta^\circ = c$ and $\theta^{\circ\circ} = 0$

As we know acceleration

$\underline{a} = (r^{\circ\circ} - r(\theta^\circ)^2)\hat{r} + (2r^\circ\theta^\circ + r\theta^{\circ\circ})\hat{s}$

$\because$ Radial Component of acceleration

$a_r = 0 - a(c)^2$

$\boxed{a_r = -ac^2}$

And transverse Component of acceleration

$a_\theta = 2r^\circ\theta^\circ + r\theta^{\circ\circ}$

✓ $= 2(0)c + a \cdot 0 = 0$

Q If the Components of velocity along and $\perp r$ to radius vector are λr^2 and $\mu\theta^2$, then find the polar path of the Curve.

Sol:- As we know

$v = r^\circ\hat{r} + r\theta^\circ\hat{s}$

where radial Components of velocity

$V_r = r^\circ = \lambda r^2$

And transverse Component of velocity

$V_\theta = r\theta^\circ = \mu\theta^2$

$(r^\circ = \lambda r^2$