

GENERALISED CO-ORDINATES \rightarrow

\rightarrow The minimum number of independent co-ordinate or variable which is required to describe the motion of a dynamical system is known as generalised co-ordinate.

For a system of N particles and for k constraints.

The number of independent co-ordinate will be $3N - k$

The cartesian co-ordinates can be expressed in term of generalised co-ordinates

\rightarrow cartesian co-ordinates x_i ($i = 1, 2, 3$)

\rightarrow generalised co-ordinate q_m (q_k)

then $x_i = x_i(q_1, q_2, q_3, \dots, q_m, t)$

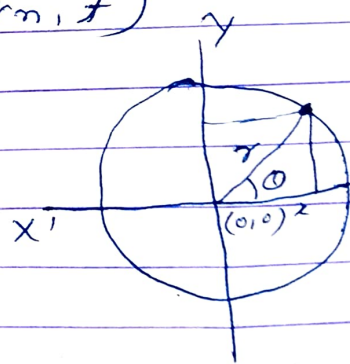
$$x = r \cos \theta \quad \text{--- (1)}$$

$$y = r \sin \theta \quad \text{--- (2)}$$

$$\frac{y}{x} = \frac{\sin \theta}{\cos \theta}$$

$$\frac{y}{x} = \tan \theta$$

$$\theta = \tan^{-1} \left(\frac{y}{x} \right)$$



$$\begin{aligned} \sin \theta &= \frac{y}{r} \\ \sin \theta &= \frac{y}{r} \\ y &= r \sin \theta \\ x &= r \cos \theta \end{aligned}$$