If time (t), velocity (v), and angular momentum (l) are taken as the fundamental units. Then the dimension of mass (m) in terms of t, v and l is :

(1) $[t^{-1} v^{1} l^{-2}]$

(2) $[t^{1} v^{2} l^{-1}]$

(3) $[t^{-2} v^{-1} l^{1}]$

(4) $[t^{-1} v^{-2} l^{1}]$

(d) Let $m \propto t^x v^y \ell^z$

By substituting the following dimensions

$[v] = LT^{-1}; \ell = [ML^2T^{-1}]$

$M^1L^0T^0 = T^x [LT^{-1}]^y [ML^2T^{-1}]^z$

$\Rightarrow \quad M^1L^0T^0 = T^{x-y-z} L^{y+2z}M^z$

On comparing powers

$z = 1$ ...(i)

$x - y - z = 0$ ...(ii)

$y + 2z = 0$ ... (iii)

$y + 2 \times 1 = 0$

$y = -2$

$x - (-2) - 1 = 0$

$x = -1$

$M \propto t^{-1} v^{-2} \ell^1$

$[M] \propto t^{-1} v^{-2} \ell^1$