PRAYAS

JEE 2025

Lecture - 07

Physics

Oscillations

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Topics to be covered

1. Ques Practice
2.
3.
4.

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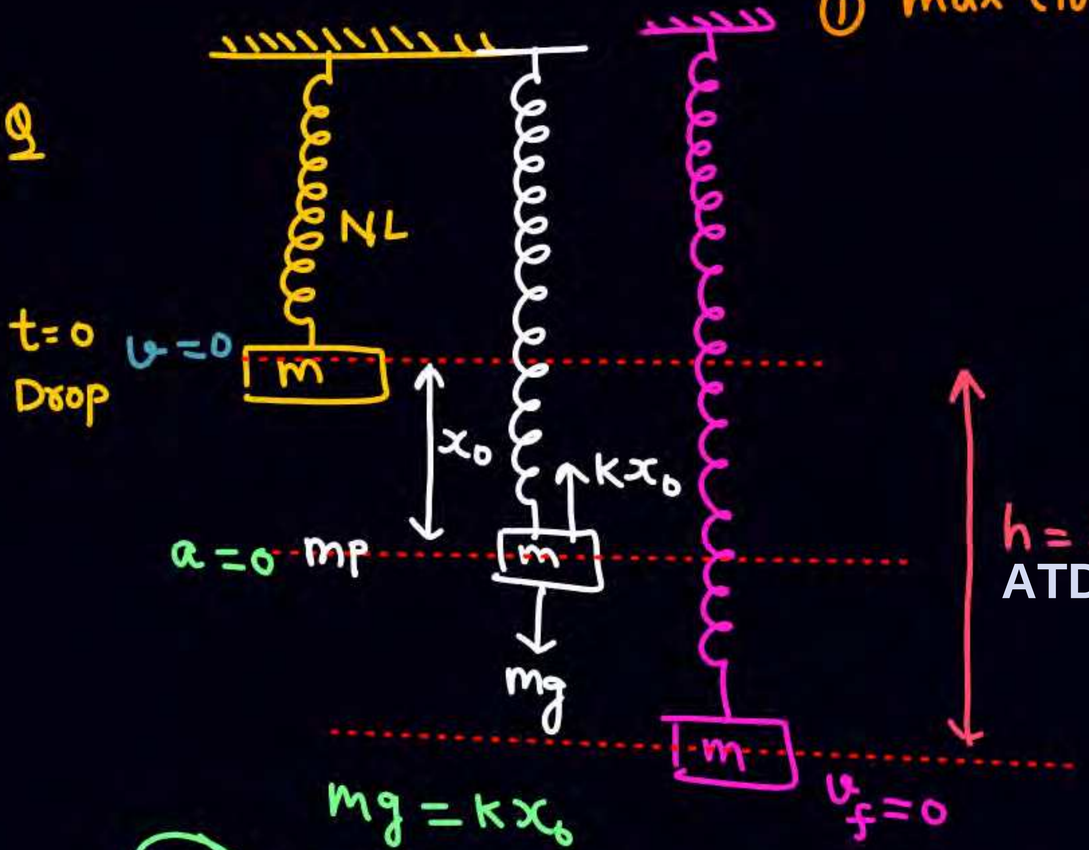
Q



$mg = kx_0$

NLM

$x_0 = mg/k$

① max elongation in spring

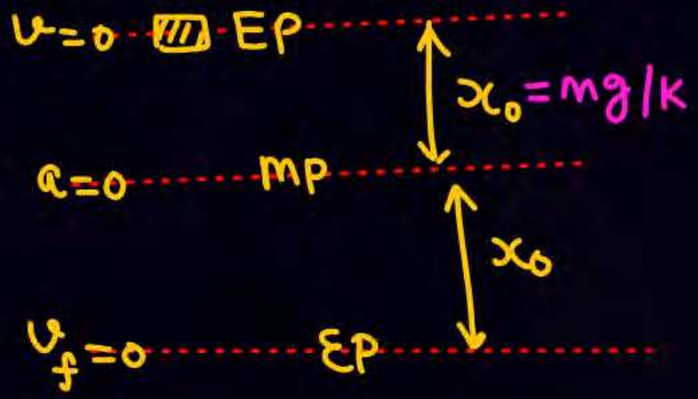
$W_g + W_{sp} = \Delta KE$

$mgh - \frac{1}{2}k(h^2 - 0^2) = 0 - 0$

$h = \frac{2mg}{k}$

② $T = 2\pi\sqrt{\frac{m}{k}}$ $\omega = \sqrt{\frac{k}{m}}$

Amplitude $= x_0 = mg/k$



③ $V_{max} = A\omega$

$= \frac{mg}{k}\cdot\sqrt{\frac{k}{m}} = g\sqrt{\frac{m}{k}}$

Q

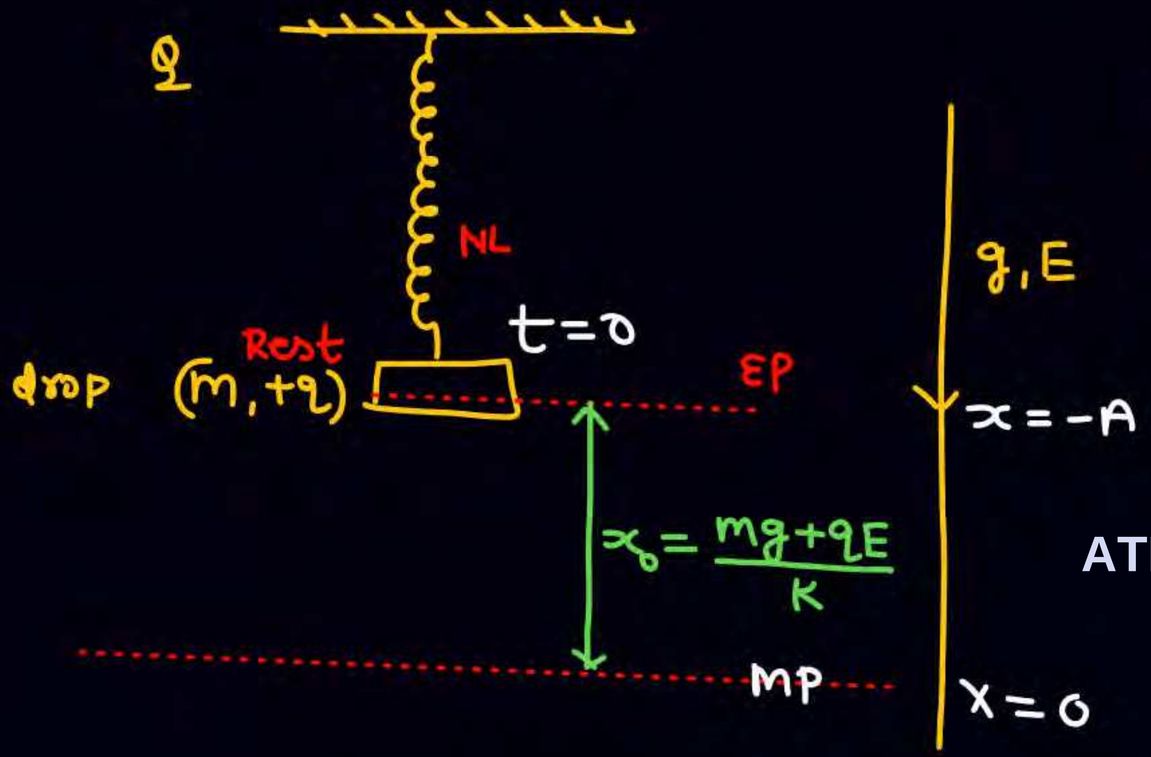
If downward dirⁿ is positive.

$$x = A\sin(\omega t + 270^\circ)$$

$$x = \frac{mg}{K}\sin\left(\sqrt{\frac{K}{m}}\,t + 3\pi/2\right)$$

mP ≡ x=0

EP x=+A



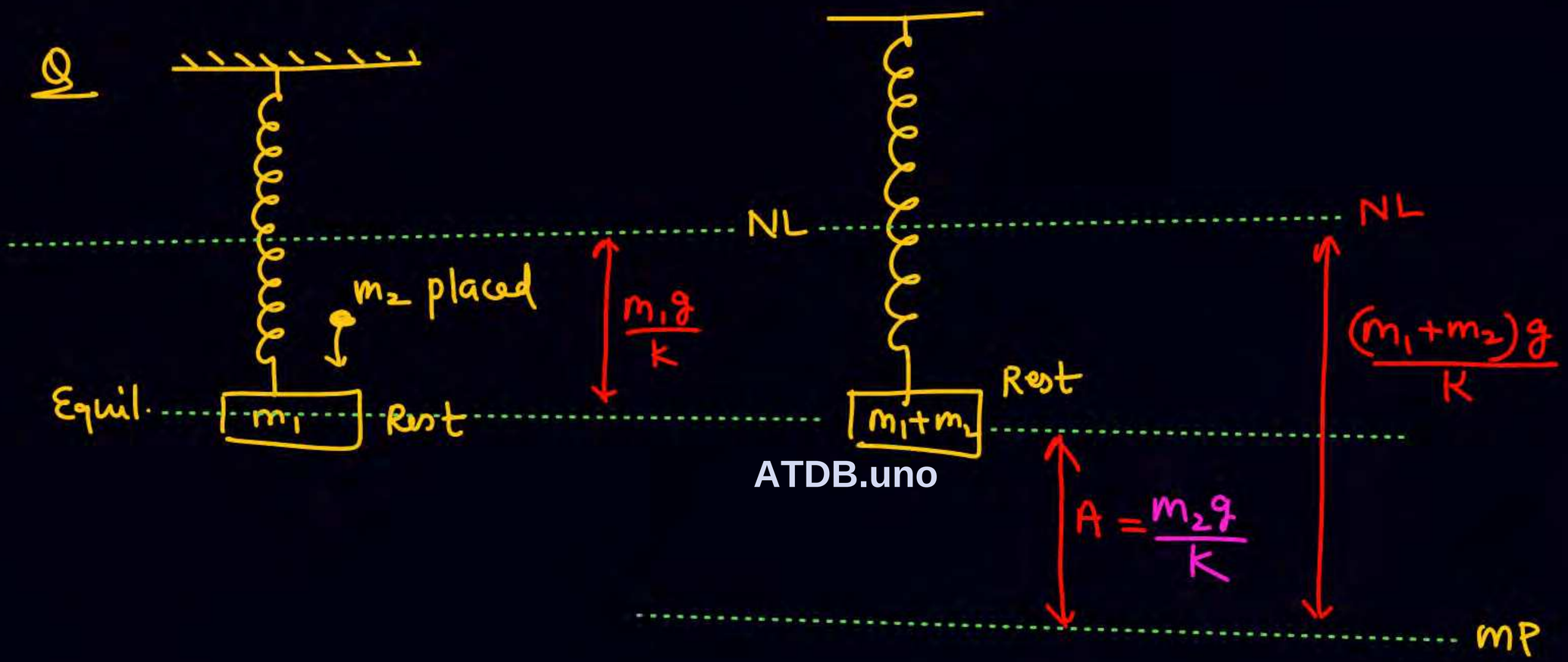
(downward dir" positive)

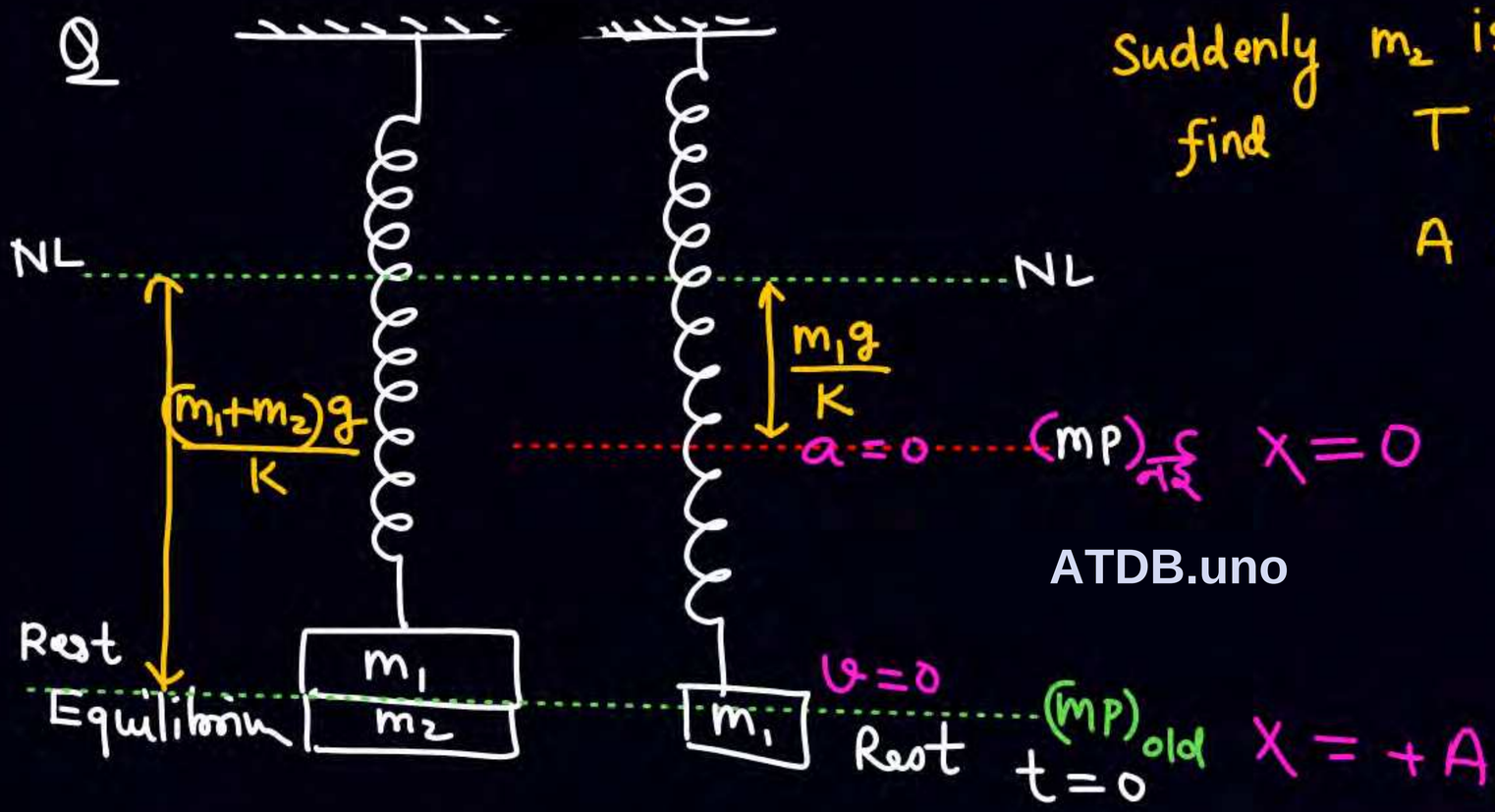
q, E

$x = -A$

$x = 0$

$A = \frac{mg+qE}{k}$, $\omega = \sqrt{\frac{k}{m}}$





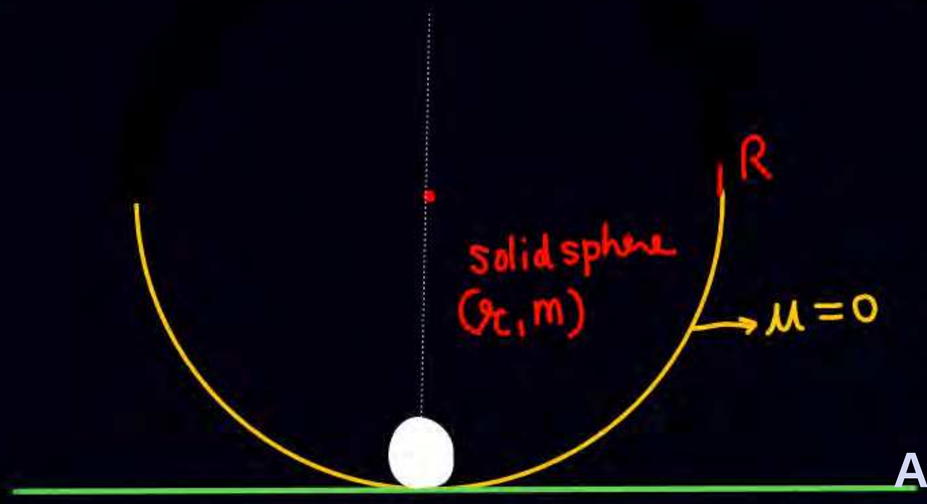
Suddenly m_2 is removed at $t=0$

find $T = 2\pi\sqrt{m_1/k}$

$A = m_2 g/k$

H·W

Q

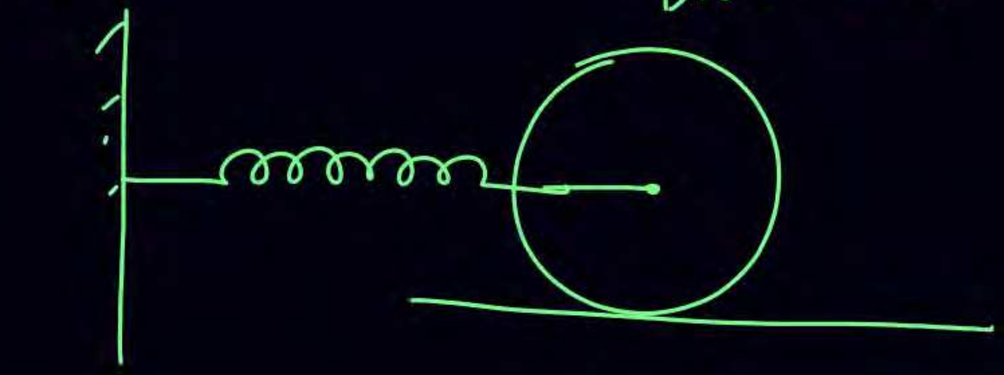


(1) Sphere of mass m, r is made to do small oscillation on smooth कटोरा. find T' of SHM

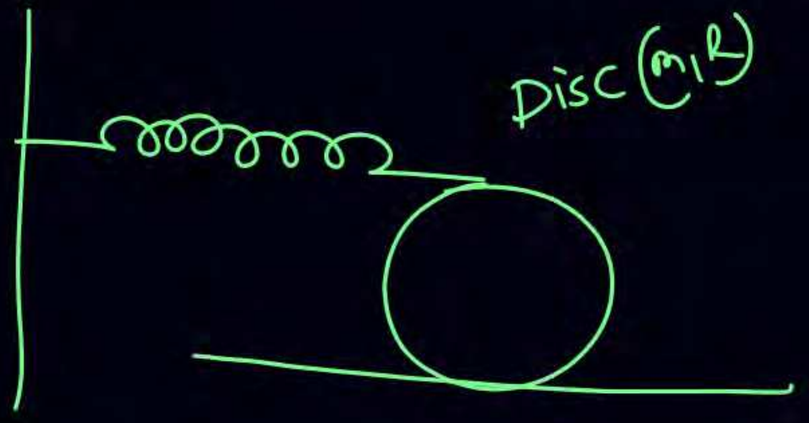
Sol^n

(2) If friction is sufficient for rolling find T of SHM

Q



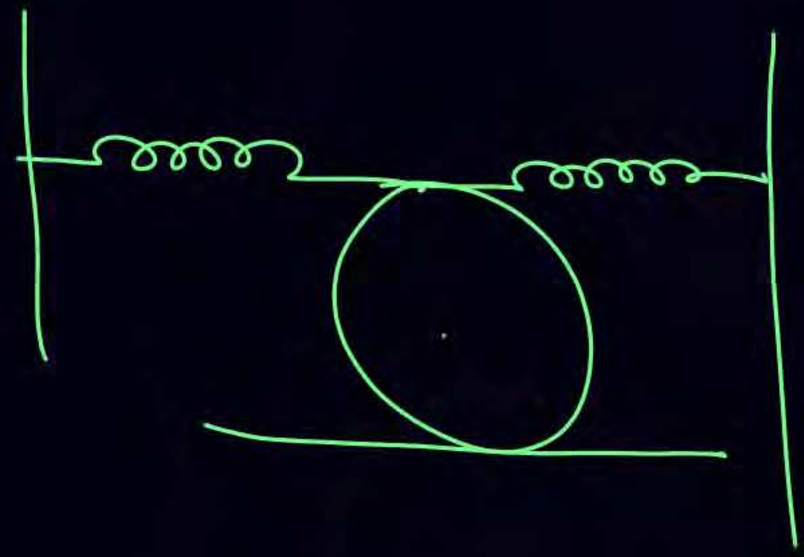
Q

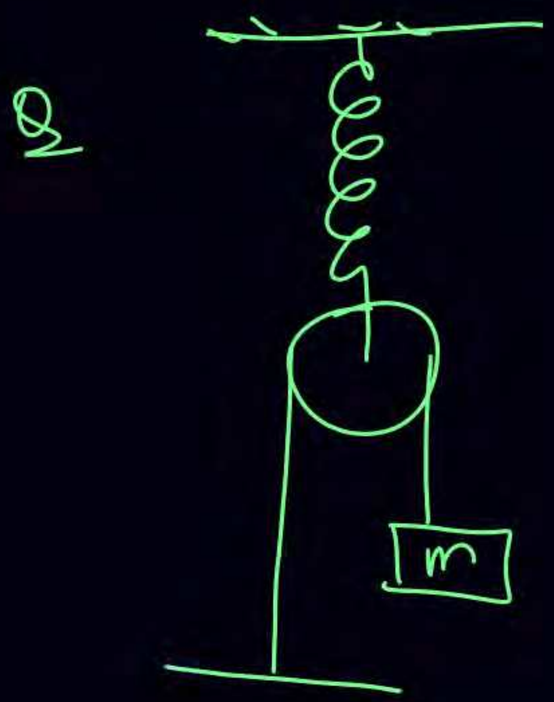


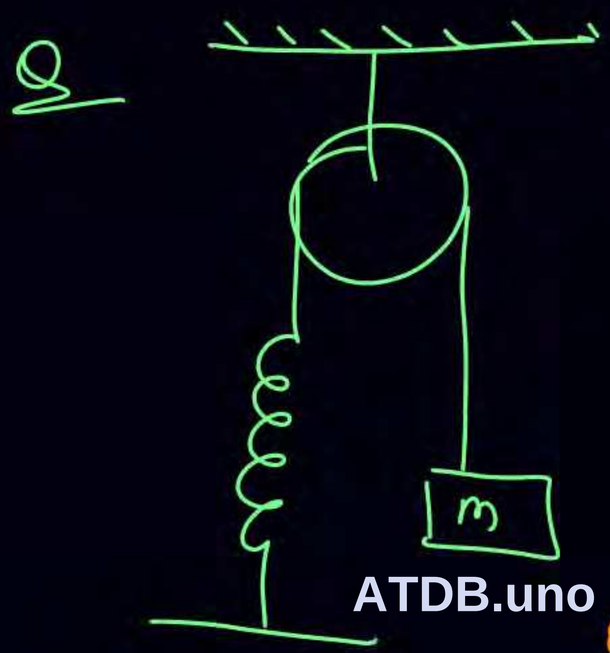
T = ? for small oscillation

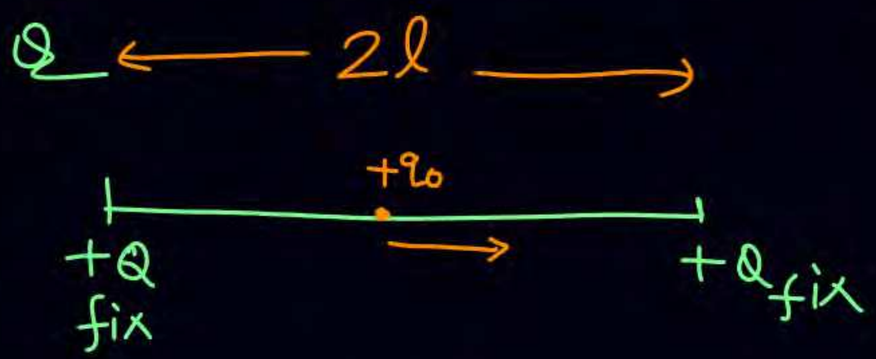
If friction is sufficient for rolling.

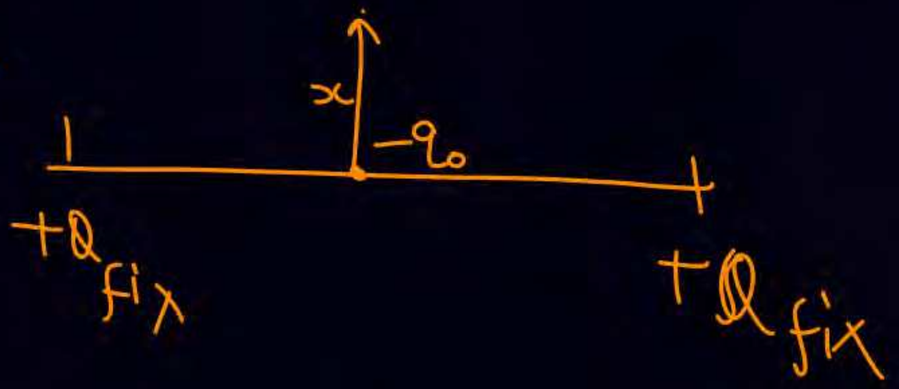
Q











Home Work

- Revise all class notes (SHm)
- module H.W ⇒ Panikplist ⇒ (1-9)

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