

$\alpha = 37^\circ$
 $m_A = m$
 $m_B(\text{max}) = 2m$

1 cu slice

$2mg = 2T$

$T = mg$

(1c
~314/10

$T = mg \sin \alpha + \mu_s mg \cos \alpha$

~~$mg = mg \sin \alpha + \mu_s mg \cos \alpha$~~

$\mu_s = \frac{1 - \sin \alpha}{\cos \alpha} = \frac{1 - \sin 37}{\cos 37} = 0.5$

$\mu_s = 0.5$

$m_B = ?$

$m_B g - 2T = 0 \quad T = \frac{1}{2} m_B g$

(2

$mg \sin \alpha = T + \mu_s mg \cos \alpha$

~1214/10

~~$mg \sin \alpha = \frac{1}{2} m_B g + 0.5 mg \cos \alpha$~~

$0.6m = \frac{m_B}{2} + 0.4m$

$m_B = 0.4m$

$M_B = 3m$

$3mg - 2T = 3m\left(\frac{a}{2}\right)$ (B 9/12)

(3
~1214/5

$T - mg \sin \alpha - \mu_s mg \cos \alpha = ma$ (A 9/12)

$T = 0.6mg + 0.4mg + ma = mg + ma$

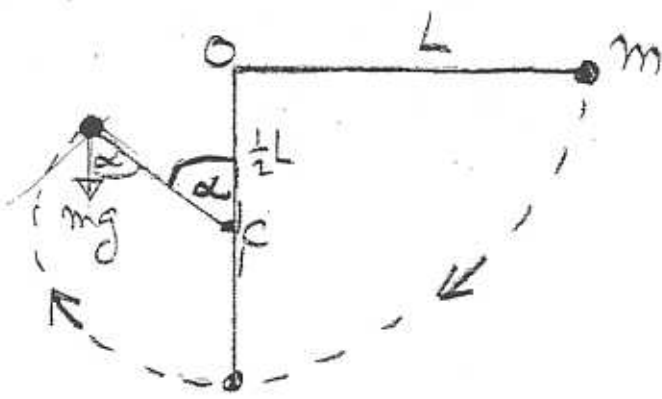
$3mg - 2(mg + ma) = 1.5ma$

$3mg - 2mg = 3.5ma$

$g = 3.5a$

$a = \frac{2}{7}g$ 9/12 A

$a = \frac{1}{7}g$ 9/12 B



(2)

$$mgL = mg\left(\frac{1}{2}L + \frac{1}{2}L\cos\alpha\right) + \frac{1}{2}mv^2 \quad (1)$$

$$gL = g\frac{L}{2}(1 + \cos\alpha) + \frac{1}{2}v^2$$

→ 10

$$v^2 = 2gL - gL(1 + \cos\alpha) = gL - gL\cos\alpha$$

$$v = \sqrt{gL(1 - \cos\alpha)}$$

$$\frac{mv^2}{L} = mg\cos\alpha \quad (2)$$

(2)

$$v^2 = \frac{L}{2}g\cos\alpha$$

→ 10

$$gL(1 - \cos\alpha) = \frac{L}{2}g\cos\alpha$$

$$1 - \cos\alpha = \frac{1}{2}\cos\alpha$$

$$1 = \frac{3}{2}\cos\alpha$$

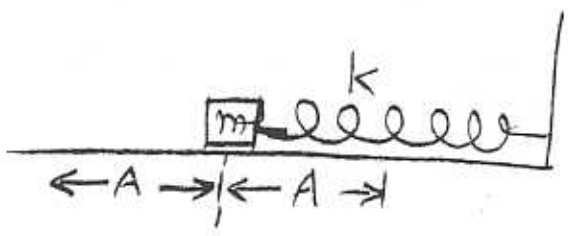
$$\cos\alpha = \frac{2}{3}$$

(radius ke liye) (2)

(2)

→ 5

3 av nke



$$A = 0.25 \text{ m}$$

$$T = 5 \text{ s}$$

$$\omega = \frac{2\pi}{T} = \frac{2\pi}{5}$$

$$X = A \cos \omega t$$

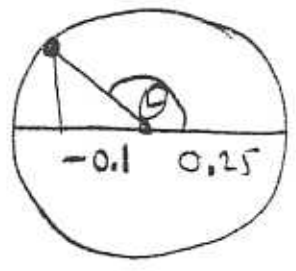
$$X = 0.25 \cos\left(\frac{2\pi}{5}\right) 0.8 = 0.25 \cos 1.0 = 0.134 \text{ m}$$

(1c)
p 10

$$F = kX = (m\omega^2)X = 0.01 \times 1.577^2 \times 0.134 = 2.11 \times 10^{-3} \text{ N}$$

$$F = -2.11 \times 10^{-3} \text{ N}$$

(2)
p 5



$$\cos \theta = \frac{-0.1}{0.25} = -\frac{1}{2.5}$$

$$\theta = 2.30$$

$$\theta = \omega t = 2$$

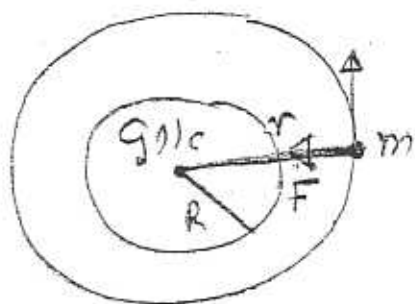
$$t = 1.57 \text{ s}$$

(3)
p 5

$$V = -\omega A \sin \omega t = -\left(\frac{2\pi}{5}\right) 0.25 \sin 114.6^\circ = -0.29 \frac{\text{N}}{\text{s}}$$

$$V = -0.29 \frac{\text{N}}{\text{s}}$$

(3)
p 5



$$\frac{GMm}{r^2} = \frac{mv^2}{r}$$

(4)
13/21 10

$$v = \sqrt{\frac{GM}{r}} = \sqrt{\frac{R^2 g_0}{r}} = R \sqrt{\frac{g_0}{r}}$$

$$T = \frac{2\pi r}{v} \rightarrow v = \frac{2\pi r}{T}$$

$$\frac{2\pi r}{T} = R \sqrt{\frac{g_0}{r}}$$

$$\frac{4\pi r^2}{T^2} = R^2 \frac{g_0}{r}$$

$$r^3 = \frac{R^2 g_0 T^2}{4\pi^2}$$

$$R = 6.38 \cdot 10^6 \text{ m} ; g_0 = 9.8 ; T = 24 \text{ h} = 86400 \text{ s}$$

$$r = 42244 \text{ m}$$

$$h = r - R = 35859 \text{ m}$$

$$v_0 = \frac{2\pi r}{T} = \frac{2\pi \cdot 42.4 \cdot 10^6}{86400} = 3067 \frac{\text{m}}{\text{s}} \quad (2)$$

$$v_0 = 3067 \frac{\text{m}}{\text{s}}$$

13/21 5

$$\frac{1}{2} m v^2 - \frac{GMm}{r} = 0$$

$$\frac{1}{2} m v^2 = \frac{GMm}{r} = 1.91 \cdot 10^{10} \text{ J} \quad (2)$$

$$v^2 = \frac{2}{2000} \cdot 1.91 \cdot 10^{10} = 3.82 \cdot 10^7$$

$$v_e = 4370 \frac{\text{m}}{\text{s}}$$

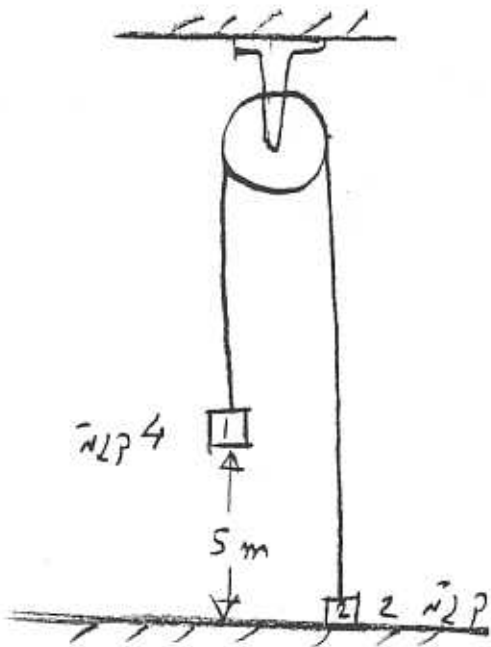
13/21 5

$$\Delta v = v_e - v_0 = 4370 - 3067 = 1303 \frac{\text{m}}{\text{s}} \quad (3)$$

$$\Delta v = 1303 \frac{\text{m}}{\text{s}}$$

13/21 5

5 on 5/10



$$R = 0.2 \text{ m}$$

$$I = 0.48 \text{ kg}\cdot\text{m}^2$$

$$m_1gh = m_2gh + \frac{1}{2}(m_1 + m_2)v^2 + \frac{1}{2}I\omega^2 \quad (*)$$

$$\omega = \frac{v}{R}$$

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$$4 \times 10 \times 5 = 2 \times 10 \times 5 + \frac{1}{2}(4+2)v^2 + \frac{1}{2} \cdot 0.48 \frac{v^2}{0.2^2}$$

$$200 = 100 + 3v^2 + 6v^2$$

$$100 = 9v^2$$

$$v = 3.33 \frac{\text{m}}{\text{s}}$$

$$v^2 = v_0^2 + 2ah$$

$$3.33^2 = 0 + 2a \times 5$$

$$a = 1.11 \frac{\text{m}}{\text{s}^2}$$

$$\alpha = \frac{a}{R} = 5.56 \frac{\text{rad}}{\text{s}^2}$$

$$\alpha = 5.56 \frac{\text{rad}}{\text{s}^2}$$

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