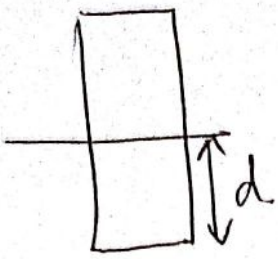
2014

(6) (a).



mass = 20kg

h = 2m.

$F_{up} = 400d$ N.

(i) when block at EP; $F_{up} = F_{down}$.

$$400d = 20g$$

$$d = \frac{20g}{400} = \boxed{0.49\,m}$$

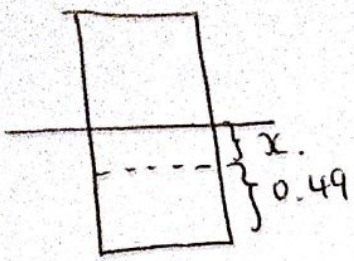
(ii). $T = \frac{2\pi}{\omega}$.

@ $x = 0.3$, $a = \underline{\text{max}}$ because 0.3 is the amplitude.

$$a = -\omega^2 x.$$

$$a_{max} = \omega^2 A.$$

↑ we don't have this, so we're gonna have to find ω a different way!



$$F = F_{down} - F_{up}$$

$$F = mg - 400(0.49 + x).$$

$$F = 196 - 196 - 400x$$

$$F = -400x$$

$$ma = -400x$$

$$a = \frac{-400}{m} x. = \frac{-400}{20} x$$

$$a = -20x.$$

$$\therefore \omega^2 = 20$$

$$\underline{\omega = \sqrt{20}}$$

$$\therefore T = \frac{2\pi}{\sqrt{20}} = \frac{2\pi}{2\sqrt{5}} = \boxed{\frac{\pi}{\sqrt{5}}} \, s$$