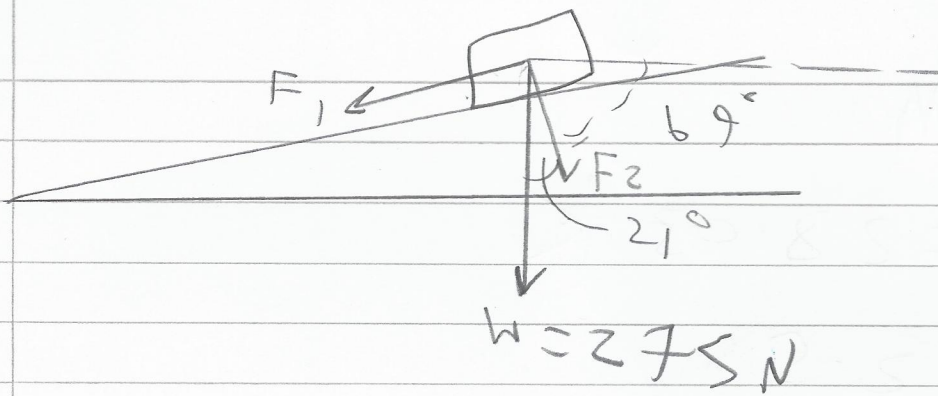




k)

$$275 = m \times 9.8$$

$$m = 28.03 \text{ kg}$$

$$F_1 = 28 \cos 69 = 10.027 \text{ N}$$

ii) $69^\circ + 90^\circ = 159^\circ$

i) $275 = m \times 9.8$

$$m = 28.03 \text{ kg}$$

$$28.03 \cos 21 = 26.17 \text{ N}$$

b) momentum $p = \text{mass} \times \text{velocity}$

$$p = mv = \text{kg} \times \text{m/s}^{-1}$$

ii) $= \text{kg} \cdot \text{m/s}$ (kilogram meter per second)

c) $F = M a$

$$M = 28.03 \text{ Kg}$$

$$a = 2.5 \text{ m/s}^2$$

$$F = 28.03 \times 2.5$$

$$F = 70.075 \text{ N}$$

ii) $P = M V$

$$P = 28.03 \times 2.5 = 70.075 \text{ W}$$

$$P = 28.03 \times 7.5 = 210.225 \text{ W}$$

$$210.225 - 70.075 = 140.15 \text{ W}$$

iii) $F = M a$

$$F = 5112.5$$

$$F = 62.5 \text{ N}$$

$$\text{speed} = 12.5$$

$$\text{time} = 3.2$$

$$2ai) R_E 20 + 20 = 40 \Omega$$

$$R_F 5 + 10 = 15 \Omega$$

$$\frac{1}{R_T} = \frac{1}{40} + \frac{1}{15}$$

$$\frac{1}{R_T} = \frac{11}{120}$$

$$R_T = 10.91 \Omega = 10.91 \Omega$$

$$ii) V = IR$$

$$I = \frac{V}{R}$$

$$I = \frac{12}{10.910}$$

$$I = 0.0011 \text{ A}$$

$$iii) P = I^2 R$$

$$R_{AC} = P = (0.0011)^2 \times 2000$$

$$P = 2.42 \times 10^{-3}$$

$$R_{CE} = P = (0.0011)^2 \times 2000$$

$$P = 2.42 \times 10^{-3}$$

$$R_{DD} = P = (0.0011)^2 \times 1000$$

$$P = 0.242 \times 10^{-3} \text{ W}$$

$$R_{DF} = P = (0.01)^2 \times 5$$

$$P = \cancel{6.05 \times 10^{-4}} \\ 0.605 \text{ W}$$

$$b) V = IR$$

$$V = 0.011 \times 2000$$

$$V = \cancel{22} \text{ V}$$

$$ii) V = IR$$

$$V = 0.011 \times 500$$

$$V = \cancel{5.5} \text{ V}$$

$$iii) \cancel{V}$$

$$12 - 5.5 = 6.5$$

$$V_a = 4.5 \text{ V}$$

$$0.011 \times 1000 = 11$$

$$12 - 11 = 1$$

$$V_b = \cancel{1}$$

$$V_T = 5.5 \text{ V}$$

3a) The moment is equal to the force multiplied by the distance between the line of action and the turning point

b) ~~moment~~ $\text{moment} = \text{force} \times \text{distance}$

$$M = 250 \times 48$$

$$M = 12000 \text{ Nm}$$

ii) $CWM = a CWM$

$$12000 = Y \times 27$$

$$444.44^N = Y$$

iii) ~~iii)~~ $F = kx$

$$k = \frac{F}{x}$$

$$k = \frac{444.44}{15}$$

$$k = 29.63 \text{ N/m}$$

v) $\text{Work done} = \text{Force} \times \text{distance}$
 $\text{work done} = 444.44 \times 27$
 $= 12000 \text{ joules}$

$$c) \text{ power} = \frac{\text{energy}}{\text{time}}$$

$$\text{Joules} = \frac{\text{watts}}{\text{seconds}}$$

$$1 \text{ watt} = 1 \frac{\text{Nm}}{\text{s}}$$

$$ii) W = \frac{12000}{2.2}$$

$$W = 5454.55 \text{ W}$$

$$\text{power} = \frac{5454.55}{2.2}$$

$$= 2479.34 \text{ Joules}$$

$$d) 3.2 \text{ kJ}$$

$$3200 \text{ Joules}$$

$$\frac{3200}{2479.34} = 1.29 \text{ ~~times~~ }$$

trigger will be squashed once