

Adrian R. 330r (1903403)

2)

Rest
 $FP = FD$
 $N = F \sin$

i) $275 \times \cos(69) = 98.55$
 $FP = 98.55 N$

ii) angle = 21°

iii) $275 \times \cos(21) = 256.73$
 $F \sin = 256.73$
 $F \sin = N$
 $N = 256.73$

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b)

momentum = mass $\times$ velocity

i) $P = mv$

ii) $P = \text{units} = \text{kg m/s}$

c) mass = $\frac{275}{9.81} = 28.03$
 $28.03 \times 2.5 = 70.08$
 $F1 = 70.08$

ii) $28.03 \times 7.5 = 210.23 \text{ kg m/s}$
 $P = 210.23 \text{ kg m/s}$

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i) $20 k\Omega + 20 k\Omega = 40 k\Omega$
 $10 k\Omega + 5 k\Omega = 15 \Omega$
 $\frac{1}{40} + \frac{1}{15} = \frac{11}{12000}$
 $12000 \div 11 = 10909.09 \Omega / 10.91 k\Omega$
 $1R = 10909.09 \Omega / 10.91 k\Omega$

ii) $I = \frac{V}{R}$
 $\frac{12}{10909.09} = 1.10000092 \times 10^{-3} A$
 $\frac{12}{1091} = 1.10 A$
 $I = 1.10000092 \times 10^{-3} A / 1.10 A$

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iii) $V = IR$ $W = A \times V$

$20k \times 1.10000092 \times 10^{-3} = 22 V$
 $22 \times 1.10000092 \times 10^{-3} = 24.2$
 $W_{\text{alt}} = 0.02$

$10k \times 1.10000092 \times 10^{-3} = 11 V$
 $11 \times 1.10000092 \times 10^{-3} = 0.012$
 $W_{\text{alt}} = 0.01$

$5k \times 1.10000092 \times 10^{-3} = 5.5$
 $W_{\text{alt}} = 0.005$

b) Thevenin theorem

i) $V \left(\frac{R_1}{R_1 + R_2} \right)$ $i) 12 \left(\frac{20}{20+15} \right) = 6.4$
 $12 \left(\frac{5}{15} \right) = 4 V$

ii) $12 - 10 = 2$
 $2 V$

3)

The moment of a force about a point is equal to the force multiplied by the perpendicular distance between the line of action of the force and pivot.

$$i) \quad M = F \times d = 250 \times 48 \times 10^{-3} = \boxed{12 \text{ Nm}}$$

$$ii) \quad F \times 27 \times 10^{-3} = 12 \Rightarrow F = \frac{12}{27 \times 10^{-3}} = \boxed{444.44 \text{ N}}$$

$$iii) \quad F = K \times x$$

$$K = \frac{F}{x} = \frac{444}{15 \times 10^{-3}} = 30 \text{ kNm}^{-1}$$

$$\boxed{K = 30 \text{ kNm}^{-1}}$$

(ciii)

$$W = \frac{1}{2} F \times x = \frac{1}{2} \times 444 \times 15 \times 10^{-3} = 3.3 \text{ J}$$

$$\boxed{W = 3.3 \text{ J}}$$

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c) i) $w = \frac{2}{5}$ $p = \frac{6}{5} \Rightarrow w = \frac{2}{5}$

ii) $\frac{3.3}{2.25} = 1.5 \text{ watts}$

$\frac{d}{t} = 32 \times 1000 = 32000$

$\frac{32000}{5.3} = 969.641$

$3.3 \times 969.641 = 3200.01$

The trigger will be speed 470 times.

This is Adrien Risser (1903483) Science Coursework that have done from notes and the researcher. I also need 20 words before I can turn it in.