(3C)

1) $E.P.E = \frac{\lambda x^2}{2L}$

$= \frac{8(0.4)^2}{2(0.6)}$

$= \underline{1.07\ J}$

2) $EPE = \frac{\lambda x^2}{2L}$

$= \frac{4(0.2)^2}{2(0.8)}$

$= \underline{0.1\ J}$

3) $EPE = \frac{\lambda x^2}{2L}$

$= \frac{10(0.3)^2}{2(1.2)}$

$= 0.375\ J$

$EPE = \frac{\lambda x^2}{2L}$

$= \frac{10(0.6)^2}{2(1.2)}$

$= 1.5\ J$

WD from 1.5 to 1.8 = $1.5 - 0.375 = \underline{1.125\ J}$

(3C)

4)

a) $EPE = \frac{\lambda x^2}{2L}$

$= \frac{20(0.2)^2}{2(0.7)} = \underline{0.5714\,(3sf)}$

b) $\frac{20(0.3)^2}{2(0.7)} - \frac{20(0.1)^2}{2(0.7)} = \underline{1.14\,J\,(3sf)}$

c) $\frac{20(0.7)^2}{2(0.7)} - \frac{20(0.5)^2}{2(0.7)} = \underline{3.43\,J\,(3sf)}$

5)

$T = 2g$

$\lambda = 10$

x

$L = 1.2$

$T = \frac{\lambda x}{L}$

$2g = \frac{10x}{1.2}$

$x = 2.352$

$EPE = \frac{\lambda x^2}{2L} = \frac{10(2.352)^2}{2(1.2)}$

$= \underline{23.0\,J\,(3sf)}$

(3C)

6)

$T = 2mg$

λ

$x = 2a$

$L = a$

$T = \frac{\lambda x}{L}$

$2mg = \frac{\lambda 2a}{a}$

$\lambda = mg$

$$EPE = \frac{\lambda x^2}{2L}$$

$$= \frac{mg(2a)^2}{2(a)}$$

$$= \frac{4a^2mg}{2a}$$

$$= 2amg$$

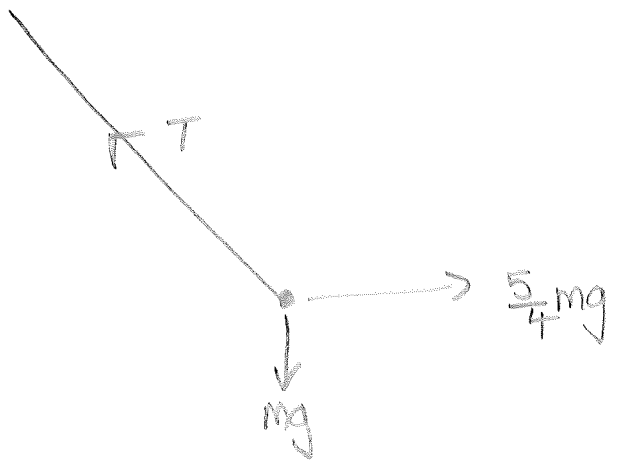
(3c)

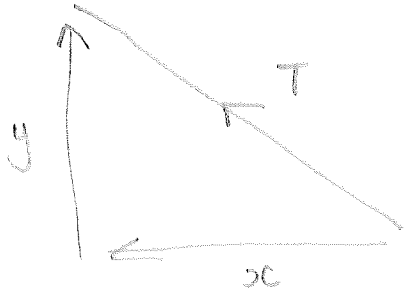
7)

$\lambda = 2mg$

$l = a$

a)





$y = mg$

$x = \frac{5}{4}mg$

$T^2 = (mg)^2 + \left(\frac{5}{4}mg\right)^2$

$T^2 = m^2g^2 + \frac{25}{16}m^2g^2$

$T^2 = \frac{41}{16}m^2g^2$

$T = \frac{\sqrt{41}}{4}mg$

b) $EPE = \frac{\lambda x^2}{2l}$

$= \frac{2mg\left(\frac{\sqrt{41}a}{8}\right)^2}{2(a)}$

$= \frac{2mg}{2a}\left(\frac{41a^2}{64}\right)$

$= \frac{41mga}{64}$ J

$T = \frac{\lambda x}{l}$

$\frac{\sqrt{41}}{4}mg = \frac{2mg\,x}{a}$

$x = \frac{\sqrt{41}a}{8}$