

Two blocks of 4 kg and 8 kg hang from a massless pulley. After we release them and they start moving, answer questions 4-7 (Use 10 m/s^2 for gravity).

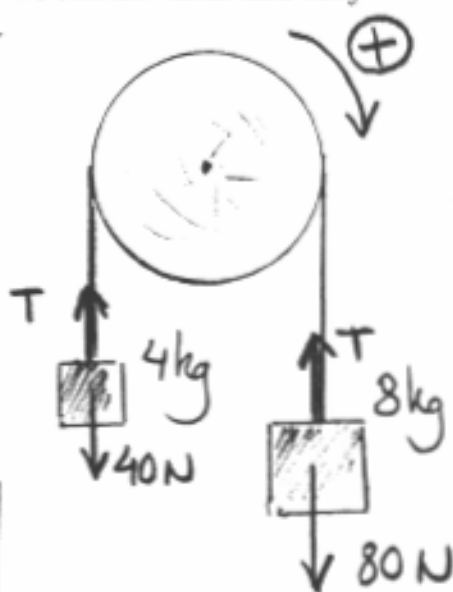
4) The tension of the cable is approximately:

- a) 14 N
- b) 45 N
- c) 67 N
- d) 53 N
- e) 35 N

$$80 - T = 8\left(\frac{10}{3}\right)$$

$$T = 80 - \frac{80}{3}$$

$$= \frac{160}{3} = 53.3 \text{ N}$$



5) The magnitude of the acceleration of any of these blocks is:

- a) 2.2 m/s^2
- b) 4.1 m/s^2
- c) 1.4 m/s^2
- d) 3.3 m/s^2
- e) 0 m/s^2

$$\left. \begin{array}{l} 80 - T = 8a \\ T - 40 = 4a \end{array} \right\}$$

$$+ \quad \frac{40}{40} = 12a \quad \rightarrow \quad a = \frac{10}{3} = 3.3 \text{ m/s}^2$$

6) After the 8 kg block moves a distance of 3 m, the total change of potential energy of the two-block system is:

- a) 100 J
- b) 120 J
- c) 150 J
- d) -300 J
- e) 350 J

$$\Delta U_g = (8 \text{ kg})(10 \text{ m/s}^2)(-3 \text{ m}) + (4 \text{ kg})(10 \text{ m/s}^2)(3 \text{ m})$$

$$= -240 \text{ J} + 120 \text{ J} = -120 \text{ J}$$

7) After the 8 kg block moves a distance of 3 m, the change of kinetic energy of this two-block system is:

- a) 100 J
- b) 120 J
- c) 150 J
- d) 300 J
- e) 350 J

$$\Delta E_{\text{TOTAL}} = \Delta K + \Delta U_g = 0$$

$$\rightarrow \Delta K = -\Delta U_g = 120 \text{ J}$$

8) We throw a 2 kg rock straight up with an initial speed of 40 m/s. How high does it go?