

Sangam Skm College Nadi

Year 13

Physics

Worksheet 2

Solutions:

1. i.  $f_k = \mu_k mg \cos \theta$

$$= 0.35 \times 4 \times 9.8 \times \cos 30^\circ$$

$$= 11.88 \text{ N}$$

$$a = \frac{m_2 g - m_1 g \sin \theta - f_k}{m_1 + m_2}$$

$$= \frac{9 \times 9.8 - 4 \times 9.8 \sin 30 - 11.88}{4 + 9}$$

$$= 4.36 \text{ ms}^{-2}$$

ii.  $T = m_2 g - m_2 a$

$$= 9 \times 9.8 - 9 \times 4.36$$

$$= 48.93 \text{ N}$$

2. i.  $f_k = \mu_k mg$

$$= 0.15 \times 3 \times 9.8$$

$$= 4.41 \text{ N}$$

$$\Sigma F = m_2 g - f_k$$

$$= 7 \times 9.8 - 4.41$$

$$= 64.19 \text{ N}$$

ii.  $a = \frac{\Sigma F}{m_1 + m_2} = \frac{64.19}{3 + 7} = 6.419 = 6.42 \text{ ms}^{-2}$

iii.  $T = m_2 g - m_2 a$

$$= 7 \times 9.8 - 7 \times 6.419$$

$$T = 23.67 \text{ N}$$

3. i.  $v_f^2 = v_i^2 + 2ad$

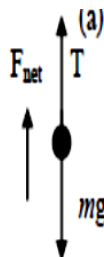
$$0 = 7^2 + 2a \times 12$$

$$a = -2.04 \text{ ms}^{-2}$$

ii.  $T = mg + ma$

$$= 800 \times 9.8 + 800 \times -2.04$$

$$T = 6208 \text{ N}$$



iii.  $ma = R - W$

$$R = W + ma$$

$$= 60 \times 9.8 + 60 \times -2.04$$

$$R = 465.6$$

