

P 113
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P 119

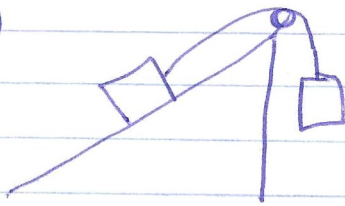
Concept 26
Problem 33, 50, 83
Reading 93, 94, 95

(9)

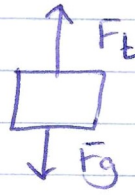
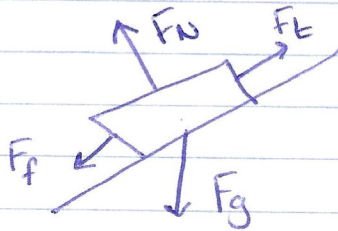
- Concept

26)

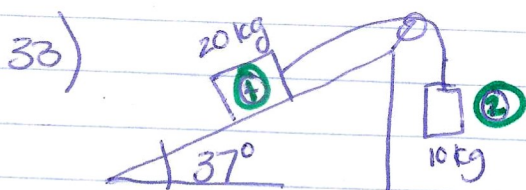
Draw force diagram



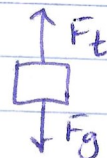
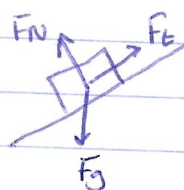
(1)



- Problem



- accelerates down + left
- no friction



a) $a = ?$

$$\Sigma F = ma$$

$$m_2 g - m_1 g \sin \theta = (m_1 + m_2) a$$

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

(2)

$$= \frac{(10 \text{ kg})(9.8 \text{ m/s}^2) - (20 \text{ kg})(9.8 \text{ m/s}^2)(\sin 37^\circ)}{(30 \text{ kg})}$$

$$a = 0.67 \text{ m/s}^2$$

b) $F_t = ?$

$$\Sigma F = ma$$

$$F_t - F_g = ma$$

hanging

$$F_t = ma + mg$$

$$= (10 \text{ kg})(0.67 \text{ m/s}^2) + (10 \text{ kg})(9.8 \text{ m/s}^2)$$

$$= 105 \text{ N}$$

OR

$$\Sigma F = ma$$

$$F_t - F_{g \parallel} = ma$$

incline

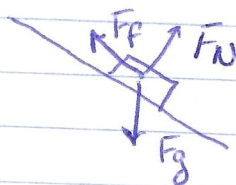
$$F_t = ma + mg \sin \theta$$

$$= (20 \text{ kg})(0.67 \text{ m/s}^2) + (20 \text{ kg})(9.8 \text{ m/s}^2) \sin 37^\circ$$

$$= 105 \text{ N}$$

5

50) $\theta = 30^\circ$
 $\mu = 0.10$



a) $a = ?$

$$\Sigma F = ma$$

$$F_f - F_{g\parallel} = ma$$

$$\mu F_N - F_g \sin \theta = ma$$

$$\mu mg \cos \theta - mg \sin \theta = ma$$

$$a = \mu g \cos \theta - g \sin \theta$$

$$= (0.10) \cos 30^\circ - \sin 30^\circ (9.81 \text{ m/s}^2)$$

$$= 4.1 \text{ m/s}^2$$

(1)

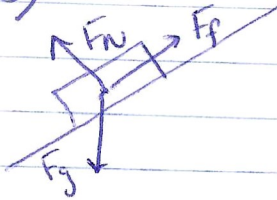
b) $t = 6 \text{ s}$
 $v_f = ?$

$$v_f = v_0 + at$$

$$= (4.1 \text{ m/s}^2)(6 \text{ s})$$

$$= 25 \text{ m/s}$$

83)



$$F_f = F_g \sin \theta$$

$$\mu F_N = mg$$

$$\sum F = 0 \text{ N}$$

$$F_f - F_{g\parallel} = 0 \text{ N}$$

$$\mu F_N = F_g \sin \theta$$

$$\mu mg \cos \theta = mg \sin \theta$$

$$\mu = \tan \theta$$

~~Multiple choice~~

(1)

- Place the shoe on a piece of concrete
- Tilt one end up
- Find the point where it just begins to slip
- Measure θ
- $\mu = \tan \theta$

Text-write procedure

essay question

5

- Reading

$$\theta_1 = 35^\circ$$

$$l = 116 \text{ m}$$

$$\theta_2 = 11^\circ$$

$$\mu = .05 \pm .02$$

(4)

$$\theta_{\text{avg}} = 23^\circ$$

$$m = 60 \text{ kg}$$

93) $\Sigma F = 0 \text{ N}$

$$F_N - F_{g\perp} = 0 \text{ N}$$

$$F_N = mg \cos \theta$$

$$= (60 \text{ kg})(9.81 \text{ m/s}^2)(\cos 23^\circ)$$

$$= 540 \text{ N}$$

94) $F_f = \mu F_N$

a) $= (.05)(540 \text{ N})$

$$= 27 \text{ N}$$

$$F_{g\parallel} = F_g \sin \theta$$

$$= (60 \text{ kg})(9.81 \text{ m/s}^2) \sin 23^\circ$$

b) $= 230 \text{ N}$

95) a) $a = \frac{F_{\text{net}}}{m} = \frac{F_{g\parallel} - F_f}{m} = \frac{230 \text{ N} - 27 \text{ N}}{60 \text{ kg}}$

$$= 3.4 \text{ m/s}^2$$

b) $v_f^2 = v_0^2 + 2ad$

$$v_f = \sqrt{2ad} = \sqrt{2(3.4 \text{ m/s}^2)(116 \text{ m})}$$

$$= 28 \text{ m/s}$$

random #
may change
from #93