



National University
of computer and emerging sciences

Foundation of Advancement
of Science and Technology



ASSIGNMENT # 05

PRESENTED BY:

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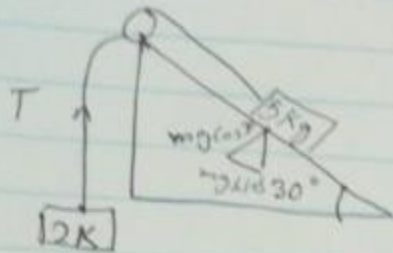
COURSE NAME: APPLIED PHYSICS

COURSE INSTRUCTOR: MADAM RABIA

Roll No: 18K-0131

QNO: 1

(1)



$$mg \sin 30 - T = 5a \rightarrow (1)$$

$$T - mg = 2a \rightarrow (2)$$

$$\therefore T - 19.6 = 2a$$

$$T = 2a + 19.6 \rightarrow (3)$$

$$5(9.8) \sin 30 - T = 5a$$

$$49 \sin 30 - T$$

$$T = 2(0.7) + 19.6$$

$$\boxed{T = 21 \text{ N}} \text{ Ans}$$

Put (3) in (1)

$$49 \sin 30 - (2a + 19.6) = 5a$$

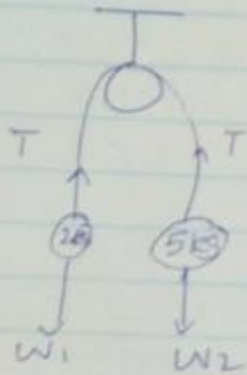
$$49(0.5) - 2a - 19.6 = 5a$$

$$24.5 - 19.6 = 7a$$

$$a = \frac{4.9}{7}$$

$$\boxed{a = 0.7 \text{ m/s}^2} \text{ Ans}$$

QNO:2



$$\Rightarrow T = 2a + m_1g \rightarrow (1)$$

$$m_2g - T = 5a \rightarrow (2)$$

$$T - (2)(9.8) = 2a$$

$$T - 19.6 = 2a$$

$$T = 2a + 19.6 \rightarrow (3)$$

Put (3) in (2)

$$5(9.8) - T = 5a$$

$$49 - (2a + 19.6) = 5a$$

$$7a = 29.4$$

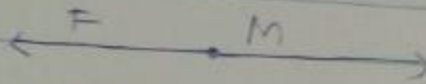
$$a = 4.2 \text{ m/s}^2$$

$$T = 2(4.2) + 19.6$$

$$= 8.4 + 19.6$$

$$T = 28 \text{ N}$$

QNO: 3 : 010 (3)



$$F = MR$$

$$470 = M(79 \times 9.8)$$

$$M = \frac{470}{774.2}$$

$$\boxed{M = 0.607}$$

QNO: 4 (14)

Sol:

$$\mu_s = 0.62$$

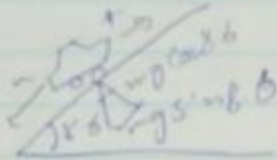
$$m = 1500 \text{ kg}$$

a) $F = \mu R$

$$F = 0.62 \times 1500 \times 9.8$$

$$F = 9114 \text{ N}$$

b)



$$F = \mu R$$

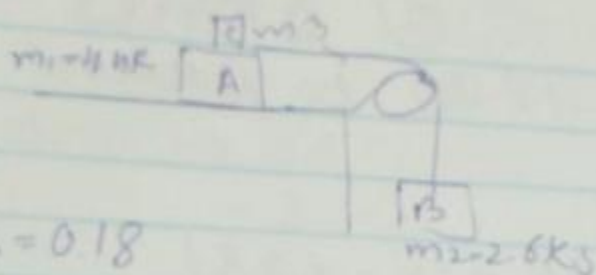
$$F = 0.62 \times 1500 \times 9.8 \times \cos 8.6$$

$$F = 0.62 \times 14700 \times \cos 8.6$$

$$F = 9011.5 \text{ N}$$

QNO: 5

⑤



$$\mu_s = 0.18$$

$$\mu_k = 0.15$$

$$\rightarrow T - F = m_1 a \rightarrow \text{①}$$

$$m_2 g - T = m_2 a \rightarrow \text{②}$$

$$T - (0.18 \times 44 \times 9.8) = 44a$$

$$T - 7.76 = 4.4a$$

$$a = \frac{T - 7.76}{4.4} \rightarrow \text{③}$$

9) Put ③ in ②

$$(2.6 \times 9.8) - T = 2.6a$$

$$25.48 - T = 2.6 \left(\frac{T - 7.76}{4.4} \right)$$

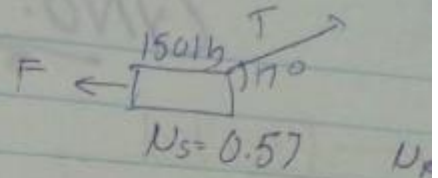
$$112.11 - 4.4T = 2.6T - 20.17$$

$$7+ = 132.266$$

QNO: 6

(7)

$$150 \text{ lb} \rightarrow 150 \times 0.454 = 68.1 \text{ kg}$$



$$T \cos 17 - F_s = 0 \rightarrow \textcircled{1}$$

$$T \cos 17 - F_k = 68.1a \rightarrow \textcircled{2}$$

a) $T \cos 17 = F_s$

$$T \cos 17 = 0.52 \times (68.1 \times 9.8) - T \sin 17$$

$$T \cos 17 = 347.05 - 0.52 T \sin 17$$

$$T(\cos 17 + 0.52 \sin 17) = 347.05$$

$$\boxed{T = 313.1 \text{ N}}$$

b)

$$T \cos 17 - F_k = 68.1a$$

$$313.1 \cos 17 - (0.35 \times (667.4 - 33.1 \sin 17)) = 68.1a$$

$$313.1 \cos 17 - 201.55 = 68.1a$$

$$\boxed{a = 1.44 \text{ ms}^{-2}}$$

⑥

F should be 18.9N to prevent moving

$$18.9 = 0.18 \times 4.4 \times 9.8 + (m_3 \times 9.8)$$

$$105 = 43.12 + 9.8m_3$$

$$\boxed{m_3 = 6.3 \text{ Kg}}$$

$$25.48 - T = 2.69$$

$$T - F = 4.49$$

$$T - (0.15 \times 4.4 \times 9.8) = 4.49$$

$$T = 6.468 + 4.49$$

∴

$$25.48 - T = 2.69$$

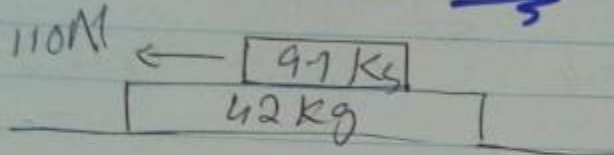
$$25.48 - (4.49 + 6.468) = 2.69$$

$$25.48 - 4.49 - 6.468 = 2.69$$

$$7a = 19.012$$

$$\boxed{a = 2.72 \text{ m/s}^2}$$

QNO: 7 (8)



$$\mu_s = 0.53$$

$$\mu_k = 0.38$$

$$110 = F_s \rightarrow \text{①}$$

$$110 - F_k = 9.7a \rightarrow \text{②}$$

a) $F_k = ?$

$$F_k = 0.3 \times 9.7 \times 9.8$$

$$\boxed{F_k = 36.12 \text{ N}}$$

$$110 - F_k = 9.7a$$

$$110 - 36.12 = 9.7a$$

$$\boxed{a = 7.62 \text{ m/s}^2}$$

b) F will be the pulling force

$$36.17 = (9.7 + 42)a$$

$$\boxed{a = 0.7 \text{ m/s}^2}$$

