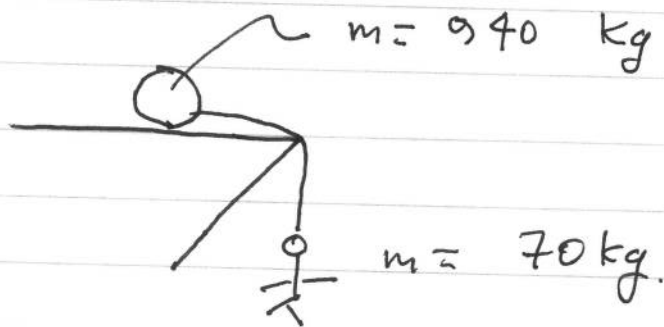


# EXAMPLE FROM LECTURE



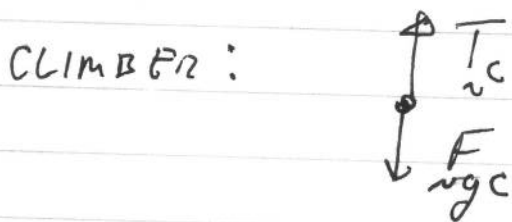
CLIMBER ATTACHED TO ROCK. ROCK IS ON VERY SLIPPERY ICE. CLIMBER IS OBSERVED TO ACCELERATE DOWNWARDS. WHAT IS DOWNWARDS ACCELERATION  $a$ ?

$$\text{CLIMBER: } \vec{T}_c + \vec{F}_{gc} = m_c \vec{a}_c$$

$$\text{ROCK: } \vec{T}_r + \vec{F}_{gr} + \vec{n} = m_r \vec{a}_r$$

$\vec{T}_c$  = TENSION FORCE ON CLIMBER.

$\vec{F}_{gc}$  = GRAVITY FORCE ON CLIMBER.



(1) CLIMBER:  $T - m_c g = -m_c a$  (CLIMBER ACCELERATES DOWNWARD)

(2) ROCK:  $T = m_r a$

(3) ROCK:  $n - m_r g = 0$

(1) & (2)  $\Rightarrow m_r a - m_c g = -m_c a$

$$(m_r + m_c) a = m_c g$$

$$a = \frac{m_c}{m_r + m_c} g$$

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