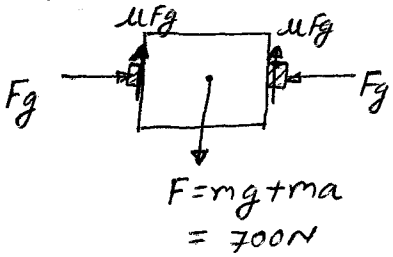
CHAPTER-8

1. There are two forces to be balanced to avoid slippage, namely, gravity force and inertia force.

Gravity force = $mg = 20 \times 10 = 200N$

Inertia force = $ma = 20 \times 25 = 500N$

The Free body diagram is as shown



$\therefore \quad 2\mu Fg = 700 \Rightarrow Fg = \frac{700}{2 \times 0.4} = \underline{875N}$

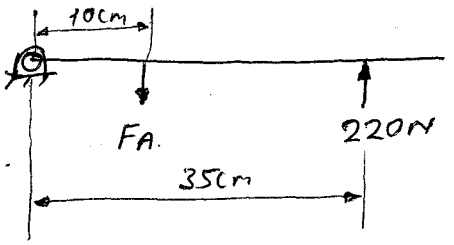
2. For this example $m = 24kg$, $a = 20m/s^2$, $Fg = 620N$.

$\therefore \quad 2\mu Fg = mg + ma$

$\therefore \quad 2\mu Fg = 24(10 + 20)$

$\therefore \quad \mu = \frac{24 \times 30}{2 \times 620} = \underline{0.58065}$

3. Free body diagram of the horizontal lever is,



Taking moments about the pivot,

$F_A \times 10 = 220 \times 35$

$\therefore \quad F_A = 22 \times 35 = \underline{770N}$