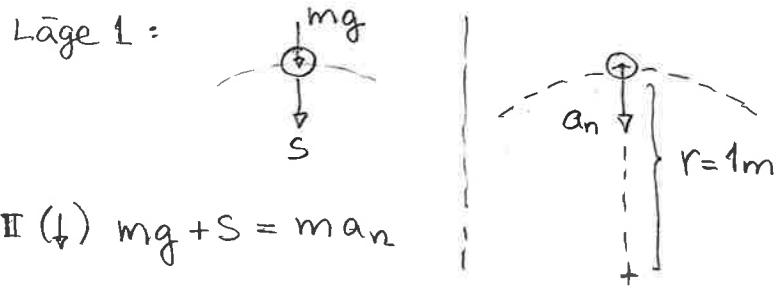


Seminariepass 12

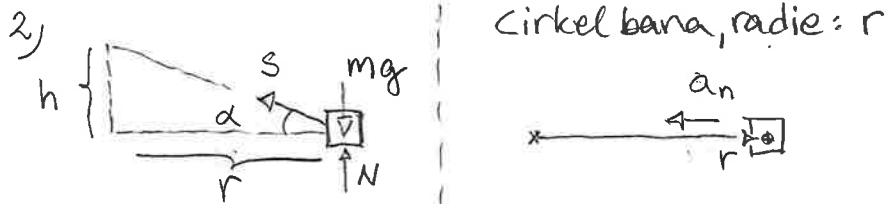
1) sträckt snöre i läge 1 kräver  $s \geq 0$ ,  
 $s = 0$  gränsen.



NII ( $\downarrow$ )  $mg + s = ma_n$

$s = 0 \Rightarrow g = a_n ; \frac{v^2}{r} = g ;$

$v = \sqrt{gr} = \sqrt{9.81 \cdot 1} = 3.13 \text{ m/s}$



( $\leftarrow$ )  $s \cos \alpha = ma_n \dots$  NII

( $\uparrow$ )  $N + s \sin \alpha - mg = 0 \dots$  7mv.

$\left\{ \begin{array}{l} \text{Lyfter precis} \Rightarrow N = 0 \\ \text{Vinkel hastighet } \omega, a_n = \frac{v^2}{r} = \frac{(r\omega)^2}{r} = r\omega^2 \end{array} \right.$

( $\leftarrow$ )  $\Rightarrow s = \frac{mr\omega^2}{\cos \alpha}$  insatt i ( $\uparrow$ )  $\Rightarrow$

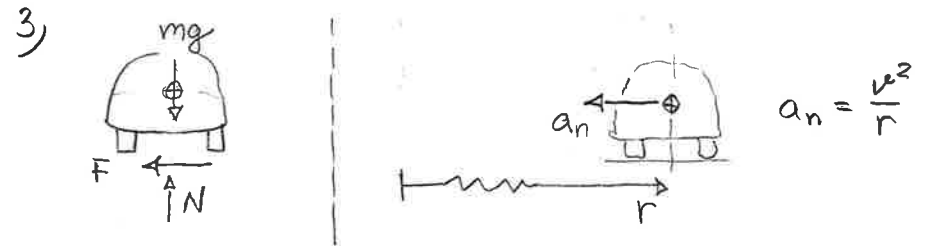
sem.p. 12

2 forts.

$m \cdot r \omega^2 \tan \alpha = mg$

$\tan \alpha = \frac{h}{r} \Rightarrow \omega^2 h = g$

$\omega = \sqrt{\frac{g}{h}} = \sqrt{\frac{9.81}{1}} = 3.1 \text{ rad/s} \text{ (} \frac{1}{2} \text{ varv/s.)}$



( $\leftarrow$ )  $F = ma_n, F = m \frac{v^2}{r} \dots$  (1)

( $\uparrow$ )  $N - mg = 0 ; N = mg \dots$  (2)

Fullt utb. friktion:  $F = \mu N \dots$  (3)

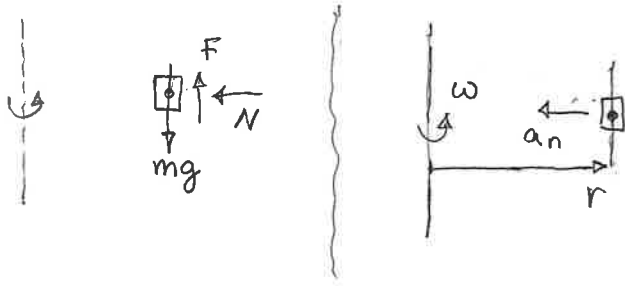
(1) & (2) insatt i (3)  $\Rightarrow$

$m \frac{v^2}{r} = \mu mg ; \mu = \frac{v^2}{rg} = \frac{20^2}{100 \cdot 9.81} = 0.41$

Friktionstalet som krävs är minst 0.41

Sem. pass 12 forts

4)



$$(\uparrow) F - mg = 0 ; F = mg \quad \dots (1)$$

$$(\leftarrow) N = m a_n,$$

$$a_n = r \omega^2 \Rightarrow N = m r \omega^2, \dots (2)$$

Fullt utbildad friktion vid den minsta hastigheten:

$$F = \mu N \quad \dots (3)$$

$$(1) \text{ \& } (2) \text{ insatt i } (3) \Rightarrow$$

$$mg = \mu r \omega^2 ;$$

$$\omega = \sqrt{\frac{g}{\mu r}} = \sqrt{\frac{9.81}{0.5 \cdot 0.3}} = \underline{\underline{8.1 \text{ rad/s}}}$$

$$\Rightarrow \frac{8.1}{2\pi} = 1.29 \text{ varv/s} = 77.4 \text{ rpm}$$

Extra: Normalkraften:

$$N = m \cdot r \cdot \omega^2 = m \cdot r \cdot \frac{g}{\mu r} = m \frac{g}{\mu} \\ = 2mg$$