

(2)

p 145 MC 3, 8, 9
p 146 Problem 2, 25, 26, 35
Online Tutorial - Understand $m + \vec{F}_g$

- Multiple Choice

(15)
(14)

3) Classmate drew F diagram pendulum
+ put horizontal F in v direction

(3)

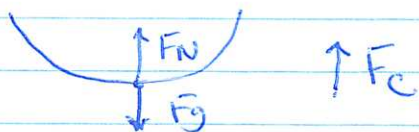
b) Incorrect b/c no F in direction motion

8) Why feel thrown up going over hump?

~~a)~~ c) You press on seat less than when
at rest

b) Not correct b/c don't go straight

9) Compare F_N to F_g at bottom dip



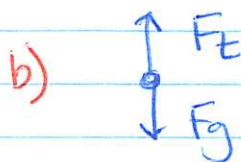
a) $F_N > F_g$

- Problems

z) Swing rock in vertical circle

a) lowest point ① ^{a)} ac points up

② F diagram



③ Compare F_t to F_g $F_t > F_g$

Explain The F_c points up so need net upward force

b) highest point online: calc T in terms of v_b, R, m_g

$$\Sigma F = ma$$

$$F_t - F_g = \frac{mv^2}{r}$$

$$c) F_t = \frac{mv^2}{r} + mg$$

b) highest point d) ① ac points down

c) Stronger pull ② F diagram



g) Bottom because

F_t greater ③ Compare F_t to F_g $F_t < F_g$

$$f) \Sigma F = ma$$

$$F_t + F_g = \frac{mv^2}{r}$$

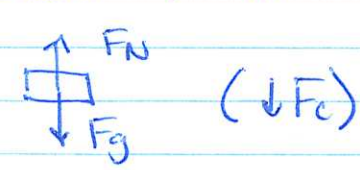
$$F_t = \frac{mv^2}{r} - F_g$$

25)



$v = 8.0 \text{ m/s}$
 $r = 12 \text{ m}$
 $m = 48 \text{ kg}$

$F_N = ?$ (upward F of seat)



$$\sum F = ma$$

$$F_N - F_g = \frac{mv^2}{r}$$

$$F_N = \frac{mv^2}{r} + mg$$

$$= \frac{(48 \text{ kg})(8.0 \text{ m/s})^2}{12 \text{ m}} + (48 \text{ kg})(9.81 \text{ m/s}^2)$$

$$= 215 \text{ N}$$

(1)

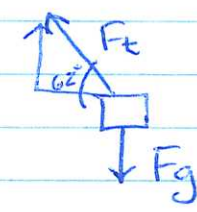
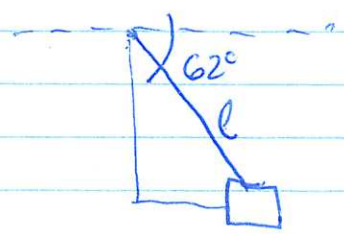
26)

$m = 80 \text{ kg}$
 $l = 6.0 \text{ m}$
 $\theta = 62^\circ$ below horizontal
 $v = ?$

① $r = l \cos \theta$

② $\sum F_y = \frac{mv^2}{r}$

$$F_{tx} = \frac{mv^2}{r}$$



$$F_t \cos \theta = \frac{mv^2}{l \cos \theta}$$

③ $\sum F_y = 0 \text{ N}$

$$F_{ty} - F_g = 0 \text{ N}$$

$$F_t \sin \theta = mg$$

$$F_t = \frac{mg}{\sin \theta}$$

$$\frac{mg \cos \theta}{\sin \theta} = \frac{mv^2}{l \cos \theta}$$

$$v = \sqrt{lg \cos \theta \tan \theta}$$

$$= \sqrt{g \frac{l(\cos \theta)^2}{\sin \theta}}$$

$$= \sqrt{\frac{(9.81 \text{ m/s}^2)(6.0 \text{ m})}{\sin 62^\circ}}$$

$$= \sqrt{(6.0 \text{ m}) \cos 62^\circ \tan 62^\circ}$$

$$= 3.8 \text{ m/s}$$

(2)

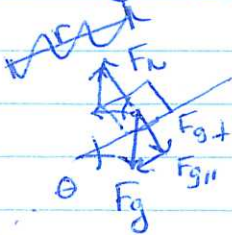
(2)

35) circular track, horizontal plane

$$r = r$$

$$\theta = \theta$$

a) Expression for speed so need zero friction

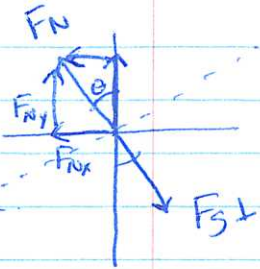


$$\sum F = ma$$

$$F_{g||} = \frac{mv^2}{r}$$

$$mg \sin \theta = \frac{mv^2}{r \cos \theta}$$

$$r = r \cos \theta$$



• horizontal FN provides F_c

$$\textcircled{1} \sum F_x = \frac{mv^2}{r}$$

$$F_N = \frac{mv^2}{r}$$

$$F_N \sin \theta = \frac{mv^2}{r}$$

$$\textcircled{2} \sum F_y = 0 \text{ N}$$

$$F_{Ny} - F_g = 0 \text{ N}$$

$$F_N \cos \theta = mg$$

$$F_N = \frac{mg}{\cos \theta}$$

$$mg \tan \theta = \frac{mv^2}{r}$$

$$v = \sqrt{rg \tan \theta}$$

b) faster or slower w/ 1.3 times mass?

same speed - mass cancels
so doesn't affect
speed

- Online Tutorial

Understand mass + weight

a) Represent mass

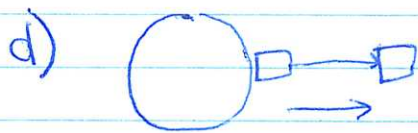
321g 120 kg

b) Represent weight

12.0 lbs 1600 kN

c) What changes moon to earth

weight only



What happens to $m + F_g$?

mass remains same
weight decreases