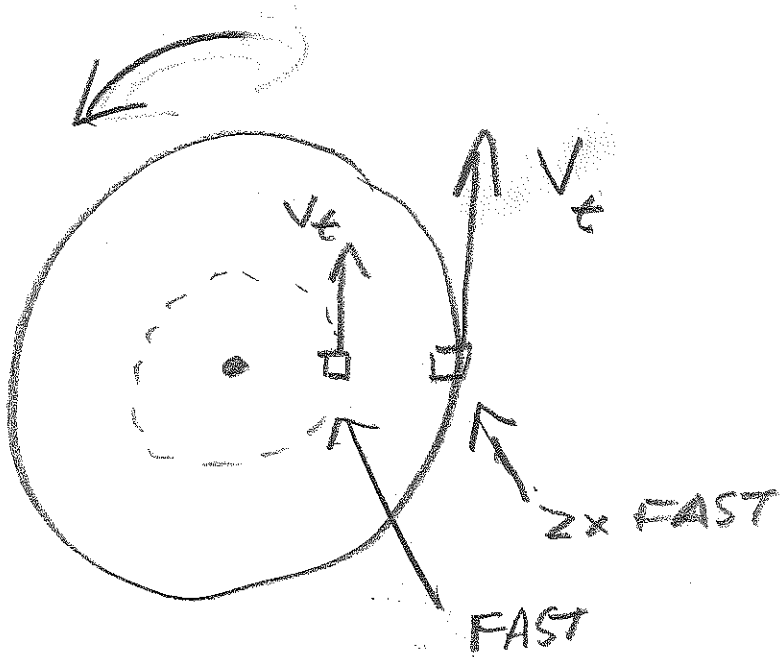
CH8 CIRCULAR MOTION

fig 8.1



V_t = tangential velocity $\left(\frac{m}{s}\right)$

$$\boxed{V_t = r \cdot \omega}$$

ω = angular velocity $\left(\frac{RAD}{s}\right)$

m = meter

RAD = RADIANS ; s = seconds

Example p125,

fig 8.4 : roll a coffee (paper) cup from "STAR BUCKS" on a table and the path bends in a circle.

reason: $v_t = r\omega$.

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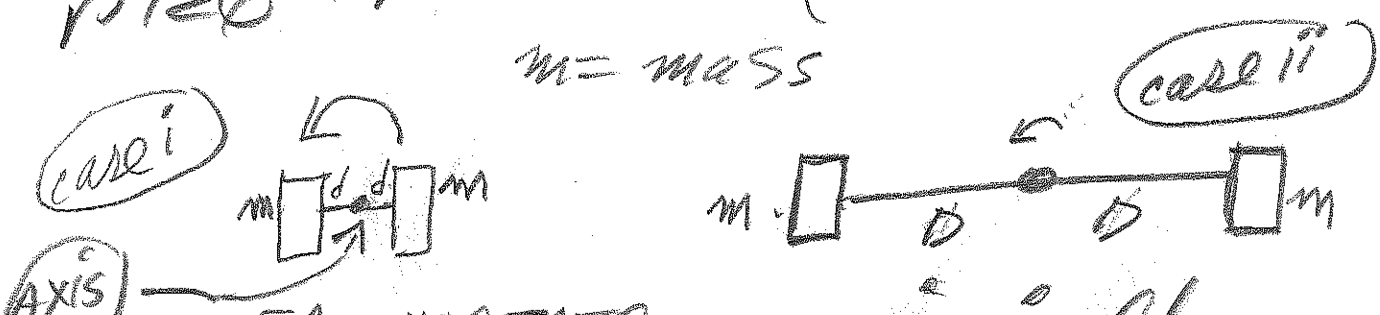
p126 ROTATIONAL INERTIA

m = mass



EASY TO ROTATE

DIFFICULT TO ROTATE

I = ROTATIONAL INERTIA

d = distance of mass from AXIS (case i)

D = " " " " " (case ii)

case i: $I_1 = 2m \cdot d^2$; case ii: $I_2 = 2mD^2$

$I_1 < I_2$ since $D > d$.

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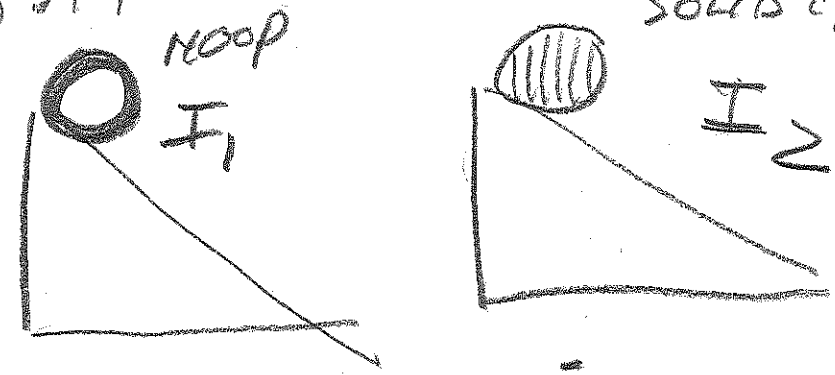
see TABLE page 128

(fig 8.15)

RACE between NOOP, CYLINDER & SOLID CYLINDER

FIG 8.14



SOLID CYLINDER WINS RACE

$$I_2 = \frac{1}{2} mR^2$$

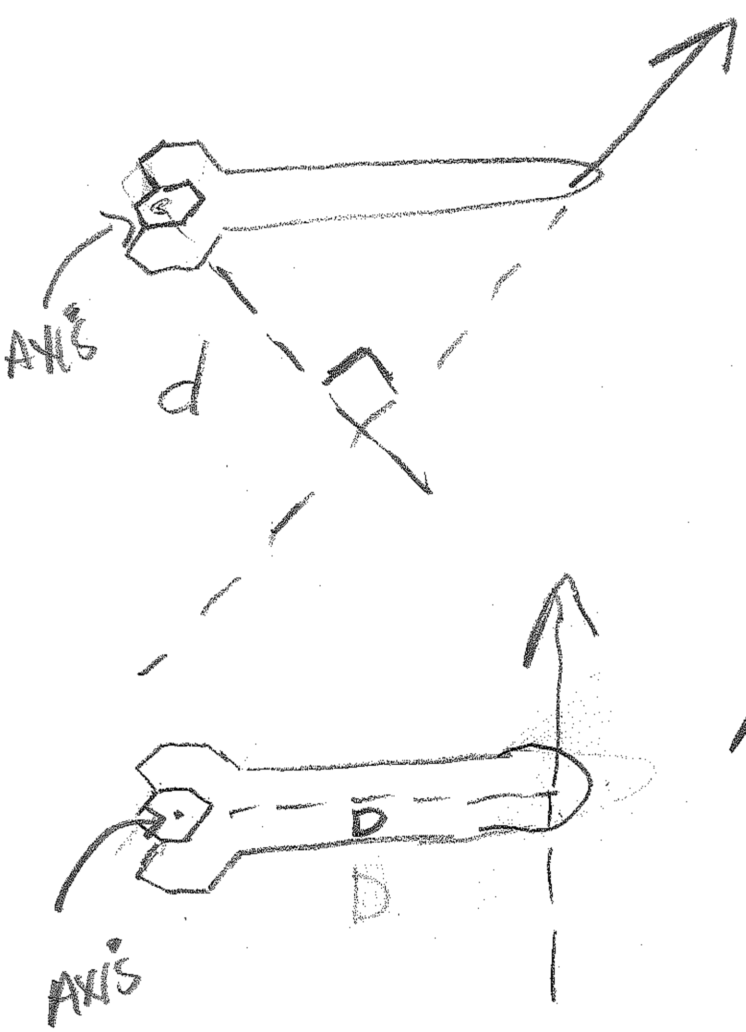
$$I_1 = mR^2$$

R = RADIUS

$$I_2 < I_1$$

TORQUE

FIG 8.20

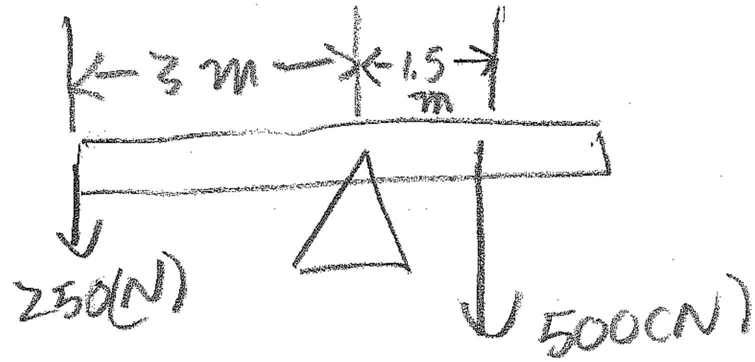


TORQUE = d·F

MORE TORQUE
= D·F

NOTE D > d.

Fig 8.17



NET TORQUE = 0

$0 = (3\,m)(250\,N) - (1.5\,m)(500\,N)$

$0 = 750\,N\cdot m - 750\,N\cdot m$

$0 = 0$

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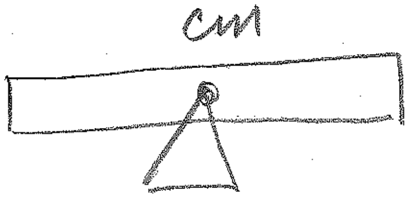
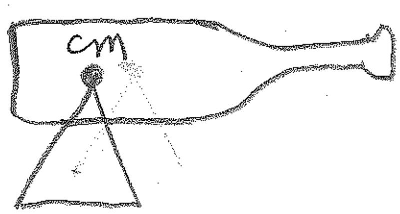
p130 center of mass = cm = balance point.

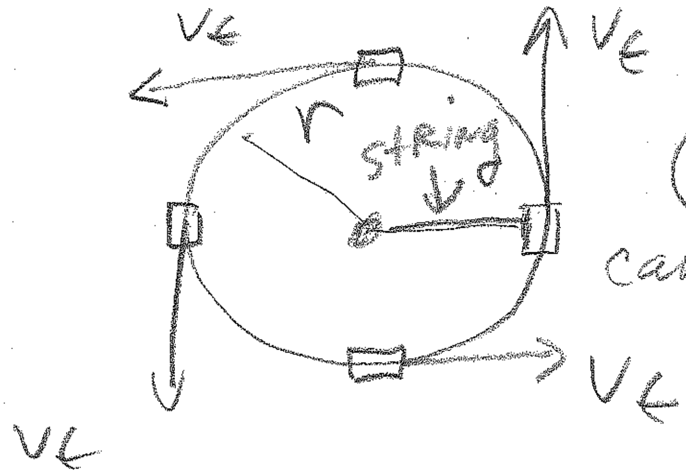


BALANCED METER STICK



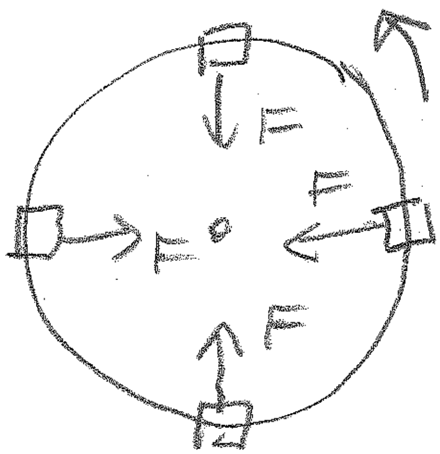
Balanced baseball bat
CM NOT at center.

centripetal force



WHIRL CAN IN CIRCLE

can; m = can mass



$$F = \frac{m v_t^2}{r}$$

F = tension in string

centripetal force is *any* force causing circular motion.