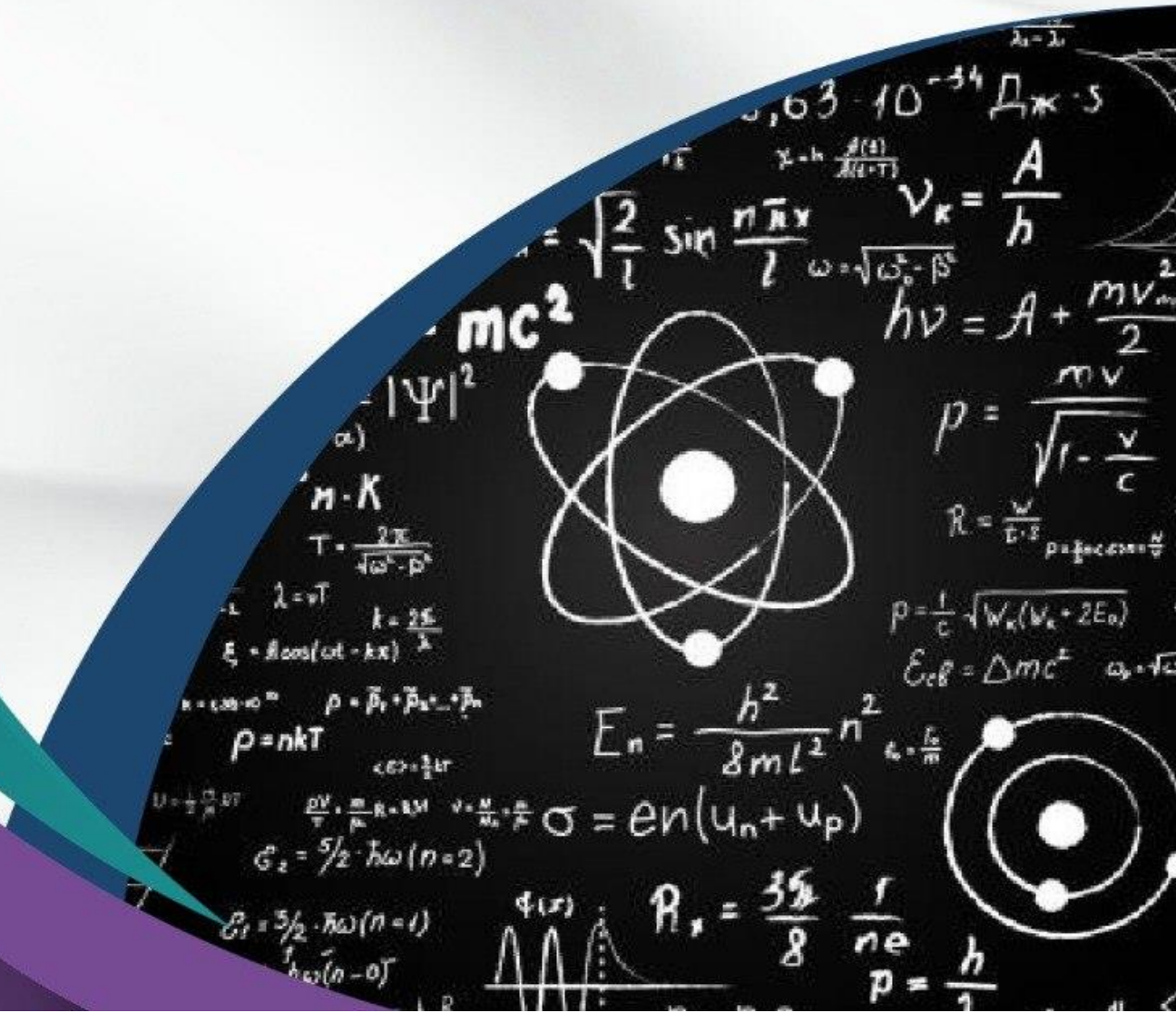
Physics 105

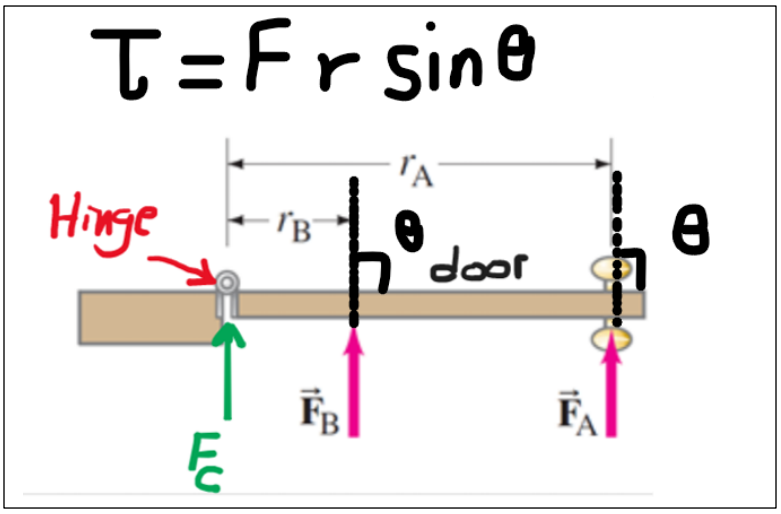
File: Chapter 8+9
Concept:

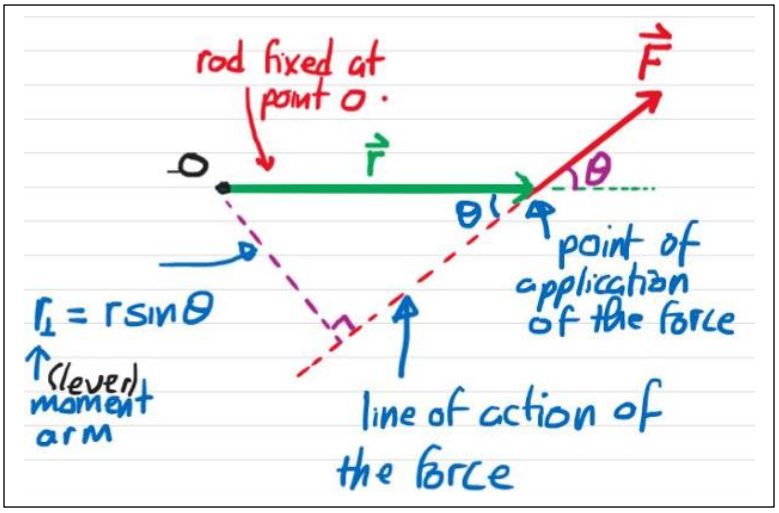


Chapter 8

Torque: Ability to cause rotation around an axis

Torque = (Length between hinge and force) x (Force) x (sin “angle between length and force”)





→ When torque equals “zero”?

1) When Force equals zero
2) When the force is applied on the hinge “distance = zero”
3) When the angle = zero or 180

→ Why do we use Sin “angle” and not cos ”angle”?

Because (sin) is the Y component of the force, and it’s what really causes movement

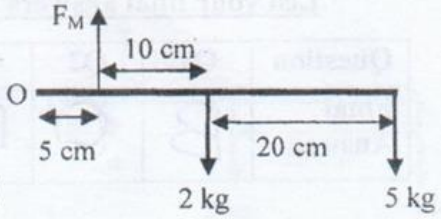
→ Torque is greatest when angle = 90

→ Clockwise = negative

→ Anti-clockwise = positive

→ Past papers on chapter 8:

Q6) How much force (F_M in N) must the biceps muscle exert when a 5.0-kg mass is held in the hand with the arm horizontal as in the figure. Assume that the mass of forearm and hand together is 2.0 kg.



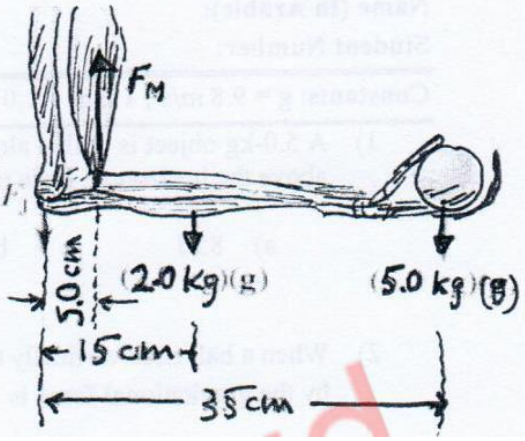
A) 803 C) 50 E) 106

B) 201 D) 402

8) How much force (F_M) must the biceps muscle exert when a 5.0-kg mass is held in the hand with the arm horizontal as in the figure. Assume that the mass of forearm and hand together is 2.0 kg and their CG is as shown.

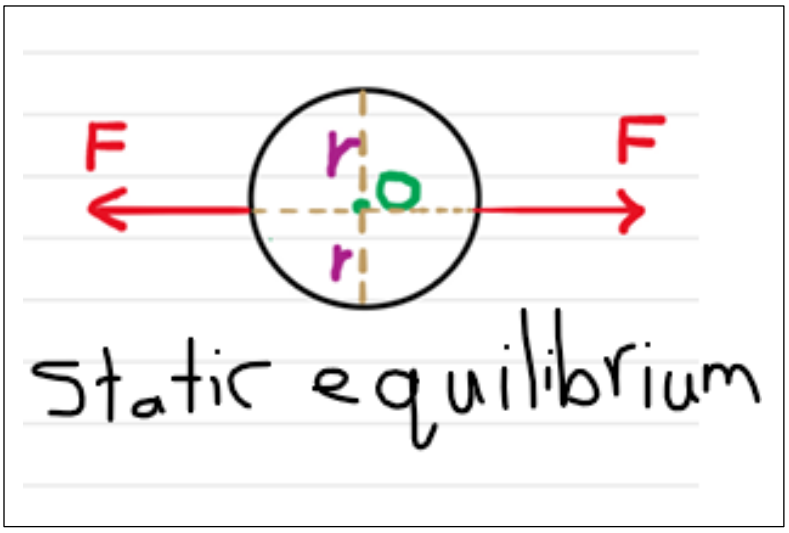
a) 800 N b) 400 N c) 100 N

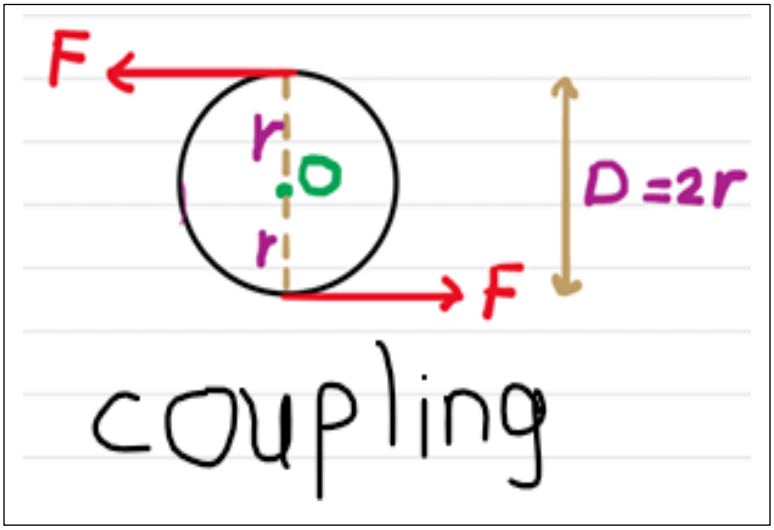
d) 200 N e) 50 N



Chapter 9

Static equilibrium: NO MOVEMENT AT ALL





Conditions for static equilibrium

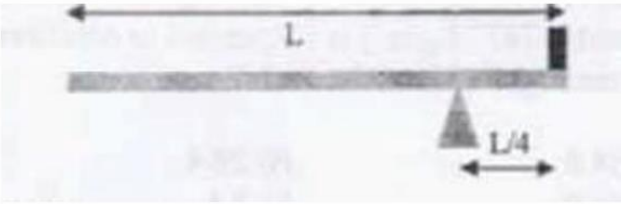
i) $\Sigma \tau = 0$

ii) $\Sigma F = 0$

} Both must be satisfied simultaneously.

A 40Kg box is placed at the end of a uniform board of length L and mass M. the pivot is placed a distance L/4 from the end of the board as shown. If the board is in static equilibrium, then the weight of the board (in N) is:

A. 200
B. 392
C. 120
D. 196
E. 784



The figure represents a forearm of mass m in a horizontal position as shown. The elbow joint, O, is 5 cm from the force exerted by the biceps muscle, F_M. when a mass M is held in the hand at the position H, the forearm is in static equilibrium. If F_M = 185 N , and M = 2.0 Kg, then the mass m (in Kg) is:

A. 1.9
B. 2.1
C. 0.5
D. 1.1
E. 1.6