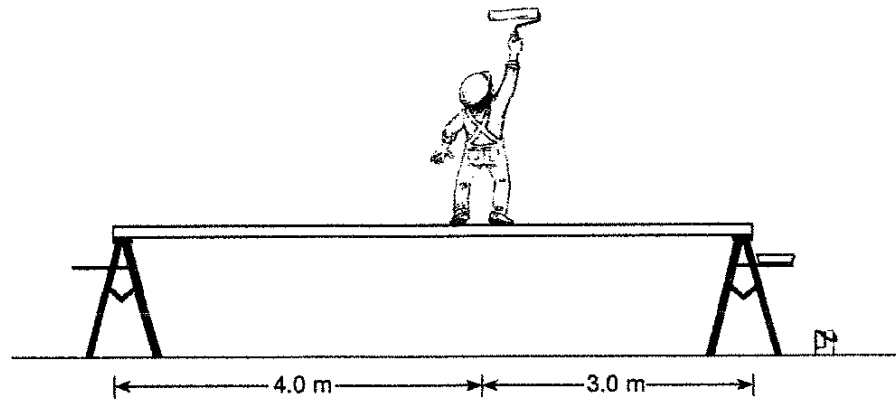[2]   I. Which of the following demonstrates the application of torque?

   A. Pulling a block across a floor
   B. Pushing a block up an incline
   C. Using a screwdriver to turn a screw
   D. Stopping a block from sliding down an incline
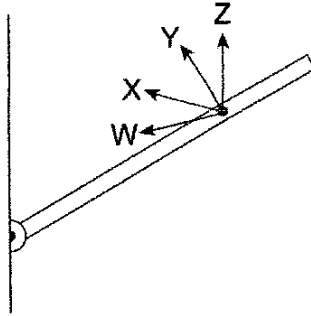
[4]   2. An 840 N painter stands on a 7.0 m board of negligible weight. The board is supported by two step-ladders as shown.

|←————————— 4.0 m ——————————→|←————— 3.0 m ——————→|

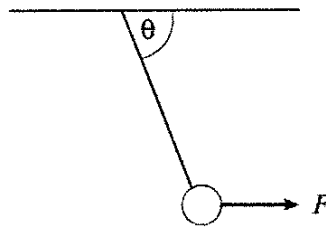What is the force exerted on the board by the left step-ladder?

   A. 360 N
   B. 420 N
   C. 630 N
   D. 840 N

[2] 3. In which direction should a force act on the boom so that it creates a **minimum** torque about the hinge?

A. W
B. X
C. Y
D. Z

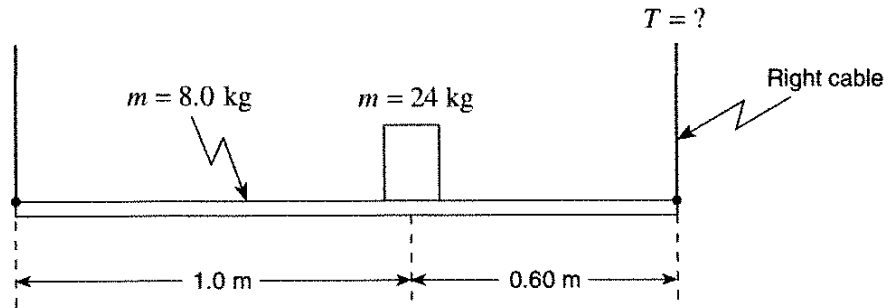[4] 4. A 5.0 kg mass is suspended by a rope. A horizontally directed force F is applied to the mass.

What magnitude of force is needed to produce an angle of $\theta = 65°$?

A. 21 N
B. 23 N
C. 44 N
D. 110 N

[4]   5. Two cables are used to support a 24 kg mass on a 1.6 m long 8.0 kg uniform horizontal beam
        as shown.
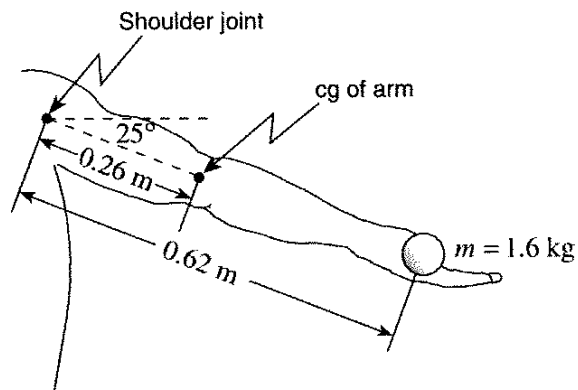
$T = ?$

m = 8.0 kg   m = 24 kg

Right cable

|←———— 1.0 m ————→|←—— 0.60 m ——→|

What is the tension T in the right cable?

A. 130 N
B. 150 N
C. 190 N
D. 300 N

[4]   6. A 1.6 kg ball is held in the hand of a fully extended 11.2 kg arm as shown.
        (cg = centre of gravity)

Shoulder joint

cg of arm

25°
0.26 m

0.62 m

m = 1.6 kg

What is the total torque about the shoulder joint due to the ball and to this arm?

A. 17 N · m
B. 19 N · m
C. 35 N · m
D. 38 N · m

[7]   7. A 4.0 m long uniform pole with a mass of 15 kg is pivoted at one end and held in position by a horizontal cable at the other end. If a 25 kg mass is suspended from the end of the pole, what is the tension in the horizontal cable?   **(7 marks)**

50°

15 kg

Cable

25 kg