Torque - Practice
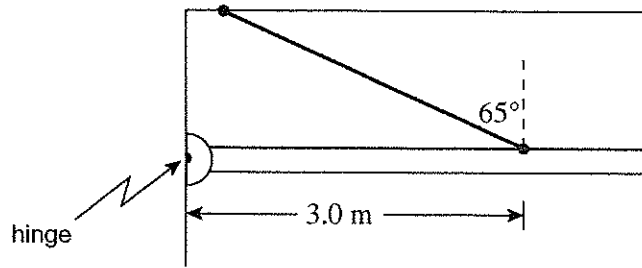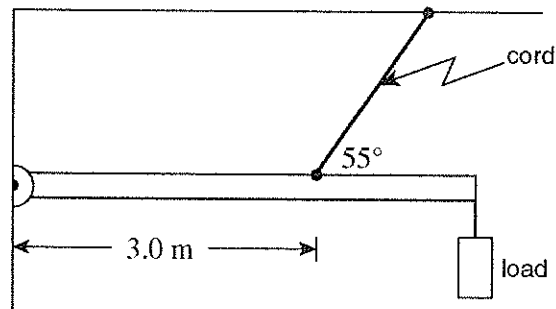
1. A uniform 3.5 m beam of mass 54 kg is supported by a cord attached at the 3.0 m position and at an angle as shown in the diagram. The tension in the cord is 730 N.

What is the magnitude of the torque produced by the cord about the hinge?

A.   310 N·m
B.   930 N·m
C.   2000 N·m
D.   2200 N·m

2. The horizontal uniform beam shown below is 4.0 m long and has a mass of 120 kg.

If the maximum tension allowed in the cord is 2.7×10^3 N, what is the maximum load that can be hung from the end of the beam?
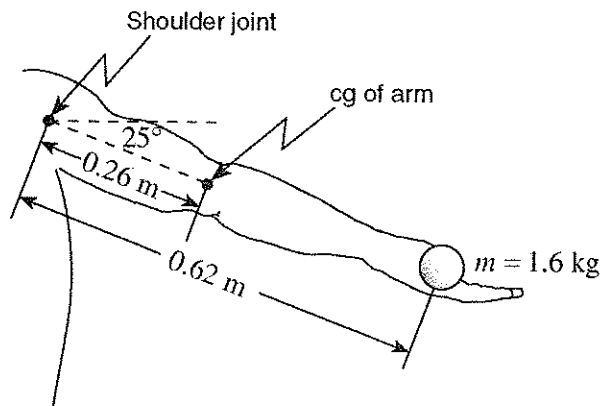
A.   59 kg
B.   110 kg
C.   150 kg
D.   230 kg

3. Two cables are used to support a 24 kg mass on a 1.6 m long 8.0 kg uniform horizontal beam as shown.
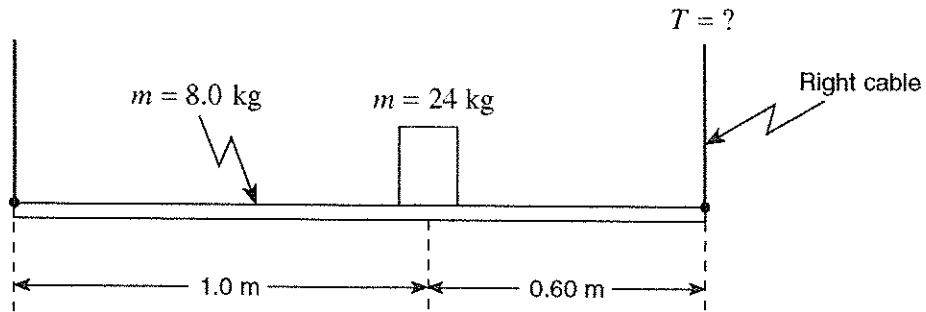
What is the tension T in the right cable?

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

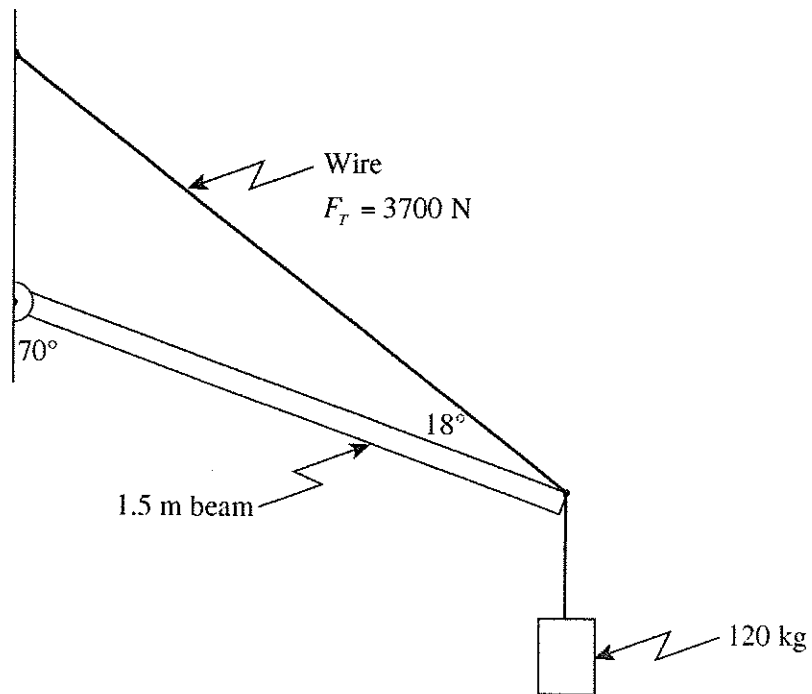4. A 1.6 kg ball is held in the hand of a fully extended 11.2 kg arm as shown. (cg = centre of gravity)

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

5. **(5 marks)**
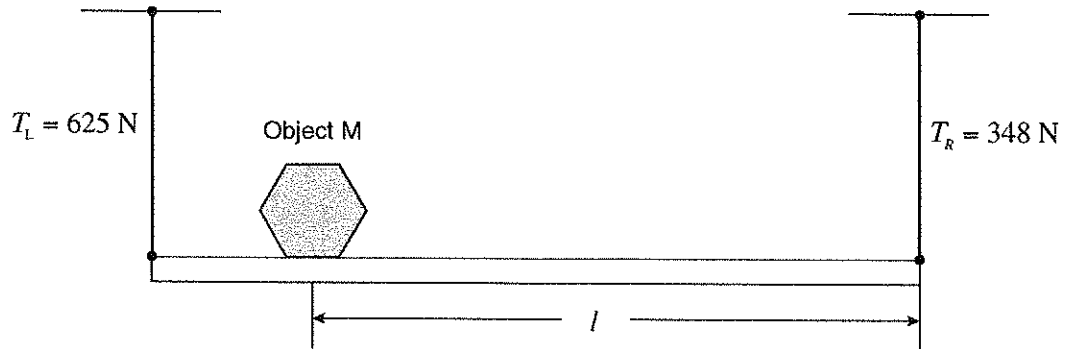
A 1.5 m-long uniform beam supports a 120 kg load. The beam is suspended by a wire connected as shown. This wire is under a tension of 3700 N.

Wire
$F_T = 3700$ N

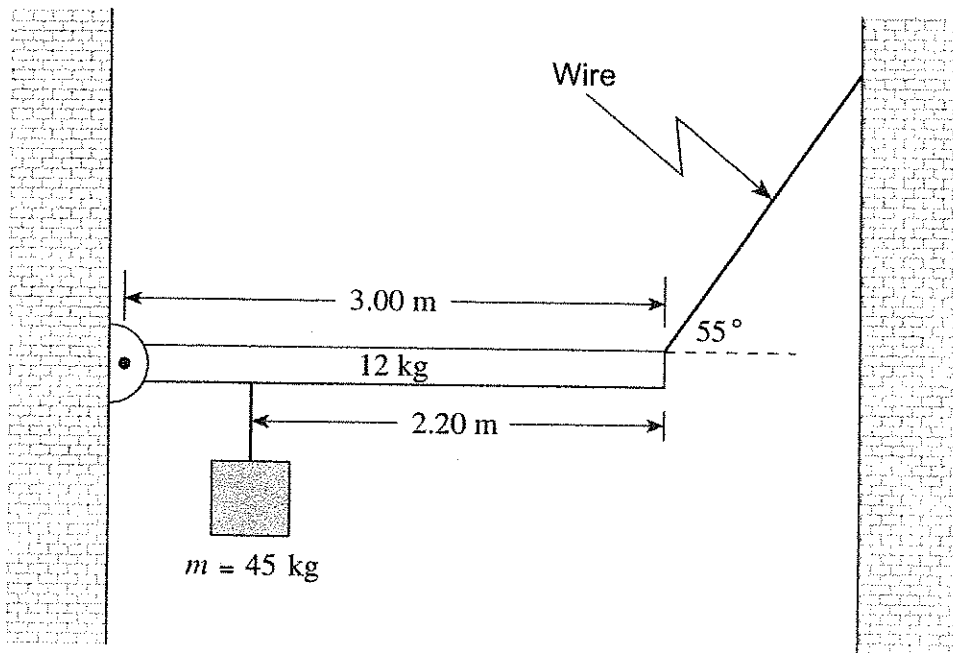70°

18°

1.5 m beam

120 kg

What is the mass of the beam?

6. (5 marks)

Two vertical wires with tensions as indicated support a uniform 14 kg, 3.0 m-long beam carrying an object of mass M as shown.

$T_L = 625$ N   Object M $T_R = 348$ N

l

At what distance l from the right-hand wire is the object located?
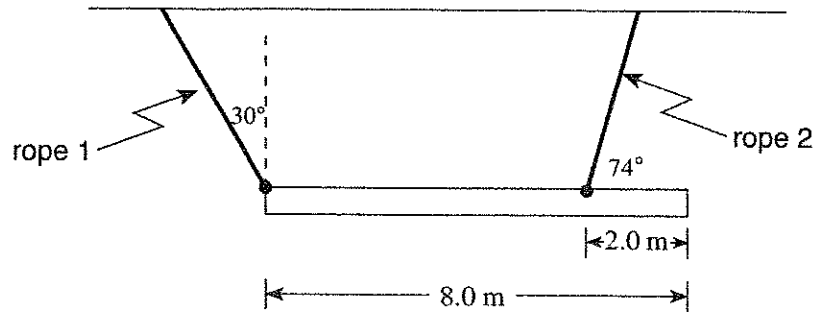
7. A uniform 12 kg beam of length 3.00 m holding a 45 kg mass is attached by a wire to a wall as shown.

What is the tension in the wire?   (7 marks)

$\cancel{8}$. The 8.0 m uniform beam shown below, suspended horizontally by two ropes, has a mass of 75 kg.

Determine the tension in rope 1 and the tension in rope 2.   (7 marks)