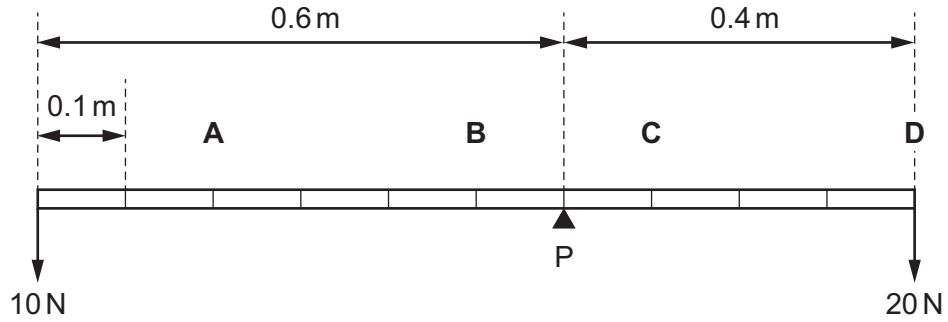
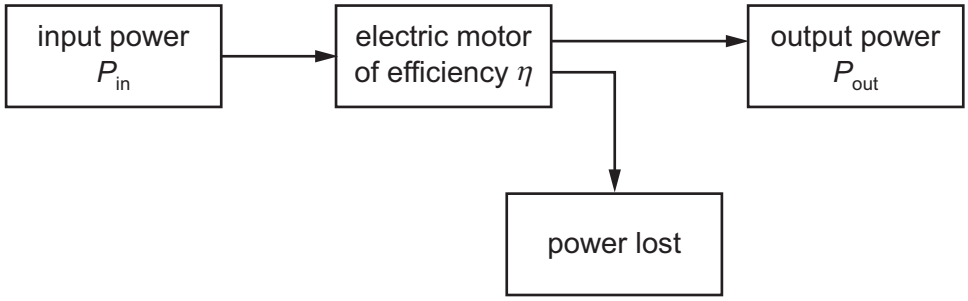
15 A uniform beam is pivoted at P as shown. Weights of 10 N and 20 N are attached to its ends.

The length of the beam is marked at 0.1 m intervals. The weight of the beam is 100 N.

At which point should a further weight of 20 N be attached to achieve equilibrium?



16 An electric motor has an input power P_{in}, useful output power P_{out} and efficiency η.



How much power is lost by the motor?

A ηP_{in} **B** $\left(\frac{1}{\eta}-1\right)P_{in}$ **C** ηP_{out} **D** $\left(\frac{1}{\eta}-1\right)P_{out}$

17 A shot-put champion accelerates a 7.0 kg metal ball in a straight line. The ball moves from rest to a speed of 12 m s^{-1} in a distance of 1.2 m.

What is the average resultant force on the metal ball?

A 70 N **B** 210 N **C** 420 N **D** 840 N

Space for working