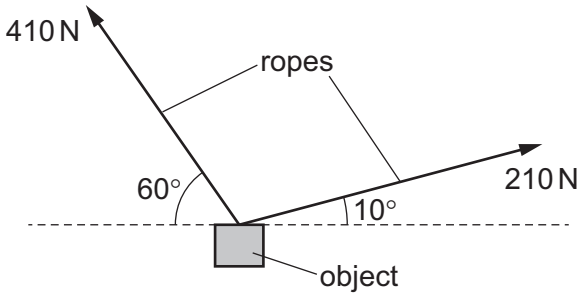
14 An object is suspended by two ropes. One rope has a tension of 410 N at an angle of 60° to the horizontal. The other rope has a tension of 210 N at an angle of 10° to the horizontal.



The object is in equilibrium.

What is the mass of the object?

A 40 kg **B** 42 kg **C** 390 kg **D** 410 kg

15 A solid cube is floating in equilibrium in liquid mercury. The cube is made of iron of density 7900 kg m^{-3}.

The cube floats with 42% of its volume above the surface of the mercury.

What is the density of the mercury?

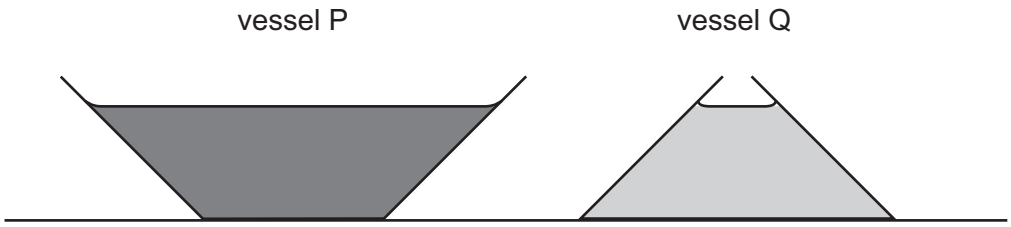
A 3300 kg m^{-3}

B 4600 kg m^{-3}

C 14 000 kg m^{-3}

D 19 000 kg m^{-3}

16 The diagram shows two vessels, P and Q, both with sides inclined at 45° to the horizontal.



Vessel P tapers outwards and vessel Q tapers inwards, as shown.

Both vessels contain a liquid. The depth of the liquid in the vessels is the same. The liquid in vessel P is twice as dense as the liquid in vessel Q.

What is the ratio $\frac{\text{pressure due to the liquid on the base of P}}{\text{pressure due to the liquid on the base of Q}}$?

A $\frac{2}{1}$ **B** $\frac{\sqrt{2}}{1}$ **C** $\frac{1}{\sqrt{2}}$ **D** $\frac{1}{2}$