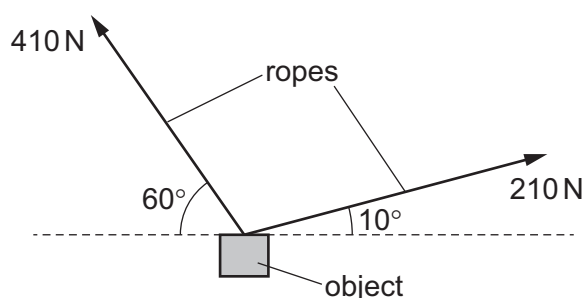


- 14 An object is suspended by two ropes. One rope has a tension of 410 N at an angle of  $60^\circ$  to the horizontal. The other rope has a tension of 210 N at an angle of  $10^\circ$  to the horizontal.



The object is in equilibrium.

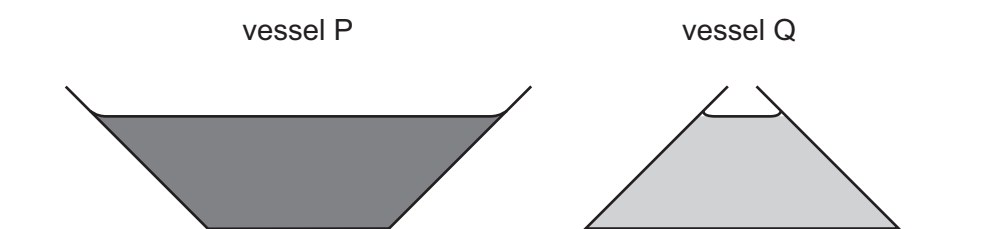
What is the mass of the object?

- 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  $7900 \text{ kg m}^{-3}$ .

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

What is the density of the mercury?

- A**  $3300 \text{ kg m}^{-3}$   
**B**  $4600 \text{ kg m}^{-3}$   
**C**  $14\,000 \text{ kg m}^{-3}$   
**D**  $19\,000 \text{ kg m}^{-3}$
- 16 The diagram shows two vessels, P and Q, both with sides inclined at  $45^\circ$  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**  $\frac{1}{2}$