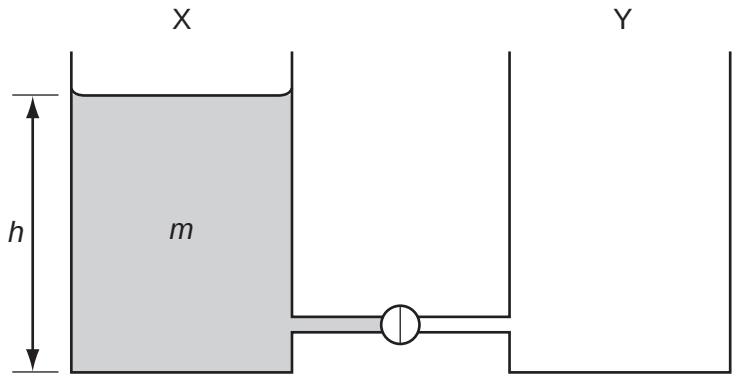
14 The forward motion of a motor-boat is opposed by forces F which vary with the boat's speed v in accordance with the relation $F = kv^2$, where k is a constant.

The effective power of the propellers required to maintain the speed v is P.

Which expression relates k, P and v?

A $k = \frac{P}{v}$ **B** $k = \frac{P}{v^2}$ **C** $k = \frac{P}{v^3}$ **D** $k = \frac{P}{v^4}$

15 The diagram shows two identical vessels X and Y connected by a short pipe with a tap.



Initially, X is filled with water of mass m to a depth h, and Y is empty.

When the tap is opened, water flows from X to Y until the depths of water in both vessels are equal.

How much potential energy is lost by the water during this process? (g = acceleration of free fall)

A 0 **B** $\frac{mgh}{4}$ **C** $\frac{mgh}{2}$ **D** mgh

Space for working