16 A team of nine dogs can pull a sledge with a combined force of 800 N at a speed of $1.5\,m\,s^{-1}$ for 360 minutes.

What is the average work done by each dog during this time?

A 4.8×10^4 J **B** 4.3×10^5 J **C** 2.9×10^6 J **D** 2.6×10^7 J

17 Which statement is correct?

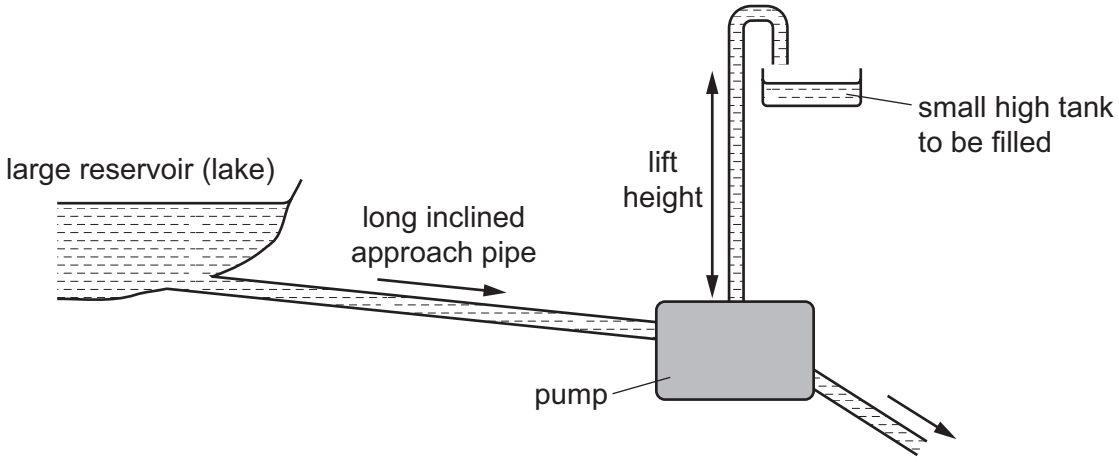
A A ball lands on the ground and bounces. The kinetic energy changes sign, because the ball changes direction.

B A car drives up a slope at a steady speed. The power generated by the engine equals the potential energy gained per unit time.

C An electric heater can be 100% efficient.

D It is impossible for momentum to be conserved in a collision.

18 The diagram shows a pump called a hydraulic ram.



In one such pump the long approach pipe holds 500 kg of water. A valve shuts when the speed of this water reaches $2.0\,m\,s^{-1}$ and the kinetic energy of this water is used to lift a small quantity of water by a height of 15 m.

The efficiency of the pump is 10%.

Which mass of water could be lifted 15 m?

A 0.15 kg **B** 0.68 kg **C** 1.5 kg **D** 6.8 kg

19 A conveyor belt is driven at velocity v by a motor. Sand drops vertically on to the belt at a rate of $m\,kg\,s^{-1}$.

What is the additional power needed to keep the conveyor belt moving at a steady speed when the sand starts to fall on it?

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