

- 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.

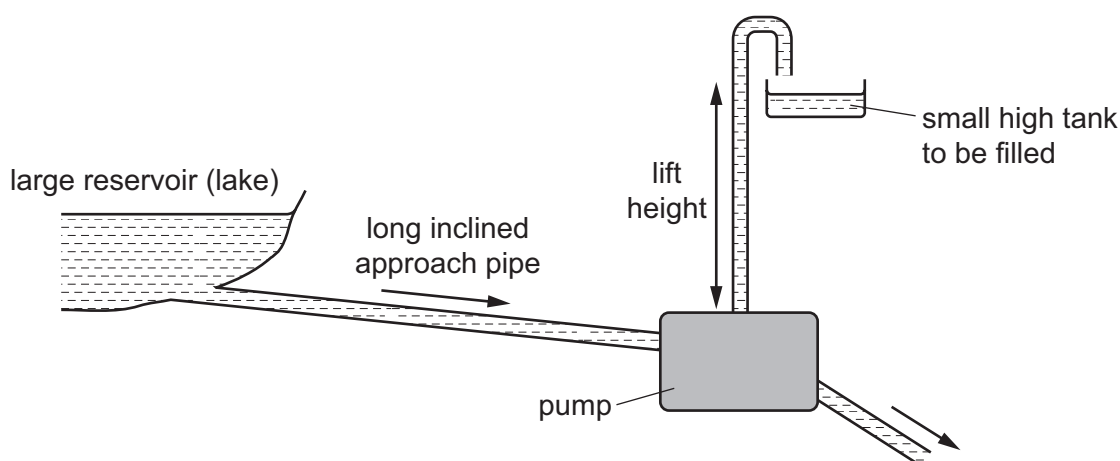
What is the average work done by each dog during this time?

- A $4.8 \times 10^4 \text{ J}$ B $4.3 \times 10^5 \text{ J}$ C $2.9 \times 10^6 \text{ J}$ D $2.6 \times 10^7 \text{ J}$

- 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 $m \text{ kg s}^{-1}$.

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