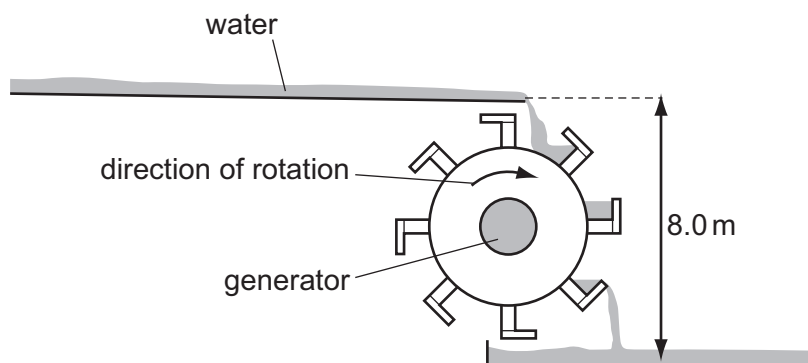


- 18 The diagram shows the design of a water wheel which drives a generator to produce electrical energy. The flow rate of the water is  $200 \text{ kg s}^{-1}$ . The generator supplies a current of  $32 \text{ A}$  at a voltage of  $230 \text{ V}$ .



Ignoring any changes in kinetic energy of the water, what is the efficiency of the system?

- A** 14 %                      **B** 16 %                      **C** 22 %                      **D** 47 %
- 19 A car engine exerts an average force of  $500 \text{ N}$  in moving the car  $1.0 \text{ km}$  in  $200 \text{ s}$ .  
What is the average power developed by the engine?
- A**  $2.5 \text{ W}$                       **B**  $2.5 \text{ kW}$                       **C**  $100 \text{ kW}$                       **D**  $100 \text{ MW}$
- 20 A mass of gas enclosed in a cylinder by a piston is heated gently. At the same time, the piston is moved so that the pressure remains constant.
- As a result of this, what will **not** occur?
- A** The average velocity of the molecules will increase.  
**B** The mean separation of the molecules will increase.  
**C** The molecules will travel greater distances between collisions.  
**D** The number of collisions per second of the molecules on the piston will increase.

**Space for working**