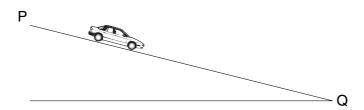
17 A car driver adjusts the pressure on a car's brakes so that the car travels at constant speed down a hill from P to Q.



The magnitude of the change in the car's kinetic energy is ΔE_k . The magnitude of the change in its gravitational potential energy is $\Delta E_{\rm p}$.

Which statement is correct?

- **A** $\Delta E_k > \Delta E_p$ **B** $\Delta E_k = \Delta E_p$ **C** $\Delta E_p > \Delta E_k > 0$ **D** $\Delta E_k = 0$
- 18 An area of land is an average of 2.0 m below sea level. To prevent flooding, pumps are used to lift rainwater up to sea level.

What is the minimum pump output power required to deal with 1.3×10⁹ kg of rain per day?

- 15 kW
- В 30 kW
- 150 kW
- 300 kW
- 19 A twig from a tree drops from a 200 m high cliff on to a beach below. During its fall, 40% of the twig's energy is converted into thermal energy.

What is the speed with which the twig hits the beach?

- $35 \, \mathrm{m \, s^{-1}}$
- **B** $40 \,\mathrm{m \, s^{-1}}$ **C** $49 \,\mathrm{m \, s^{-1}}$
- **D** $63 \,\mathrm{m \, s^{-1}}$
- 20 Pollen grains are suspended in a liquid and are illuminated strongly. When observed under a microscope they are seen to be in continuous random motion.

What is the reason for this?

- Α convection currents in the liquid
- В evaporation of the liquid
- C molecules of the liquid colliding with the pollen grains
- D pollen grains colliding with each other