

## Questions

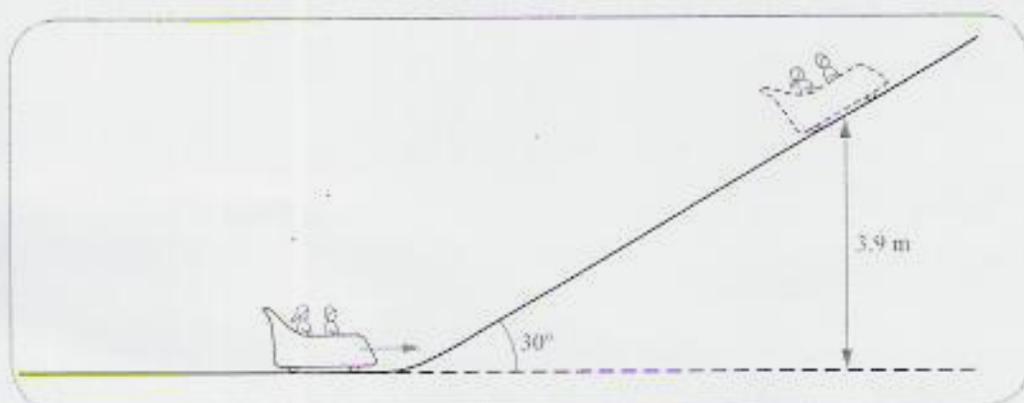
- ✓ 1 a Explain the quantities:
- i gravitational potential energy [2]
  - ii kinetic energy [2]
  - iii power. [1]
- ✓ b Water leaves a reservoir and falls through a vertical height of 130 m and causes a water wheel to rotate. The rotating wheel is then used to produce 110 kW of electrical power.
- i Calculate the velocity of the water as it reaches the wheel, assuming that all the gravitational potential energy is converted to kinetic energy. [3]
  - ii Calculate the mass of water flowing through the wheel per second, assuming that the production of electrical energy is 100% efficient. [3]
  - iii State and explain two reasons why the mass of water flowing per second needs to be greater than the value in ii in order to produce this amount of electrical power. [2]

Hint

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[Total 13]

- 2 a Define:
- i power [1]
  - ii a joule. [1]
- ✓ b The diagram shows part of a fairground ride with a carriage on rails.



The carriage of mass 500 kg is travelling towards a slope inclined at  $30^\circ$  to the horizontal. The carriage has a kinetic energy of 25 kJ at the bottom of the slope. The carriage comes to rest after travelling up the slope to a vertical height of 3.9 m.

- i Show that the potential energy gained by the carriage is 19 kJ. [2]
- ii Calculate the work done against the resistive forces as the carriage moves up the slope. [1]
- iii Calculate the resistive force acting against the carriage as it moves up the slope. [3]

Hint

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[Total 8]

*continued*