

Marks

2. An electric water heater takes 6 minutes to heat 10 kg of water to a temperature of 80 °C. The water heater operates from 230 V and 35 A.

(a) Calculate, showing all working and units:
the electrical energy used by the water heater;

3

(b) the starting temperature of the water. (Apply the law of conservation of energy and assume no energy losses.)

4
(7)

[Turn over

Marks

11. The maximum drop on a roller coaster is 50 m as shown in Figure Q11(a).

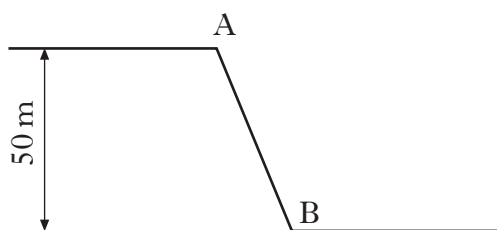


Figure Q11(a)

A carriage of mass 150 kg holding four passengers with an average mass of 75 kg is raised to position A on the roller coaster.

- (a) Calculate, for a **full** carriage:

(i) the potential energy at position A;

3

(ii) the maximum velocity at position B. (Apply the law of conservation energy and assume no energy losses.)

4