

**GCSE Physics A (Gateway)**

**J249/04 Physics A P5-P8 and P9 (Higher Tier)**

**Question Set 11**

1 (a) Fig. 1.1 is a speed-time graph for car P.

The driver of car P reacts to a traffic light at time = 0.00 s, then presses the brakes at time = 0.50 s.

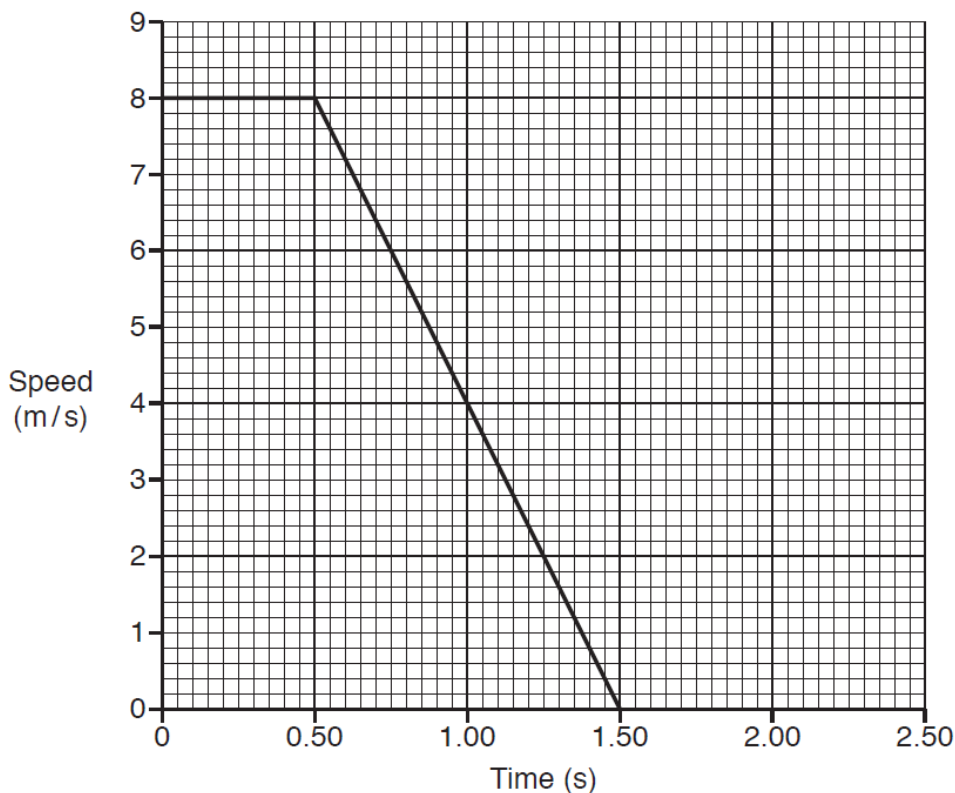


Fig. 1.1

(i) The braking distance is the same size as the thinking distance.

Explain how the graph in Fig. 1.1 shows this.

[1]

(ii) Add another line to the graph in Fig. 1.1 to show the journey of car Q.

- Car Q is travelling at 8 m / s.
- The driver of car Q reacts, then presses the brakes after 0.75 s.
- Car Q decelerates at the same rate as car P.

[2]

(b) Driver P measures the reaction time of driver Q using a 30 cm ruler.

Driver P drops a 30 cm ruler vertically and driver Q catches it.

(i) Explain how the ruler can be used to estimate reaction time.

[1]

(ii) State **one** precaution they can use to get accurate results.

[1]

- (c) In the brakes of a car there are brake pads and a brake disc, as shown in Fig. 1.2.

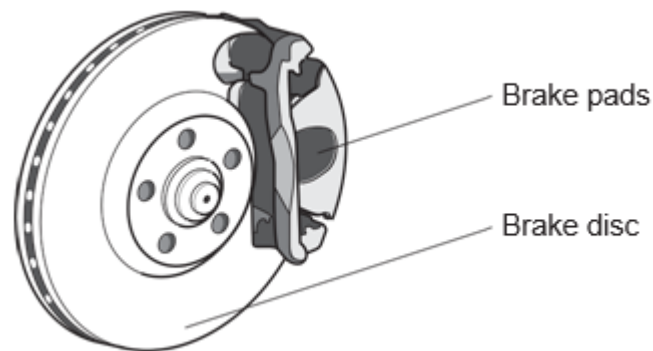


Fig. 1.2

When a car stops, energy transfers between stores.

The brake pads squeeze the brake disc and cause a friction force.

- (i) Explain how braking stops the car.

Include ideas about **energy stores** in your answer.

[2]

- (ii) High speed cars have ventilated brakes with air holes in the disc, as shown in Fig. 1.3.

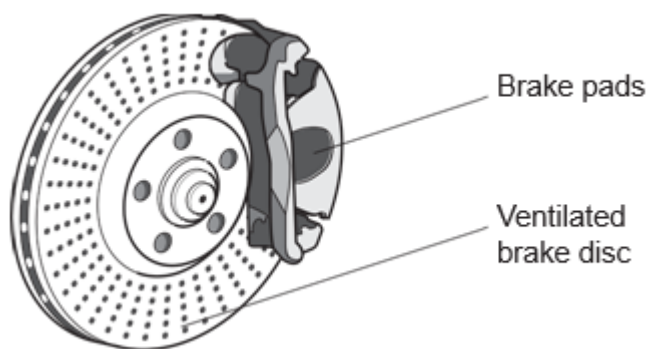


Fig. 1.3

The air holes allow more air to circulate around the disc.

Suggest how these brakes can reduce braking distances.

[1]

**Total Marks for Question Set 11: 8**

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