Section A

Answer **all** the questions in this section.

1   A car has total mass 1100 kg and an initial speed of 18.0 m s^{-1}.

A set of traffic lights turn red when the driver is some distance from them. The driver applies the brakes. This results in a braking force on the car.

The braking force increases uniformly from zero to 1980 N in 10.0 s. It then decreases uniformly back to zero in the next 10.0 s.

Fig. 1.1 is the graph of braking force against time for the car approaching the traffic lights.
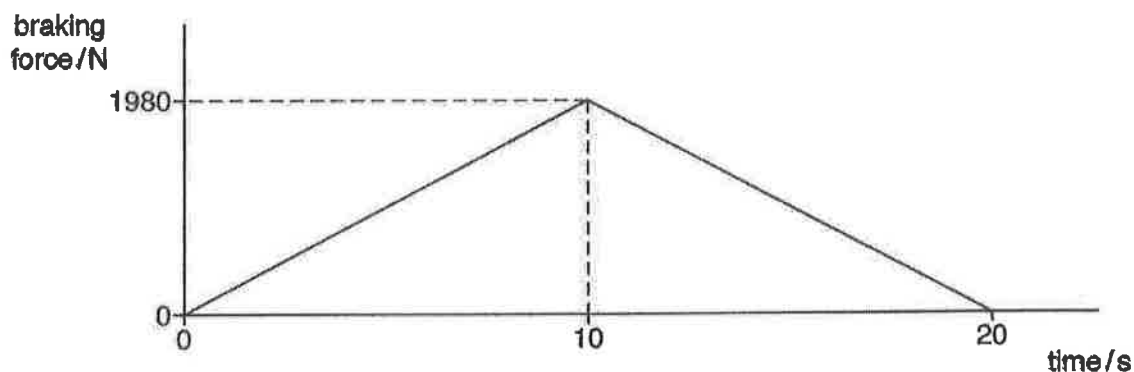

Fig. 1.1

(a) The car stops at 20.0 s.

(i) On Fig. 1.2, sketch a graph to show how the speed of the car changes from the instant that the brakes are applied until it stops.
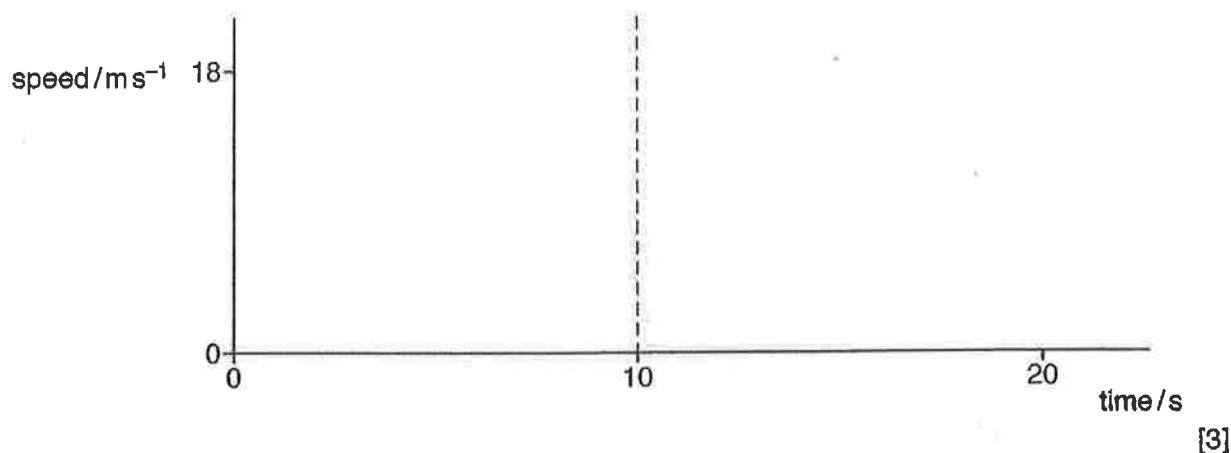

speed/m s⁻¹

Fig. 1.2

[3]

(ii) On Fig. 1.3, sketch a graph to show the distance travelled by the car from the instant the brakes are applied until it stops. You are not required to calculate any numerical values for distance.
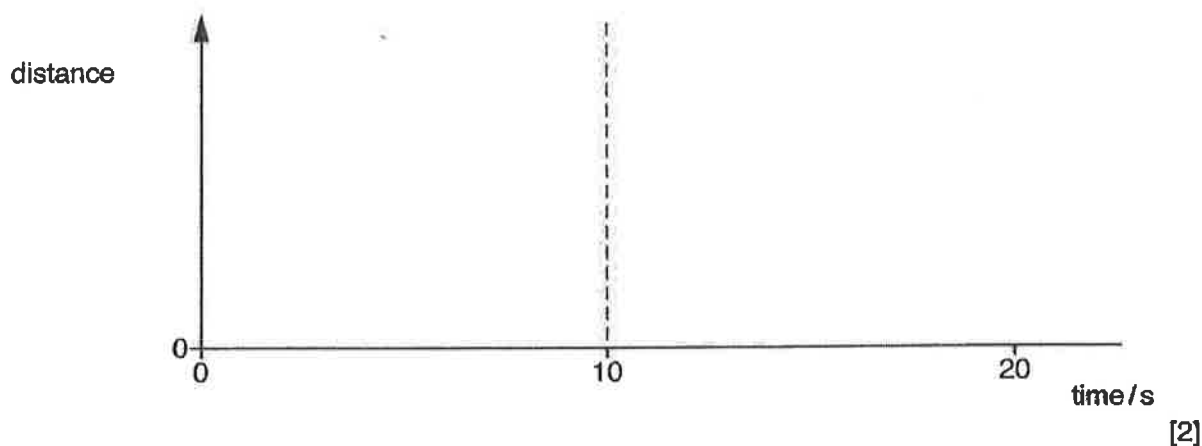

distance

Fig. 1.3

[2]

(b) Explain why applying a braking force as shown in Fig. 1.1 is more comfortable for passengers than applying a constant force.

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....[2]

[Total: 7]