3 **(a)** Define velocity.

.....

..... [1]

(b) A constant driving force of 2400 N acts on a car of mass 1200 kg. The car accelerates from rest in a straight line along a horizontal road.

Assume that the resistive forces acting on the car are negligible.

(i) Calculate the acceleration of the car.

acceleration = ... $m\,s^{-2}$ [1]

(ii) On Fig. 3.1, sketch a graph showing the variation with time t of the velocity v of the car for the first 20 seconds of its motion.

Label this line A.

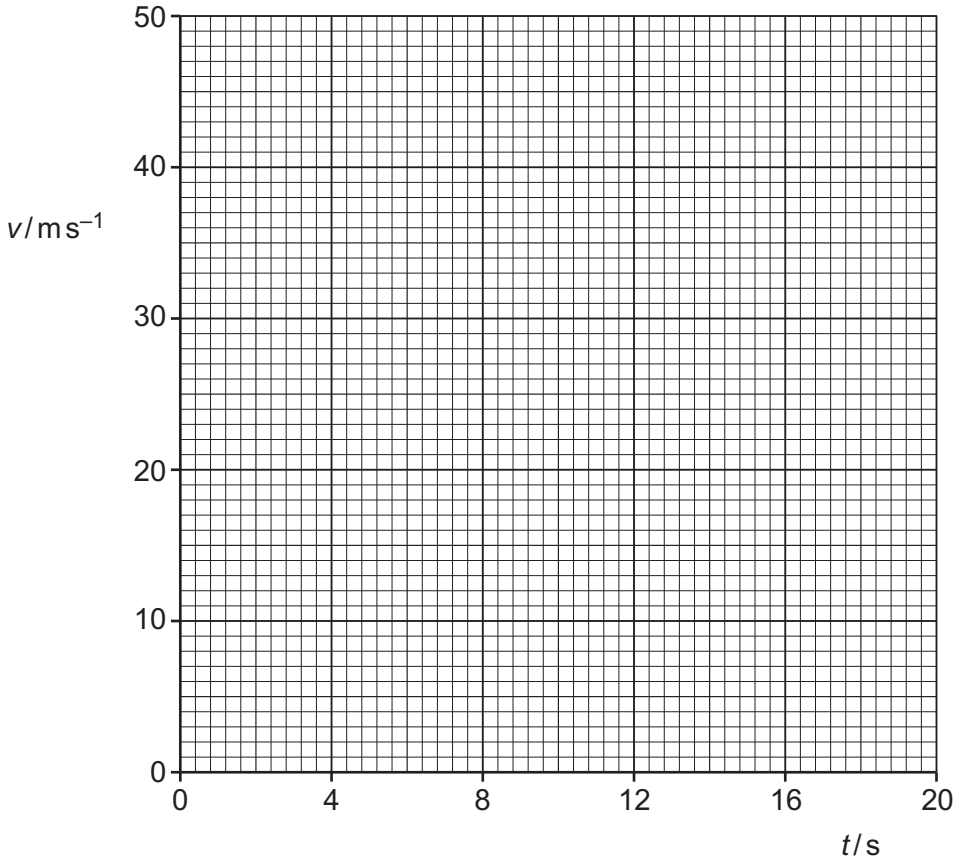

Fig. 3.1

[2]

(c) In reality, a resistive force due to air resistance acts on the car in **(b)**. This resistive force increases with speed until it becomes equal in magnitude to the driving force at time $t = 12\,s$.

(i) On Fig. 3.1, sketch a second line to show the variation with time t of the velocity v of the car for the first 20 seconds of its motion. Label this line B. [3]

(ii) At time $t = 20\,s$, the driving force is increased to 3000 N and remains constant at this value.

Describe how the velocity of the car changes due to this increase in the driving force.

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.....

.....

..... [2]

[Total: 9]