1.

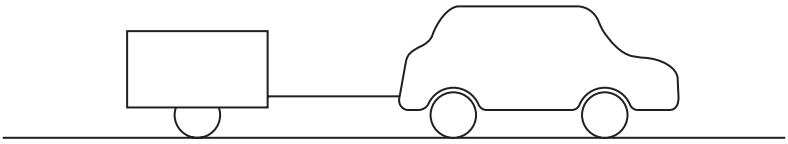


Figure 1

A car of mass 500 kg is towing a trailer of mass 150 kg along a straight horizontal road. The trailer is attached to the car by a towbar, as shown in Figure 1.

The towbar is parallel to the direction of motion of the car and the trailer.

The towbar is modelled as a light rod.

The resistance to the motion of the car is modelled as a constant force of magnitude 350 N.

The resistance to the motion of the trailer is modelled as a constant force of magnitude 200 N.

The engine of the car is working at a constant rate of 10.5 kW.

At the instant when the car and the trailer are moving with speed 14 m s^{-1}, the acceleration of the car is a m s^{-2} and the tension in the towbar is T newtons.

Using the model,

(a) find the value of a,

(4)

(b) find the value of T.

(3)

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Question 1 continued

(Total for Question 1 is 7 marks)