1. A truck of mass 1500 kg is moving on a straight horizontal road.
The engine of the truck is working at a constant rate of 30 kW.
The resistance to the motion of the truck is modelled as a constant force of magnitude R newtons.
At the instant when the truck is moving at a speed of $20\,\text{m s}^{-1}$, the acceleration of the truck is $0.6\,\text{m s}^{-2}$

(a) Find the value of R.

(4)

Later on, the truck is moving up a straight road that is inclined at an angle α to the horizontal, where $\sin\alpha = \frac{1}{8}$

The resistance to the motion of the truck from non-gravitational forces is modelled as a constant force of magnitude 500 N.
The engine of the truck is again working at a constant rate of 30 kW.
At the instant when the speed of the truck is $V\,\text{m s}^{-1}$, the deceleration of the truck is $0.2\,\text{m s}^{-2}$

(b) Find the value of V

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 1 continued

(Total for Question 1 is 8 marks)