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**Answer ALL questions. Write your answers in the spaces provided.**

**1.** A truck of mass 800 kg is moving on a straight road that is inclined at an angle $\alpha$ to the horizontal, where $\sin\alpha = \frac{1}{10}$. When the truck is moving up the road at a constant speed of $12\,\text{m s}^{-1}$, the engine of the truck is working at a constant rate of 15 kW. The resistance to the motion of the truck from non-gravitational forces is modelled as a constant force of magnitude $R$ newtons.

(a) Find the value of $R$.

**(4)**

The truck now moves down the same road. The resistance to the motion of the truck is now modelled as a constant force of magnitude 500 N. The engine of the truck is again working at a constant rate of 15 kW.

(b) Find the acceleration of the truck at the instant when it is moving at $12\,\text{m s}^{-1}$.

**(3)**

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**Question 1 continued**

**Q1**

**(Total 7 marks)**