17 **In this question use $g = 9.8\ \text{m s}^{-2}$.**

A van of mass 1300 kg and a crate of mass 300 kg are connected by a light inextensible rope.

The rope passes over a light smooth pulley, as shown in the diagram.

The rope between the pulley and the van is horizontal.

Initially, the van is at rest and the crate rests on the lower level. The rope is taut.

The van moves away from the pulley to lift the crate from the lower level.

The van's engine produces a constant driving force of 5000 N.

A constant resistance force of magnitude 780 N acts on the van.

Assume there is no resistance force acting on the crate.

17 (a) (i) Draw a diagram to show the forces acting on the crate while it is being lifted.

[1 mark]

17 (a) (ii) Draw a diagram to show the forces acting on the van while the crate is being lifted.

[1 mark]

17 (b) Show that the acceleration of the van is $0.80\ \text{m s}^{-2}$

[4 marks]

17 (c) Find the tension in the rope.

[2 marks]

17 (d) Suggest how the assumption of a constant resistance force could be refined to produce a better model.

[1 mark]