2. A car travels along a straight horizontal road between two sets of traffic lights. The distance between the two sets of traffic lights is 1500 m.

In a model of the journey, the car leaves the first set of traffic lights, accelerating uniformly from rest until it reaches a speed of V m s^{-1}, then immediately decelerates uniformly until it comes to rest at the second set of traffic lights. The car completes the journey between the two sets of lights in 120 s.

(a) Sketch a velocity-time graph which represents the above model of the journey of the car between the two sets of traffic lights.

(2)

(b) Using the model, find the value of V.

(2)

It is given that the car accelerates uniformly for T seconds.

(c) Explain why there is a range of possible values for T which satisfy the requirements of the model.

(2)

(d) Suggest one improvement to the model that would make it more realistic.

(1)

(Total 7 marks)