

1. A car moves along a straight horizontal road.

The car starts from rest at a fixed point A on the road and moves with constant acceleration for 30 seconds, reaching a speed of 15 m s^{-1} .

This speed is then maintained.

When the car has been moving for 15 seconds a motorbike starts from rest at A and moves along the same road in the same direction as the car.

The motorbike accelerates at 1.5 m s^{-2} so that it catches up with the car when the car has been moving for T seconds.

(a) Using the same axes, sketch the speed-time graph of the car and the speed-time graph of the motorbike up to the time when the motorbike catches up with the car.

(3)

(b) Find the speed of the motorbike at the instant it catches up with the car.

(6)