

- 1 (a) Define *velocity*.

.....
..... [1]

- (b) The drag force F_D acting on a car moving with speed v along a straight horizontal road is given by

$$F_D = v^2 A k$$

where k is a constant and A is the cross-sectional area of the car.

Determine the SI base units of k .

SI base units [2]

- (c) The value of k , in SI base units, for the car in (b) is 0.24. The cross-sectional area A of the car is 5.1 m^2 .

The car is travelling with a constant speed along a straight road and the output power of the engine is $4.8 \times 10^4 \text{ W}$. Assume that the output power of the engine is equal to the rate at which the drag force F_D is doing work against the car.

Determine the speed of the car.

speed = ms^{-1} [3]

[Total: 6]