3 **(a)** State what is meant by *work done*.

……

…… [1]

(b) A lift of weight 13.0 kN is connected by a cable to a motor, as shown in Fig 3.1.

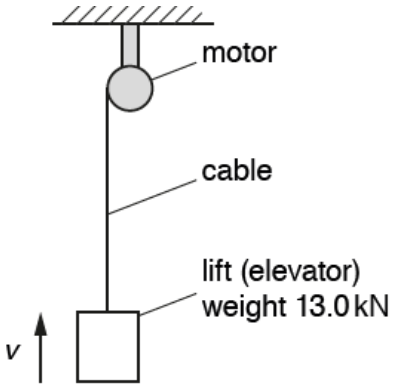

Fig. 3.1

The lift is pulled up by the cable. A constant frictional force of 2.0 kN acts on the cable by the motor when the lift is moving. The variation with time *t* of the speed *v* of the lift is shown in Fig. 3.2.

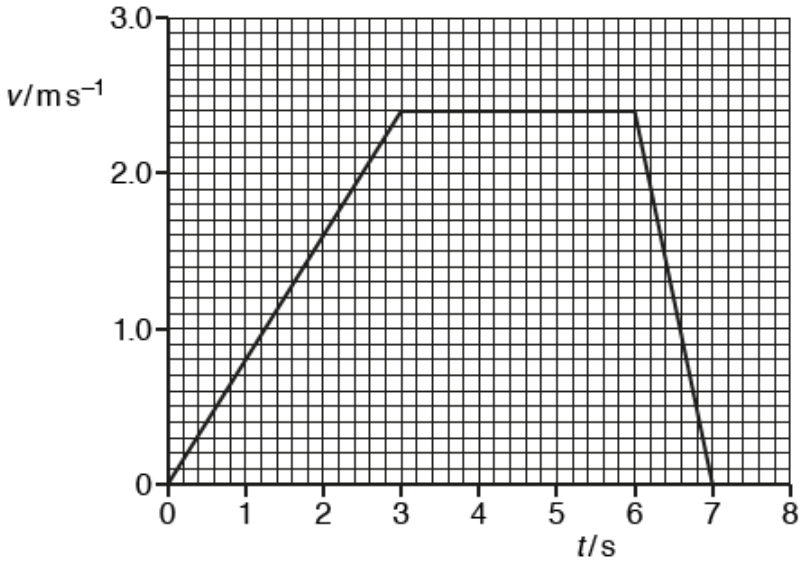

Fig. 3.2

(i) Use Fig. 3.2 to determine the displacement of the lift between time $t = 0$ and $t = 4.0$ s

displacement = …….. m [2]

(ii) Determine the work done by the motor to raise the lift between time $t = 0$ and $t = 4.0$ s.

work done = …….. J [4]

(iii) The motor has an efficiency of 67%. The tension in the cable is 1.6×10^4 N at time $t = 2.5$ s.

Determine the input power to the motor at this time.

power = …….. W [3]

[Total: 10]