2 A sky-diver jumps from a high-altitude balloon.

For Examiner's Use

(a) Explain briefly why the acceleration of the sky-diver

(i) decreases with time,

.....

.....

..... [2]

(ii) is $9.8\,m\,s^{-2}$ at the start of the jump.

.....

..... [1]

(b) The variation with time t of the vertical speed v of the sky-diver is shown in Fig. 2.1.

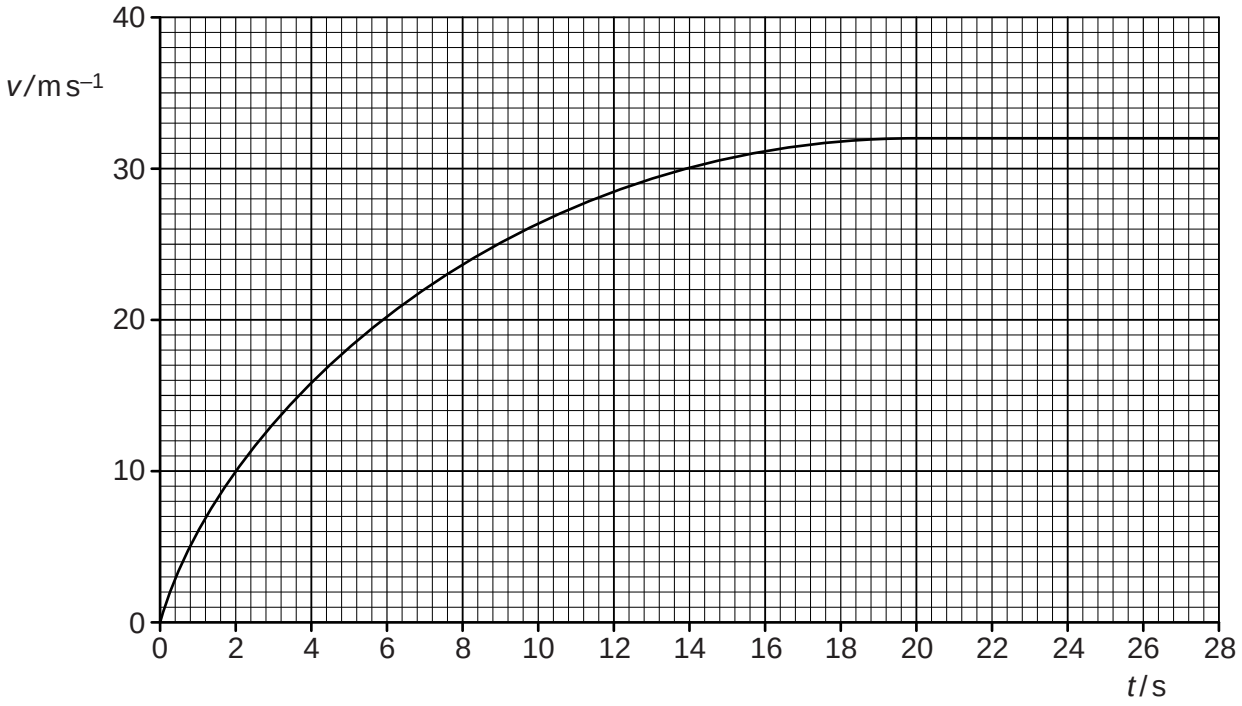

Fig. 2.1

Use Fig. 2.1 to determine the magnitude of the acceleration of the sky-diver at time $t = 6.0\,s$.

For Examiner's Use

acceleration = ... $m\,s^{-2}$ [3]

(c) The sky-diver and his equipment have a total mass of 90 kg.

(i) Calculate, for the sky-diver and his equipment,

1. the total weight,

weight = ... N [1]

2. the accelerating force at time $t = 6.0\,s$.

force = ... N [1]

(ii) Use your answers in **(i)** to determine the total resistive force acting on the sky-diver at time $t = 6.0\,s$.

force = ... N [1]

[Turn over