Question 06. *The acceleration versus time graph of a particle moving along a straight line is shown in the figure. Draw the respective velocity-time graph. Given $v = 0$ at $t = 0$.*

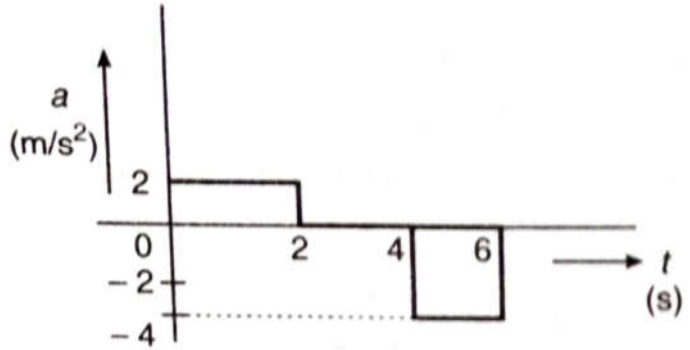

Fig. 6.33

Solution From $t = 0$ to $t = 2$ s, $a = +2$ m/s^2

$\therefore$ $v = at = 2t$

or v-t graph is a straight line passing through origin with slope 2 m/s^2.

At the end of 2 s,

$v = 2 \times 2 = 4$ m/s

From $t = 2$ to 4 s, $a = 0$.

Hence, $v = 4$ m/s will remain constant.

From $t = 4$ to 6 s, $a = -4$ m/s^2.

Hence, $v = u - at = 4 - 4t$ (with $t = 0$ at 4 s)

$v = 0$ at $t = 1$ s or at 5 s from origin.

At the end of 6 s (or $t = 2$ s) $v = -4$ m/s. Corresponding v-t graph is as shown in Fig. 6.34.

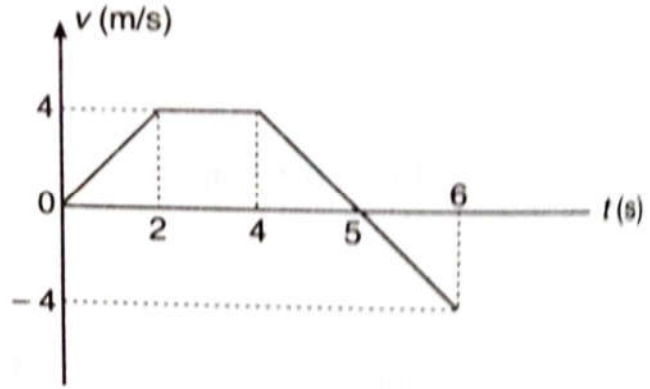

Fig. 6.34