Question Number	Scheme	Marks
8. (a)	$v = \int a\,dt = 6t - \frac{4}{2}t^2 (+c)$	M1A1
	(i) $v = 0$, (when $t = 0$) so $c = 0 \Rightarrow v = 6t - 2t^2$	A1
	(ii) $s = \int v\,dt = 3t^2 - \frac{2t^3}{3}(+d)$	M1
	$s = 5, t = 0, \Rightarrow d = 5, \Rightarrow s = 3t^2 - \frac{2t^3}{3} + 5$	M1A1
		(6)
(b)	$6t - 2t^2 = 0 \Rightarrow 2t(3-t) = 0, \Rightarrow (t = 0), \Rightarrow t = 3$	M1M1A1
	$s = 3\times 3^2 - \frac{2\times 3^3}{3} + 5 = 14\,\text{m}$	M1A1
		(5)
		(11)

Notes

(a) (i)

M1 for attempting to integrate the given expression for *a* (see General Guidance for the definition of an attempt)

A1 for the correct expression for *v* (with or without *c*)

A1 for the correct expression for *v* **AFTER** using $t = 0$ when $v = 0$. For the award of this mark they must have had (+*c*) following integration. **They cannot just assume *c* = 0.**

(ii)

M1 for an attempt to integrate their expression for *v* (with or without *d*)

M1d for substituting in $s = 5, t = 0$ to attempt to find *d*. Note; they cannot earn this mark without +*d*.

A1 for a fully correct expression for *s*

(b)

M1 setting their $v = 0$ which must be a quadratic expression.

M1 attempting to solve a two term quadratic – take *t* out as a common factor.

A1 for finding $t = 3$

M1 for substituting their $t = 3$ into their expression for *s* **AND** attempting to evaluate

A1 for $s = 14$ (m)

Note: **If they give an answer of 14m + 5 m = 19 m after 14 m is seen, award A0**