Question Number	Scheme	Marks
5.	$V = 500 \Rightarrow 4h^3 = 500$ $\Rightarrow h = 5$ $\frac{\mathrm{d}V}{\mathrm{d}h} = 12h^2$ $\frac{\mathrm{d}h}{\mathrm{d}t} = \frac{\mathrm{d}h}{\mathrm{d}V} \times \frac{\mathrm{d}V}{\mathrm{d}t} = \frac{1}{12h^2} \times 36$ $= \frac{36}{12 \times 5^2} = \frac{3}{25} = 0.12$ cm/s	M1 A1 M1 A1 M1 M1 A1 (7)

Notes

Question 5

Note: Parts of the question can be found anywhere in their working on the page

M1 for $V = 500 \Rightarrow 4h^3 = 500$

A1 $h = 5$ cso

M1 for differentiating $V = 4h^3$ (usual rules apply)

A1 for $\frac{dV}{dh} = 12h^2$ cso

M1 for applying chain rule to find an expression for $\frac{dh}{dt} = \frac{dh}{dV} \times \frac{dV}{dt}$ or any correct arrangement

(expression is sufficient – substitution of values is not required for this mark)

M1 for substituting values into their $\frac{dh}{dt}$

A1 for $\frac{dh}{dt} = \frac{3}{25} = 0.12$ (cm s^{-1}) oe - exact answer only.