Question	Scheme	Marks
6 (a)	$(V=)5\times\frac{1}{2}\times r^2\times\sin\left(\frac{\pi}{3}\right)=\frac{5\sqrt{3}}{4}r^2$ *	B1*cso [1]
(b)	$\left(\frac{\mathrm{d}V}{\mathrm{d}r}=\right)\frac{5\sqrt{3}}{2}r$ oe	M1
	(When the area of $BCDF$ = 60 cm^2, $BC = DF = r$ =)12 cm	B1
	$\frac{\mathrm{d}V}{\mathrm{d}t}=\frac{\mathrm{d}V}{\mathrm{d}r}\times\frac{\mathrm{d}r}{\mathrm{d}t}$ oe	M1
	$\left(\frac{\mathrm{d}V}{\mathrm{d}t}=\right)\frac{5\sqrt{3}}{2}\times12\times0.2=6\sqrt{3}$ oe $\left(\mathrm{cm}^3/\mathrm{s}\right)$	dM1A1 [5]
		Total 6 marks

Part	Mark	Notes
(a)	B1* cso	For a correct expression for the volume of a prism $V=5\times\frac{1}{2}\times r^2\times\sin\left(\frac{\pi}{3}\right)$ followed by the given answer stated. No errors. Use of 60° for $\frac{\pi}{3}$ is fine.
(b)	M1	For differentiating the expression for V to given an expression of the form pr where p is a positive constant. We don't need to see $\left(\frac{\mathrm{d}V}{\mathrm{d}r}=\right)$ if it's clear the candidate has attempted to differentiate the given volume.
	B1	For finding the length BC or DF when the area of the face $BCDF$ = 60 and deducing that r = 12 cm.
	M1	For a correct chain rule involving $\frac{\mathrm{d}V}{\mathrm{d}t}$, $\frac{\mathrm{d}V}{\mathrm{d}r}$ and $\frac{\mathrm{d}r}{\mathrm{d}t}$ [Can be implied by later correct substitution.]
	dM1	For substituting their $\frac{\mathrm{d}V}{\mathrm{d}r}$, their r and the given value of $\frac{\mathrm{d}r}{\mathrm{d}t}=0.2$ Dependent on the first method mark.
	A1	For $\left(\frac{\mathrm{d}V}{\mathrm{d}t}=\right)6\sqrt{3}$ $\left(\mathrm{cm}^3/\mathrm{s}\right)$