Question			Answer	Marks	Part Marks and Guidance	
1			175.8 to 176 or 56π	**3**	**M2** for $\pi\times3.5\times12.5 + \pi\times3.5^2$ **Or M1** for $\pi\times3.5\times12.5$ soi by 137.44… rot	

2			$\pi d = 60$ oe $r = \frac{60}{2\pi}$ oe A = 4π (*their r*)^2 $\frac{3600}{\pi}$	M1 A1 M1 A2	Soi by $d = 19$ to 19.11 Condone $r = 9.5$ to 10 **A1** for <u>any</u> correct partial simplification Or for answer (364 to 365) π	

3	**(a)**		195 to 195.5	2	**M1** for $\frac{4}{3} \times \pi \times 3.6^3$	
	(b)		0.8 to 0.821 g/cm^3 <u>or</u> g per cm^3 <u>or</u> g per cubic cm <u>or</u> g cm^{-3}	2 1	**M1** for $\frac{160}{\textit{their}(a)}$	

4			$\frac{2}{3} \times \pi \times 6^3$ oe $\frac{1}{3} \times \pi \times 6^2 \times 10$ 264π final answer	M2 M1 A2	May be implied by 144π **M1** for $\frac{4}{3} \times \pi \times 6^3$ or 288π May be implied by 120π NOT from decimals Or **A1** for 264π final answer from decimals or for 144π or 120π seen After **0** scored **SC4** for 264π without work	Condone (447 to 455) for **M2** Condone (894 to 905) for **M1** Condone (373 to 378) for **M1**

5			550.18 to 551.09 final answer	5	*Final answer must be 2dp* *For answer 550 look back for 2dp value in range to score 5* **M2** for $(\pi \times 2.5 \times 3) \times 8.99$ Or **M1** for $\pi \times 2.5 \times 3$ soi by 23.5 to 23.6 **AND** **M2** for $(2 \times \pi \times 2.5 \times 2.4) \times 8.99$ Or **M1** for $2 \times \pi \times 2.5 \times 2.4$ soi by 37.6 to 37.7	**Ignore any extra values calculated** May find total area first before multiplying by 8.99 Multiplying by 8.99 may be implied

6	**(a**		93.3 to 94.3 or 30π	2	**M1** for $\frac{1}{3} \times \pi \times 3^2 \times 10$	
	(b)		73 or 73.3 to 73.31	3	**M2** for $\tan^{-1} \frac{10}{3}$ seen Or **M1** for $\tan x = \frac{10}{3}$ seen	<u>For sine rule or cosine rule</u> **M2** for $\sin^{-1} \frac{10}{\sqrt{(10^2 + 3^2)}}$ or $\cos^{-1} \frac{3}{\sqrt{(10^2 + 3^2)}}$ Or **M1** for $\sin x = \frac{10}{\sqrt{(10^2 + 3^2)}}$ or $\cos x = \frac{3}{\sqrt{(10^2 + 3^2)}}$

7			$\pi \times 1.2^2 \times 3$ $\frac{1}{3} \times \pi \times 1.2^2 \times 3$ 18 to 18.15 or $\frac{144}{25}\pi$ oe *Their*(total volume) × 0.79 14 to 14.4	M1 M1 A2 M2 A1	Soi by **A** marks Soi by **A** marks **A1** for 13.5 to 13.6 or $\frac{108}{25}\pi$ or for 4.5 to 4.52 or $\frac{36}{25}\pi$ **M1** for (part volume) × 0.79 soi by 10.66 to 10.75 or 3.5 to 3.6	**A2** may be implied by *their* final answer