Solid Geometry – Paper 2 – Mark Scheme

Question 2

8	6.70	**3**	**M1** for $(r^3 =)\ 1260 \times \frac{3}{4\pi}$ oe seen **M1** for $\sqrt[3]{}$ of their r^3 seen or implied

Question 3

15	4.94	**3**	**M1** $\pi r^2 \times 12 = 920$ **M1** $(r^2) = \frac{920}{\text{their}\ (\pi \times 12)}$

Question 4

21	96 www	**5**	**M1** $3^2 + 4^2$ **A1** 5 **M1** ½ × 6 × "5" (= 15) **M1** 4 × their triangle area + 6^2

Question 5

14	$66\frac{2}{3}$ or 66.7 www	**3**	**M2** for $\frac{\frac{4}{3}\pi r^3}{\pi r^2 (2r)}$ (× 100) or **M1** for $\pi r^2 (2r)$

Question 6

16	359 www	**4**	**M1** $\pi \times 4^2$ or $\frac{1}{2}\pi \times 4^2$ **M1** for $0.5 \times \pi \times 8 \times 15$ oe **M1** for 8 × 15 + their 2 ends + their curved surface area

Question 7

8	113000 or 112795 to 112840	**3**	**B1** for 85000 **M1** for $\pi \times 0.65^2 \times$ figs 85

Question 9

15	2.67 or 2.672 to 2.67301	**3**	**M2** for $\sqrt[3]{(80 \div \frac{4}{3}\pi)}$ oe or **M1** for $80 \div \left(\frac{4}{3}\pi\right)$ oe

Question 10

26	420	**5**	**M1** for $[CB =] \sqrt{4^2 + (9-6)^2}$ **M1** for *their CB* from Pythagoras × 15 **M1** for $[2 \times]\ \frac{1}{2}(6+9) \times 4$ **M1** for 4 × 15, 9 × 15, 6 × 15 with intention to add

Question 11

18	486 cao	**4**	**M1** for $\frac{1}{2} \times 4\pi r^2 + \pi r^2 = 243\pi$ or better **A1** for $[r =]\ 9$ **M1** for $\frac{1}{2} \times \frac{4}{3}[\pi](\text{their}\ r)^3$

Question 12

8	3619 to 3620	**2**	**M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi \times 12^3$ or better

Question 13

16	**(a)** 8.61 or 8.609 to 8.6102	**4**	**M1** for $\frac{1}{2}\times 3^2\times\pi\times\sin 120$ **M1** for $\frac{30}{360}\times\pi\times 3^2[\times 2]$ **M1** for area of triangle + 2 sectors
	(b) 430 or 431 or 430.4 to 430.41	**1FT**	FT their **(a)** × 50

Question 14

17	890 or 890.1 to 890.2…	**5**	**M4** for $\frac{1}{2}\times\left(\frac{4}{3}\times\pi\times 5^3\right)+\pi\times 5^2\times 8$ or **M3** for $\frac{1}{2}\times\left(\frac{4}{3}\times\pi\times 5^3\right)$ and $\pi\times 5^2\times 8$ or **M2** for $\frac{1}{2}\times\left(\frac{4}{3}\times\pi\times 5^3\right)$ or $\pi\times 5^2\times 8$ or **M1** for $\frac{4}{3}\times\pi\times 5^3$

Question 15

14	**(a)**	2.47 or 2.474 to 2.4744	**2**	**M1** for $\frac{56}{360}\times\pi\times 2.25^2$ oe
	(b)	0.742 or 0.7422 to 0.74232	**1FT**	FT *their* **(a)** × 0.3[0] correctly evaluated.

Question 16

18	**(a)**	3	**4**	**B3** for 3.536 to 3.54 as an answer or **M2** for $2000\div\frac{1}{3}\pi\times 6^2\times 15$ or **M1** for $\frac{1}{3}\pi\times 6^2\times 15$ and **SC1** for truncating *their* 3.54 to a whole number
	(b)	303 to 304	**3**	**M2** for 2000 – *their* 3 × *their* volume or **M1** for *their* 3 × *their* volume

Question 17

21	285 cao	**4**	**M1** for $\frac{1}{3}\times\pi\times 4^2\times 9$, 48π **M1** for $\frac{1}{2}\times\frac{4}{3}\times\pi\times 4^3$, $\frac{128\pi}{3}$ **A1** for 284.8 to 284.9, $\frac{272\pi}{3}$ If **A0** then **B1** for *their* final answer rounded correctly to nearest whole number from their more accurate answer dependent on at least **M1**

Question 18

18 **(a)**	78	**3**	**M2** for $5 \times 12 + \frac{1}{2} \times 12 \times (8-5)$ **or** $\frac{1}{2} \times 6 \times (5+8) \times 2$ oe or **M1** for 5×12, $\frac{1}{2} \times 12 \times (8-5)$, $\frac{1}{2} \times 6 \times (5+8)$ or $12 \times 8 - (\ldots)$
(b)	1170	**1FT**	$15 \times$ *their* **(a)**

Question 19

18	912 or 912.2…	**5**	**M4** for $4 \times 0.5 \times 20 \times \sqrt{8^2+10^2} + 20 \times 20$ or better **or** **M3** for $4 \times 0.5 \times 20 \times \sqrt{8^2+10^2}$ or better **or** **M1** for $\sqrt{8^2+10^2}$ **and** **M1** for $0.5 \times 20 \times \sqrt{8^2+10^2}$ **and** **M1** for 20×20

Question 20

19	281 or 280.8 to 280.9…	**5**	**M2** for $\frac{25}{360} \times 2 \times \pi \times 15 \times 5$ oe or **M1** for $\frac{25}{360} \times 2 \times \pi \times 15$ oe and **M1** for $[2] \times \frac{25}{360} \times \pi \times 15^2$ oe and **B1** for $15 \times 5 [\times 2]$

Question 21

5	262 or 261.7 to 261.83…	**2**	**M1** for $\frac{1}{2} \times \frac{4}{3} \pi \times 5^3$ If zero scored **SC1** for final answer 524 or 523.5 to 523.7

Question 22

3	572.4	**2**	**M1** for figs $(120 \times 90 \times 53)$

Question 23

15	310 or 310.2 to 310.3	**3**	**M2** for $7^3 - \frac{1}{2} \times \frac{4}{3} \times \pi \times \left(\frac{5}{2}\right)^3$ or **M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi \times \left(\frac{5}{2}\right)^3$ or **SC1** for $7^3 - \frac{4}{3} \times \pi \times \left(\frac{5}{2}\right)^3$ soi

Question 24

12	32.7 or 32.72 to 32.73	**2**	**M1** for $\left[\frac{1}{2} \times\right] \frac{4}{3} \times \pi \times \left(\frac{5}{2}\right)^3$

Question 26a

14	62	**3**	**M1** for [height =] 21 ÷ 7 **M1** for 2(1 × *their*3 + *their*3 × 7 + 1 × 7) oe

Question 26b

15	628 or 628.3 to 628.4 cm^3	**3**	**B2** for 628 or 628.3 to 628.4 or **M1** for $5^2 \times 8 \times \pi$ **B1** for cm^3

Question 25

16	35.4 or 35.36 to 35.37	**3**	**M2** for $1000 \div (\pi \times 0.75^2 \times 16)$ oe or **M1** for $\pi \times 0.75^2 \times 16$ oe or $1000 \div (\pi \times 0.75^2)$

Question 26c

14	684	**3**	**M2** for 0.95 × 4 × 3 × 60 or **M1** for 0.95 × 4 [× 3] or 4 × 3 × 60 or 0.95 × 3 × 60 or 0.95 × 4 × 60