Mark scheme

Compound solids and parts of solids

Mathematics 0580 · Questions from Paper 1, Paper 2, Paper 3 and Pape…

Total marks

48

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	Total
3	3	4	5	4	4	6	9	10	**48**

Question 1 **[3]**

1	9.8[0] or 9.804 to 9.805	**3**	**M2** for $x^3 = \pi \times 5^2 \times 12$ oe or **M1** for $\pi \times 5^2 \times 12$ oe or for x^3 = *their* 942.7

Question 2 **[3]**

2	$66\frac{2}{3}$ 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 3 **[4]**

3	32	**4**	**M3** for $[h =] \frac{\frac{4}{3}\times\pi\times 8^3}{\frac{1}{3}\times\pi\times 8^2}$ oe or **M2** for $\frac{4}{3}\times\pi\times 8^3 = \frac{1}{3}\times\pi\times 8^2\times h$ oe or **M1** for $\frac{4}{3}\times\pi\times 8^3$ oe or $\frac{1}{3}\times\pi\times 8^2\times h$ oe

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Question 4 [5]

4	36	**5**	**B4** for 36.16 to 36.17 or 36.2 or **B1** for 50 or 0.12 and 0.32 **M1** for $\frac{4}{3}\times\pi\times(their50)^3$ or $\frac{4}{3}\times\pi\times 0.5^3$ **M1** for $\pi\times12^2\times32$ or $\pi\times$ *their* $0.12^2\times$ *their* 0.32 **M1** for *their* 523 598 ÷ *their* 14 476 or *their* 0.523 598 ÷ *their* 0.014 476 dep on M1 M1and correct formulae used If **1**,**2**or **3** scored award **SC1** for *their* decimal answer correctly rounded down to the nearest integer

Question 5 [4]

5	144π cao	**4**	**M2** for $[R^2=]\ \dfrac{\frac{4}{3}\times\pi\times6^3}{18\times\pi}$ oe or **M1** for $\frac{4}{3}\times\pi\times6^3=\pi\times R^2\times18$ oe **M1** for $2\times\pi\times theirR\times18$ oe

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Question 6 **[4]**

6	168 or 167.5 to 167.6	**4**	**M3** for $\frac{\pi}{3}\times\left[4.2^2\times(4.5+7.5)-\left(4.2\times\frac{7.5}{4.5+7.5}\right)^2\times 7.5\right]$ oe or **M2** for $\left(\frac{7.5}{7.5+4.5}\right)^3\times\frac{1}{3}\times\pi\times4.2^2\times(4.5+7.5)$ or for $\frac{1}{3}\times\pi\times\left(4.2\times\frac{7.5}{4.5+7.5}\right)^2\times7.5$ or **M1** for $\frac{1}{3}\times\pi\times4.2^2\times(4.5+7.5)$ OR **M1** for $\frac{1}{3}\times\pi\times4.2^2\times(4.5+7.5)$ **M1** for $\frac{4.2}{4.5+7.5}=\frac{radius}{7.5}$ oe or better **M1** for $\frac{1}{3}\times\pi\times(their\ 2.625)^2\times7.5$

Question 7 **[6]**

7 (a)	correct working	**2**	**B2** for $\sqrt[3]{\frac{1}{8}}=\frac{1}{2}$ or $\sqrt[3]{8}=2$ AND $\frac{10}{2}=5$ oe and $\frac{4}{2}=2$ oe or **B1** for $\sqrt[3]{\frac{1}{8}}$ or $\sqrt[3]{8}$ or $8=2^3$ or $\frac{1}{8}=(\frac{1}{2})^3$
(b)	147 or 146.5 to 146.6…	**4**	**M3** for $\frac{7}{8}\times\frac{1}{3}\times\pi\times4^2\times10$ or **M1** for $\frac{1}{3}\times\pi\times4^2\times10$ and **M1** for $\frac{1}{3}\times\pi\times2^2\times5$ and **M1** for subtracting *their* volumes

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Question 8 [9]

8(a)	$[h=]\ \dfrac{\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3}{\pi\times12^2}$ oe leading to 0.125 or $3-\dfrac{\pi\times12^2\times3-\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3}{\pi\times12^2}$ oe leading to 0.125	**M3**	**M2** for $\pi\times12^2\times h=\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3$ oe or for $\pi\times12^2\times3=\pi\times12^2\times x+\frac{2}{3}\times\pi\times3^3$ oe or for $\dfrac{\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3}{\pi\times12^2\times3}=\dfrac{h}{3}$ oe or **M1** for $\pi\times12^2\times h$ or $\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3$ oe or $\pi\times12^2\times3$
8(b)	4.8[0] or 4.795 to 4.796	**3**	**M2** for $\pi\times12^2\times(3-0.125)=\pi\times R^2\times18$ oe or $\pi\times12^2\times3-\frac{2}{3}\times\pi\times3^3=\pi\times R^2\times18$ or **B1** for $3-0.125$ or for 414π oe
8(c)	10.5 or 10.47 to 10.49	**3**	**M2** for $\dfrac{\frac{4}{3}\times\pi\times3^3-30\times1.5^3}{\frac{4}{3}\times\pi\times3^3}$ or $\dfrac{30\times1.5^3}{\frac{4}{3}\times\pi\times3^3}\times100$ oe or **M1** for $\frac{4}{3}\times\pi\times3^3-30\times1.5^3$ or $\dfrac{30\times1.5^3}{\frac{4}{3}\times\pi\times3^3}$ oe

Question 9 [10]

9 (a)	2030 or 2040 or 2034 to 2036. (…)	**2**	$(V=)\frac{1}{3}\times\pi\times9^2\times24$ Accept 648π for 2 marks if final answer
(b)	(upper radius =) 3	**B1**	accept $9\times\dfrac{8}{24}$ oe
	(vol cut off =) $\frac{1}{3}\times\pi\times$ *their* $3^2\times8$	**M1**	(= 75.36 to 75.41) their *r* must be less than 9
	their (a) – *their* 75.39	**M1 dep**	[alternate method **M1** for ratio sides 1:3 **M1** ratio vols 1 : 27 **M1** *their* (a) × 26 ÷ 27] 624π implies **B1 M2** or **M3**
	1958 to 1964.(...)	**E1**	must see a figure after decimal point if 1960
(c)	$1960 = 5\times\pi\times r^2\times15$ soi	**M1**	
	$r^2=1960\div\pi\div15\div5$	**M1**	implied by 8.318...
	√ *their* 8.318	**M1**	dep on **M1 M1**
	2.88 to 2.89	**E1**	**SC2** for $5\times\pi\times2.9^2\times15=1980$ to 1982

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