Mark scheme

Surface area and volume

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

Total marks

50

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
2	4	4	4	3	5	9	5	7	7	**50**

Question 1 [2]

1	5	**2**	**M1** for $180 \div 6^2$ oe

Question 2 [4]

2 (a)	51	**2**	**M1** for $\frac{1}{2} \times (10+7) \times 6$ oe
(b)	612	**1FT**	**FT** $12 \times$ *their* (a)
	cm^3	**1**	

Question 3 [4]

3	4.5	**4**	**M3** for $2(6h+15h) = 369 - 2(6\times15)$ or better or **M2** for $[2](6\times15+6\times h+15\times h)$ oe or **M1** for $[2\times]\,6\times15$ or $[2\times]\,6h$ or $[2\times]\,15h$

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Question 4 **[4]**

4	408 or 408.4 to 408.5	**4**	**M3** for $2\times\pi\times5\times8 + 2\times\pi\times5^2$ oe OR **M1** for $2\times\pi\times5\times8$ **M1** for $[2]\times\pi\times5^2$

Question 5 **[3]**

5	3.37 or 3.367 to 3.368	**3**	**M2** for isolating r^3, e.g. $r^3 = \frac{120}{\pi}$ or **M1** for $\frac{1}{2}\times\frac{4}{3}\times\pi r^3 = 80$ oe If 0 scored **SC1** for answer 2.67 or 2.672 to 2.673...

Question 6 **[5]**

6	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

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Question 7 [9]

7 (a) (i)	4968 Allow 4970	**2**	**M1** for $4 \times 60 \times 18 + 2 \times 18 \times 18$ oe
(ii)	19440 Allow 19400	**2**	**M1** for $18 \times 18 \times 60$
(b) (i)	15260 to 15271 or 15300	**2**	**M1** for $\pi \times 9 \times 9 \times 60$ or 4860π If **M0**, **SC1** for answer of 61000 to 61100
(ii)	4172 or 4170 or 4169 to 4180 or 4140 or 4129 to 4140 or 4100	**1ft**	ft their**(a)(ii)** – their**(b)(i)** provided **(a)(ii)** > **(b)(i)**
(iii)	3391 to 3393.5 or 3390	**2**	**M1** for $2 \times \pi \times 9 \times 60$ or 1080π If **M0**, **SC1** for answer of 6780 to 6790

Question 8 [5]

8	$[R =] \frac{x}{31}$	**5**	**M1** for $\pi (2R)^2$ oe **M1** for $2 \times \pi \times 2R \times 5R$ oe **M1** for $\frac{4\pi(2R)^2}{2}$ oe **M1** for $\pi \times R \times x + \pi \times R^2$ oe

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Question 9 **[7]**

9(a)	$\frac{240}{360}\times 2\times\pi\times 12$ oe	**M1**	
9(b)	$\frac{\left(256\sqrt{5}\right)\pi}{3}$ cao	**6**	**B5** for answer $\frac{\left(256\sqrt{5}\right)}{3}$ or $\frac{\left(256\sqrt{5}\right)\pi}{3}$ seen then spoilt or an answer equivalent to $\frac{\left(256\sqrt{5}\right)\pi}{3}$ but not in required form OR **B2** for radius of cone = 8 oe or **M1** for $2\pi r = 16\pi$ **B2** for [height of cone =] $\sqrt{80}$ oe or **M1** for $12^2 =$ *their* $8^2 + h^2$ or better **M1dep** for $\frac{1}{3}\times\pi\times$ *their* $8^2\times$ *their* $\sqrt{80}$ oe dep on attempt at Pythagoras to find height of cone

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Question 10 **[7]**

10	9835 to 9844 nfww	**7**	**B5** for [area of segment =] 12.29 to 12.31 nfww **M1** for 12.29 to 12.31 × 800 **OR** **B2** for angle at centre = 157 or 156.9 or 156.92 to 156.93 or for [reflex angle =] 203 to 203.1 or **M2** for $2 \times \cos^{-1}\left(\frac{3-2.5}{2.5}\right)$ oe or **M1** for $\cos x = \frac{3-2.5}{2.5}$ oe **M2dep** for $\frac{360-their\theta}{360} \times \pi \times 2.5^2$ or **M1dep** for $\frac{[360-]their\,\theta}{360} \times \pi \times 2.5^2$ seen **M1dep** for $\frac{1}{2} \times 2.5 \times 2.5 \times \sin(their\,\theta)$ oe or $2 \times 0.5 \times \sqrt{2.5^2 - 0.5^2} \times 0.5$ oe **M1** for *their* area × 800 leading to answer

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