

M1.

$$12.9 \times 12.9 \text{ or } 166.41$$

M1

$$\frac{1}{3} \times \text{their } 166.41 \times 17.4$$

M1

$$965.178 \text{ or } 965.18 \text{ or } 965.2 \text{ or } 965$$

A1

[3]**M2.**

$$\frac{1}{3} \times \pi \times 1.5^2 \times 4$$

$$\text{or } 3\pi$$

M1

$$\frac{1}{3} \times \pi \times 1.5^2 \times 4 \div 0.2$$

$$\text{or } 15\pi$$

oe

M1dep

$$[47, 47.2] \text{ or } 48$$

A1

[3]**M3.**

$$\frac{4}{3} \times \pi \times 3^3 \text{ or } [113, 113.2]$$

or

M1

$$85 \div \text{their } [113, 113.2]$$

$$\text{or } 85 \div 36\pi$$

M1

$$0.75\dots \text{ or } 0.8$$

A1

[3]

$$\mathbf{M4.} \pi r l + \pi r^2 = 24\pi$$

$$15\pi$$

M1

$$3l + 9 = 24$$

$$\text{oe e.g. } 3\pi l = 15\pi$$

M1

5

SC1 for 8 from $\pi r l = 24\pi$ Must see working

SC1 for 6 from $\pi r l + 2\pi r = 24\pi$ Must see working

NB if height calculated after 5 seen ignore

A1

[3]

$$\mathbf{M5.} \pi \times 90 \times 90 \times 200$$

$$[5\,080\,000, 5\,120\,000]$$

M1

$$\pi \times 90 \times 90 \times 200 \div 4$$

$$[5080, 5120]$$

or $\pi \times 90 \times 90 \times 200 \div 1000$
 $[1\ 270\ 000, 1\ 280\ 000]$

M1dep

$\pi \times 90 \times 90 \times 200 \div 4 \div 1000$
 405π implies M3

M1dep

[1270, 1280] or 1300
 SC2 for [317.5, 318.5] or 320

A1

[4]

M6.(a) $4 \times \pi \times (3x)^2$
 oe

M1

$36\pi x^2$
 Accept π in any position

A1

(b) $\pi \times 3x \times l =$ their $36\pi x^2$
 oe

M1

($l =$) $12x$
 ft their $k\pi x^2$

A1ft

[4]

M7. $\frac{1}{3} \times \frac{1}{2} \times x \times x \times 2x$

or $\frac{1}{3} \times \frac{1}{2} \times CB \times DB \times AB$ (2 BC)

$$\frac{1}{2} \times x \times x \times 2x = 24 \text{ is M1 by implication.}$$

M1

$$x^3 = 216$$

M1

6

6 from T&I is 3 marks

6 without verification or working is 1 mark.

A1

[3]