

Volume Solutions

2011 Paper 2

$$\begin{aligned} \text{(a) Volume cylinder} &= \pi r^2 h \\ &= \pi \times 1.5^2 \times 15 \\ &= 106.03 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{(b) } \frac{1}{3} \pi r^2 h &= 5.7 \\ \frac{1}{3} \times \pi \times 1.5^2 \times h &= 5.7 \\ 2.36 \times h &= 5.7 \\ h &= 2.4 \text{ m} \end{aligned}$$

$$\text{Total height} = 2.4 + 15 = 17.4 \text{ m}$$

2010 P1

$$\begin{aligned} \text{Q3. } V &= \frac{4}{3} \pi r^3 \\ &= \frac{4}{3} \times \pi \times 3^3 \\ &= \frac{4}{3} \times 3.14 \times 27 \\ \frac{4}{3} \times 27 &= \frac{9}{3} \times \frac{9}{3} \times 4 \\ &= 36 \\ 3.14 \times 36 &= 113.04 \\ &= 3.14 \times 36 \\ &= 3.14 \times 36 \\ &= 9.42 \times 10 = 94.2 \end{aligned}$$

$$\begin{array}{r} 3.14 \\ \times 36 \\ \hline 18.84 \\ 94.20 \\ \hline 113.04 \end{array}$$

2010 P2

$$\begin{aligned} \text{Q11. } V &= \pi r^2 h \\ 3260 &= \pi \times 6.4^2 \times h \\ 3260 &= 128.68 \times h \\ 3260 \div 128.68 &= h \\ \underline{h} &= \underline{25.3 \text{ cm}} \end{aligned}$$

J) (a) Volume prism = area cross section x height

$$\begin{aligned} \text{area cross section} &= \begin{array}{l} L \times B \\ \text{Rectangle} \end{array} + \begin{array}{l} \pi r^2 \\ \text{circle} \end{array} \\ &= (24 \times 30) + \pi \times 12^2 \\ &= 720 + 452.39 \\ &= 1172.39 \text{ cm}^2 \end{aligned}$$

$$\text{Volume} = 1172.39 \times 50 = \underline{58619.5 \text{ cm}^3} \rightarrow \underline{58600 \text{ cm}^3}$$

(b) $\frac{1}{2}$ size = $58600 \div 2 = 29300 \text{ cm}^3$

$$\text{Volume cuboid} = L \times B \times H$$

$$\Rightarrow 35 \times 28 \times H = 29300$$

$$980 \times H = 29300$$

$$\underline{H = 29.9 \text{ cm}}$$

H) $V = \pi r^2 h$

$$V = 3.14 \times 5^2 \times 4$$

$$V = 3.14 \times 25 \times 4$$

$$V = 3.14 \times 100$$

$$\underline{V = 314 \text{ cm}^2}$$

I) V large cone - V small cone

$$\left(\frac{1}{3} \times \pi \times 15^2 \times 24 \right) - \left(\frac{1}{3} \times \pi \times 5^2 \times 8 \right)$$

$$= 5654.87 - 209.44$$

$$= \underline{5445.43 \text{ cm}^3}$$

$$\rightarrow \underline{5400 \text{ cm}^3}$$

F) (a) $V = \frac{4}{3} \pi r^3$

$$V = \frac{4}{3} \times \pi \times 0.5^3$$

$$V = 0.52 \text{ cm}^3$$

(b) $\pi r^2 h = 0.52$

$$\pi \times 0.7^2 \times h = 0.52$$

$$1.54 \times h = 0.52$$

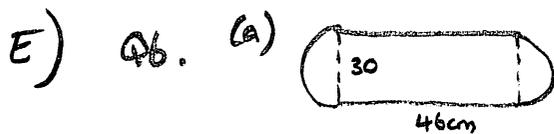
$$\underline{h = 0.34 \text{ cm}}$$

G) $V = \frac{1}{3} \pi r^2 h + \left(\frac{4}{3} \pi r^3 \div 2 \right)$

$$V = \frac{1}{3} \times \pi \times 5^2 \times 11 + \left(\frac{4}{3} \times \pi \times 5^3 \div 2 \right)$$

$$V = 287.98 + 261.8$$

$$V = 549.78 \text{ cm}^3 \rightarrow \underline{550 \text{ cm}^3}$$



$$\text{Area rectangle} = 30 \times 46 = 1380 \text{ cm}^2$$

$$\text{Area circle} = \pi r^2 = \pi \times 15^2 = 706.86 \text{ cm}^2$$

$$\text{Total area} = 2086.86 \text{ cm}^2$$

$$\text{Volume} = 2086.86 \times 25 = 52171.5 \text{ cm}^3 \rightarrow \underline{\underline{52000 \text{ cm}^3}}$$

(b) $V = 30000$

$$\text{Area cross section} \times \text{height} = 30000$$

$$\text{Area} \times 20 = 30000$$

$$\text{Area} = 30000 \div 20$$

$$\text{Area} = 1500 \text{ cm}^2$$

$$\frac{1}{4} \text{ circle} \Rightarrow \pi r^2 \div 4 = 1500$$

$$\pi r^2 = 1500 \times 4$$

$$\pi r^2 = 6000$$

$$r^2 = 6000 \div \pi$$

$$r^2 = 1909.86$$

$$r = \underline{\underline{43.7 \text{ cm}}}$$

C) $V = \frac{1}{3} \pi r^2 h$

$$V = \frac{1}{3} \times 3.14 \times 10^2 \times 12$$

$$V = \frac{1}{3} \times 3.14 \times 100 \times 12$$

$$V = \frac{1}{3} \times 314 \times 12$$

$$V = 4 \times 314$$

$$V = 314 \times 4$$

$$\underline{\underline{1256 \text{ cm}^3}}$$

D) $V = \frac{1}{3} \pi r^2 h$

$$V = \frac{1}{3} \times \pi \times 8.2^2 \times 20$$

$$V = 566.32 \text{ cm}^2$$

$$V = \pi r^2 h$$

$$V = \pi \times 5.5^2 \times 5.8$$

$$V = 551.19 \text{ cm}^2$$

The cone shaped tub is better value for money.

$$A) (a) V = \pi r^2 h$$

$$V = \pi \times 20^2 \times 50$$

$$V = 62831.85$$

$$V = \underline{63000 \text{ cm}^3}$$

$$(b) 63000 \div 800 = 78.75 \text{ cm}^3$$

$$\frac{1}{3} \pi r^2 h = 78.75$$

$$\frac{1}{3} \times \pi \times 3^2 \times h = 78.75$$

$$9.42 \times h = 78.75$$

$$h = \underline{8.36 \text{ cm}}$$

$$B) V = \frac{1}{3} \pi r^2 h \quad - \text{ little cone}$$

$$V = \left(\frac{1}{3} \times \pi \times 8^2 \times 32 \right) - \left(\frac{1}{3} \times \pi \times 25^2 \times 20 \right)$$

$$V = 2144.66 - 523.60$$

$$V = 1621.06 \text{ cm}^3 \rightarrow \underline{2000 \text{ cm}^3}$$