

Marks are indicated in brackets after each question number

2014 Paper 2 Question 7, (5)

$$\begin{aligned}\text{Volume of cone} &= \frac{1}{3}\pi r^2 h \\ &= \frac{1}{3}\pi \times 4^2 \times 15 = 251.3 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume of hemisphere} &= \frac{4}{3}\pi r^3 \div 2 \\ &= \frac{4}{3}\pi \times 3.7^3 \div 2 \\ &= 106.1 \text{ cm}^3\end{aligned}$$

$$\text{Volume of glass part} = 251.3 - 106.1 = 145.2 \text{ cm}^3$$

2015 Paper 2 Question 6, (3) (2)

$$\text{a) Volume of Sphere} = \frac{4}{3}\pi r^3$$

$$\begin{aligned}\text{Volume of the Earth} &= \frac{4}{3}\pi \times 6,400^3 \\ &= 1,098,066,219,443 \\ &= 1,100,000,000,000 \\ &= 1.1 \times 10^{12}\end{aligned}$$

$$\text{b) } \frac{1.1 \times 10^{12}}{2.2 \times 10^{10}} = 0.5 \times 10^2 = 0.5 \times 100 = 50$$

So, 50 times

2016 Paper 2 Question 7, (5)

$$\begin{aligned}\text{Volume of large cone} &= \frac{1}{3}\pi r^2 h \\ &= \frac{1}{3} \times \pi \times 16^2 \times 24 \\ &= 6,400 \text{ cm}^3 \text{ to 2 s.f.}\end{aligned}$$

$$\begin{aligned}\text{Volume of small cone} &= \frac{1}{3}\pi r^2 h \\ &= \frac{1}{3} \times \pi \times 9^2 \times 13.5 \\ &= 1,100 \text{ cm}^3 \text{ to 2 s.f.}\end{aligned}$$

$$\text{Volume of carton} = 6,400 - 1,100 = 5,300 \text{ cm}^3 \text{ to 2 s.f.}$$

2017 Paper 2 Question 6, (5)

$$\text{Volume of outer sphere} = \frac{4}{3} \times \pi \times 12^3 = 7,240 \text{ mm}^3$$

$$\text{Volume of inner sphere} = \frac{4}{3} \times \pi \times 9^3 = 3,050 \text{ mm}^3$$

$$\text{Volume of coating} = 7,240 - 3,050 = 4,190 \text{ mm}^3$$

2018 Paper 1 Question 17, (3)

$$\text{Volume} = \frac{1}{3}Ah$$

$$138 = \frac{1}{3} \times 6^2 \times h$$

$$138 = 12h$$

$$h = \frac{138}{12} = \frac{69}{6} = 11.5$$

$$h = 11.5 \text{ cm}$$

**2018 Paper 2 Question 7, (3)**

$$v = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \times \pi \times 3.2^2$$

$$= 137.2582$$

$$= 140 \text{ cm}^3$$

**2018 Paper 2 Question 11, (3)**

$$85\% = 9.3 \times 10^{11}$$

$$1\% = (9.3 \times 10^{11}) \div 85$$

$$100\% = \left[ (9.3 \times 10^{11}) \div 85 \right] \times 100$$

$$= 1,094, 117,647, 058$$

$$= 1.09 \times 10^2$$

**2019 Paper 2 Question 8, (5)**

$$\text{Volume of hemisphere} = \frac{1}{2} \times \frac{4}{3} \pi r^3$$

$$= \frac{1}{2} \times \frac{4}{3} \times \pi \times (12^3)$$

$$= 3, 619.11 \text{ cm}^3$$

$$\begin{aligned}\text{Volume of cylinder} &= \pi r^2 h \\ &= \pi \times (12^2) \times (70 - 12) \\ &= 26,238.58 \text{ cm}^3\end{aligned}$$

$$\text{Volume of bollard} = 3,619.11 + 26,238.58 = 29,857.69 \text{ cm}^3$$