ES4 Applications of Maths (Geometry & Measure)
Volume

Worked Solutions Courtesy of Mr R. Milton

You are given the below in the exam:

Volume of a cylinder	$V = \pi r^2 h$
Volume of a prism	$V = Ah$
Volume of a cone	$V = \frac{1}{3}\pi r^2 h$
Volume of a sphere	$V = \frac{4}{3}\pi r^3$

(1) $D = 2R$

$= 2 \times 4$

$= 8cm$ ✓

$V = \pi r^2 h$

$= 3.14 \times 4^2 \times 7$

$= 351.68cm^3$ ✓

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

$R = 6cm$

$D = 2 \times 6 = 12cm$ ✓

$= \frac{1}{3} \times 3.14 \times 6^2 \times 13$

$= 489.84cm^3$ ✓

(3) $R = 3.5cm$

$D = 7cm$ ✓

$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 3.5^3$

$V = 179.50cm^3$ (2DP) ✓

(4) $D = 18.6cm$

$R = 9.3cm$ ✓

$V = \pi r^2 h = 3.14 \times 9.3^2 \times 5$

$V = 1357.89cm^3$ (2DP) ✓

(5) $D = 13.4cm$

$R = 6.7cm$ ✓

$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 3.14 \times 6.7^2 \times 12$

$V = 563.82cm^3$ (2DP) ✓

(6) $D = 11.2\text{ cm}$

$R = 5.6\text{cm}$ ✓

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 5.6^3$$

$V = 735.25\text{ cm}^3$ (2DP) ✓

(7) $R = 6.3\text{cm}$

$D = 12.6\text{cm}$ ✓

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times 3.14 \times 6.3^2 \times 4.9$$

$V = 203.56\text{ cm}^3$ (2DP) ✓

(8) $V_{HS} = \left(\frac{4}{3}\pi r^3\right) \div 2$

$R = 5.1\text{cm}$

$D = 10.2\text{cm}$ ✓

$$= \left(\frac{4}{3} \times 3.14 \times 5.1^3\right) \div 2$$

$= 277.68\text{ cm}^3$ (2DP) ✓

(9) $V_{HS} = \left(\frac{4}{3}\pi r^3\right) \div 2$

$D = 15.7\text{cm}$
$R = 7.85\text{cm}$ ✓

$V_{HS} = \left(\frac{4}{3} \times 3.14 \times 7.85^3\right) \div 2$

$= 1012.62\text{cm}^3$ (2DP) ✓

(10) $D = 7.1\text{cm}$
$R = 3.55\text{cm}$ ✓

$V = \pi r^2 h$
$= 3.14 \times 3.55^2 \times 8.7$
$= 344.28\text{cm}^3$ ✓ (2DP)

AQ

$$V_T = V_{CYLINDER} + V_{CONE}$$

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

15 − 9 = 6cm

$$= (3.14 \times 4^2 \times 9) + \left(\frac{1}{3} \times 3.14 \times 4^2 \times 6\right)$$

$$= (452.16) + (100.48)$$

$$= 552.64 cm^3$$ ✓