

# Extra Volume Questions WR 11

$$1/ \text{Surface Area} = 4\pi r^2 = 81\pi$$

$$r^2 = \frac{81}{4} \quad r = \sqrt{\frac{81}{4}} = \frac{9}{2} = 4.5$$

$$\text{Volume} = \frac{4}{3}\pi r^3 = \frac{4 \times \pi \times 4.5^3}{3} = \underline{382 \text{ cm}^3} \text{ (3 sig fig)}$$

$$2/ \text{Volume of cone} = \frac{1}{3}\pi r^2 h = 270\pi$$

$$\frac{r^2 \times 10}{3} = 270 \quad \begin{array}{l} \div 10 \\ \times 3 \end{array}$$

$$r^2 = 81$$

$$r = \sqrt{81} = 9 \text{ cm}$$

$$\text{Volume of whole shape} = \text{Vol of cone} + \text{Vol of hemisphere}$$

$$270\pi + \frac{1}{2} \times \frac{4}{3} \pi \times 9^3$$

$$270\pi + 54\pi =$$

$$= \underline{324\pi}$$

$$3/ \text{Surface A of Cy} = 2 \times \text{Surface A of Sph}$$

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

$$\pi \times 9 h = 8 \times \pi \times 36$$

$$h = \frac{8 \times 36}{9} = 32 \text{ cm}$$

$$\text{Vol of cy} = \pi \times 3^2 \times 32 = 288\pi \quad \text{Vol of sphere} = \frac{4}{3}\pi \times 6^3 = 48\pi$$

$$\text{Vol of sphere} : \text{Vol of Cy}$$

$$1 : 6$$

$$4/ \text{CSA} = \pi r l$$

$$\pi \times 12x \times 20x = 2160\pi$$

$$240x^2 = 2160$$

$$x^2 = 9$$

$$x = 3$$

$$r = 12 \times 3 = 36$$

$$h = 16 \times 3 = 48$$

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

$$\frac{1}{3} \times \pi \times 36^2 \times 48 = 20736\pi$$

$$V = 20736$$

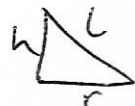
$$l^2 \text{ using pythag}$$

$$= r^2 + h^2$$

$$= (12x)^2 + (16x)^2$$

$$l^2 = 400x^2 \quad \sqrt{400x^2} = 20x$$

$$l = 20x$$



5, Volume of Solid = Vol of cone + Vol of hemisphere  
 note cone height =  $4x$

$$\frac{1}{3} \times \pi \times x^2 \times 4x + \left( \frac{4}{3} \pi x^3 \times \frac{1}{2} \right)$$

$$= \frac{4}{3} \pi x^3 + \frac{2}{3} \pi x^3$$

$$= \frac{6}{3} \pi x^3 = 2\pi x^3$$

∴ Cylinder Volume =  $2\pi x^3$        $\pi r^2 h$

$$2\pi x^3 = \pi \times (2x)^2 \times h$$

$$2\pi x^3 = 4\pi x^2 h$$

$$\frac{2x}{4} = h$$

$$h = \frac{1}{2}x$$

6, Vol of Cylinder =  $\pi r^2 h$   
 $= \pi \times (2x)^2 \times 9x$   
 $\pi \times 4x^2 \times 9x = \pi \times 36x^3$

Vol of sphere =  $36\pi x^3$       Vol of a sphere =  $\frac{4}{3}\pi r^3$

$$\frac{4}{3}\pi r^3 = 36\pi x^3$$

$$r^3 = \frac{36 \times 3 x^3}{4} = 27x^3 \quad \therefore r = 3x$$

7/ SA =  $\pi r l + \pi r^2$       ① find  $l$  using Pythagoras       $l^2 = h^2 + r^2$   
 $= 144a^2 + 25a^2$

②  $\pi \times 5a \times 13a + \pi (5a)^2$   
 $65\pi a^2 + 25\pi a^2 = 360\pi$   
 $90\pi a^2 = 360\pi$   
 $a^2 = 4$   
 $a = 2$

$r = 10$   
 $h = 24$

$l^2 = 169a^2$   
 $l = 13a$

③  $V = \frac{1}{3}\pi r^2 h$   
 $= \frac{1}{3} \times \pi \times 10^2 \times 24$   
 $= 800\pi$   
 $k = 800$