2. *Volume of solids*

1	Volume of cube = 4.4×4.4×4.4 Volume of sphere $\frac{22}{7}\times r^3 = 4.4\times 4.4\times 4.4$ $r^3 = 4.4\times 4.4\times 4.4\times \frac{7}{22}\times \frac{3}{4}$ $r^3 = 20.328$ $r = 2.73cm$ (3 s.f)	M_1 M_1 A_1	
2.	Vol. of sphere = $\frac{4}{3}\pi r^3 + \frac{4}{3}\pi r^3$ $= \frac{4}{3}\times\frac{22}{7}(2.3^3 + 3.86^3)$ $= \frac{88}{21}\times 69.679456$ = 291.990 Remaining material $\left(\frac{19}{20}\times 291.990\right)$ = 277.297 No of slabs = $\frac{277.297}{3.142\times 0.8^2\times 7}$ $= 19.699$ $= 19\,slabs$	M1 M1 M1 A1	Follow through of $\frac{22}{7}$ as π is used
		04	

1. *a) Length of diagonal* $= \sqrt{10^2 + 8^2}$
$= \sqrt{164}$

Vertical height $= \sqrt{16^2 - \left(\frac{\sqrt{164}}{2}\right)^2}$
$= 14.66cm$

b) Height of the slant surfaces
$\sqrt{16^2 - 4^2} = \sqrt{240}$
$\sqrt{16^2 - 5^2} = \sqrt{231}$

Area of slant surfaces

$(\frac{1}{2} \times 8 \times \sqrt{240} \times 2) = 124.0\ cm^2$

$(\frac{1}{2} \times 10 \times \sqrt{231} \times 2) = 152.0cm^2$

Area of the rectangular base $= 8 \times 10 = 80cm^2$

Total surface area = $\underline{356cm^2}$

c) Volume

$= (\frac{1}{3} \times 80 \times 14.66) = 391.0cm^3$

2. Volume of the cylinder

$= (\frac{22}{7} \times 6 \times 6 \times 12)cm^3 \quad = 1357.71cm^3$

Volume of a sphere

$= (\frac{4}{3} \times \frac{22}{7} \times 3 \times 3 \times 3)cm^3 \quad = 113.14cm^3$

$\therefore$ No. of spheres formed

$= \frac{1357.71}{113.14cm^3}$

$= 12$ spheres

3. Let the smaller length be x cm

$\therefore$ Dimensions are x, 2x, 3x

$x \cdot 2x \cdot 3x = 1024$

$6x^3 = 1024$

$x^3 = \frac{1024}{6}$

$x = 3\sqrt{\frac{1024}{6}}$

Dimensions are 5.547, 11.09, 16.64

4. $(\frac{60}{360} \times \frac{22}{7} \times 24 \times 24) - (\frac{60}{360} \times \frac{22}{7} \times 12 \times 12)$

$301.71 - 75.43 = 226.26$

5. (a)(i) $2\pi rh + 2r\pi^2 + \pi r^2$

$= 2 \times 22/7 \times 1.4 \times 1.4) + 2 \times 22/7 \times 1.42) + (22/7 \times 1.42)m^2$

$= (12.32 + 12.32 + 6.16)m^2 = 30.8m^2$

OR $r(2h + 2r + r)$

$= 22 \times 1.4 (2 \times 1.4 + 3(1.4) = 30.8m^2$

(ii) shs. (75 x 30.8)= Shs.2,310

(iii) Total vol.

$= \frac{22}{7} \times 1.42 \times 1.4) + (\frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 1.42)m^3$

$= 8.624\ \ 4.106 = 12.7306m^3$

capacity = (12.7306 x 1000)liters= 12730.6litres

(b) First 2days = 185 x 2 = 370litres

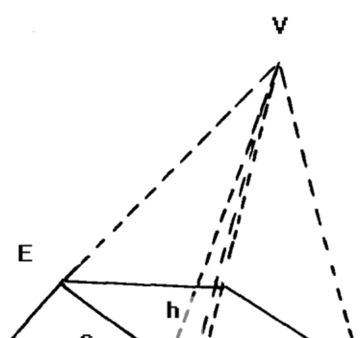
Remaining amount = (12730.6 – 370)liters

= 12360.6litres

Days to use = $\frac{12,360.6}{200}$

= 61.803days

In all it takes = (61.803 + 2)days = 63.803days



6. a) $\frac{h+3}{h} = \frac{9}{6}$ √

$6h + 18 = 9h$

$h = 6$ cm √

height = $\underline{6 + 3 = 9 \text{ cm}}$

b) Base = $9 \times 9 = 81 \text{ cm}^2$

Top = $6 \times 6 = 36 \text{ cm}^2$

Sides = $3.67 \times 15 \times \frac{1}{2} \times 4$

$= 110.15 \text{ cm}^2$

Total = $\underline{227.15 \text{ cm}^2}$

c) Vol. of bigger = $\frac{1}{3} \times 81 \times 9$

$= 243$

Vol of smaller = $\frac{1}{3} \times 36 \times 6$

V $= 72$

Vol. of frustrum = $\underline{171 \text{ cm}^2}$

d) $\sin\theta = \frac{9}{11.02}$

$\theta = \underline{54.8^o}$

7. Volume of a hemisphere

$\frac{2}{3}\pi r^3 = \frac{2}{3} \times \frac{22}{7} \times 12 \times 12 \times 12$

$= \frac{176}{7} \times 144$

$= 3620.571429 = 3620.57$

Volume of a cone

$^2/_3\pi r^2 h$

$\frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times h = 36.20.57$

$\frac{6 \times 44h}{7} = 3620.57$

$264h = 3620.57 \times 7$

$h = \frac{3620.57 \times 7}{264}$

$= 95.9981 = 95.998$

8. $V = \left(\frac{22}{7} \times 2 \times 2\ 1.5\right) + \left(\frac{22}{7} \times 3 \times 3 \times 1.5\right) + \left(\frac{22}{7} \times 4.4. \times 1.5\right)$

$= \frac{132}{7} + \frac{297}{7} + \frac{528}{7}$

V of hole $= \frac{22}{7} \times 1 \times 1\ 4.5$

$= \frac{99}{7}$

$V = \frac{957}{7} - \frac{99}{7} = \frac{858}{7}$ $= 122.57 \text{ cm}^3$

Mass = 2.8×122.57

$= 343.196g$

$\simeq 343.2g$

9. Volume of hemisphere $= \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$

$= 718.67\ cm^3$

Vol. of cylinder $= \pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 5 = 770\ cm^3$

Vol of frustrum $= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times h_1 -$

$\frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times h_2$

Height of cone $\Rightarrow \frac{h_1}{h_2} = \frac{7}{3.5}$ but $h_1 = h_2 + 6$

$\frac{h_2 + 6}{h_2} = \frac{7}{3.5} \Rightarrow 7h_2 = 3.5h_2 + 21$

$3.5\ h_2 = 21$

$h_2 = 6\ cm$

$h_1 = 12\ cm$

$\therefore$ Vol. of frustrum $= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 12\ -$

$\frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 6$

$= 616 - 77 = 539\ cm^3$

Total volume $= 718.67\ cm^3 + 770cm^3 + 539\ cm^3$

$= 2027.67\ cm^3$

a) S.A of top $= \pi r^2\ \frac{22}{7} \times 3.5 \times 3.5 = 38.5\ cm^2$

S.A of curved part of frustrum $= \frac{22}{7} \times 7 \times 13.89\ -$

$\frac{22}{7} \times 3.5 \times 6.945$

305.580

$-\ \underline{76.395}$

$229.185\ cm^2$

S.A of curved part of cylinder $= 2\pi r \times h = 2 \times \frac{22}{7} \times 7 \times 5$

$= 2220\ cm^2$

S.A of hemisphere $= \frac{1}{2} \times 4\ \pi r^2 = \frac{22}{7} \times 7 \times 7 = 308\ cm^2$

Total S.A $= \underline{795.685\ cm^2}$

10. $L/S.F = {}^{2.2}/_{3.3} = {}^{2}/_{3}$

$^{4.8}/_{4.8 + h} \quad = {}^{2}/_{3}$

$h = 24$

volume of smaller cone

$^{1}/_{3} \times {}^{22}/_{7} \times 2.2 \times 2.4$

$= 12.169$

Volume of large cone

$^{1}/_{3} \times {}^{22}/_{7} \times 3.3 \times 3.3\ (4.8 + 2.2)$

$\therefore$ V of frustum

$82.14 – 12.17 = 69.97\ cm^3$

11. (a) $Volume = \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 \times \frac{3}{2} r = 31.5\pi$

$4r^3 + 3r^3 = 31.5 \times 6$

$r = \sqrt[3]{\frac{31.5 \times 6}{7}}$

$= 3cm$

(b) slant height of con $= \sqrt{4.5^2 + 3^2}$

$= 5.408cm$

Surface are $= 2\pi \times 3^2 + \pi \times 3 \times 5.408 = 107.5cm^2$

(c) $Height = \frac{31.5}{4^2\pi}$

$= 1.969cm$

(d) $Density = \frac{144}{231.5\pi}$

$= 1.46g/cm^3$

12. Volume of cube side x cm = $(xcm)^3$

$\therefore \; x^3cm^3 = \frac{1280}{20}\ cm^3$

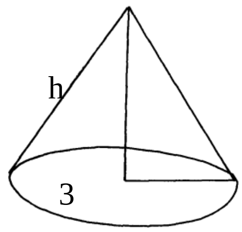
$x = \sqrt[3]{\frac{1280}{20}}$

$= \sqrt[3]{64}$

$= 4\ cm$

13.

$^{9}/_{3} = {}^{14 + h}/_{h}$



9h = 42 + 3h

6h = 42

h = 7

volume of the frustrum $= (\frac{1}{3} \times \frac{22}{7} \times 9 \times 9 \times 21)cm^3$

$= (\frac{1}{3} \times \frac{22}{7} \times 3 \times 3 \times 7)cm^3$

$= 1782 - 66 = 1716cm^3$