SURFACE, AREA, VOLUME

WORKED OUT SUMS

Ex 1:

TSA of toy

= CSA of hemisphere + CSA of cone

CSA of hemisphere $= \frac{1}{2}(4\pi r^2) = 2\pi r^2$

$= \left(2 \times \frac{22}{7} \times \frac{3.5}{2} \times \frac{3.5}{2}\right) cm^2$

$= \left(5 - \frac{3.5}{2}\right) cm = 3.25\ cm$

Slant height of cone $(l) = \sqrt{r^2 + h^2}$

$= \sqrt{\left(\frac{3.5}{2}\right)^2 + (3.25)^2}$

$= 3.7 cm$

CSA of cone $= \pi r l$

$= \left(\frac{22}{7} \times \frac{3.5}{2} \times 3.7\right) cm^2$

Surface area of toy $= \left(2 \times \frac{22}{7} \times \frac{3.5}{2} \times \frac{3.5}{2}\right) cm^2 + \left(\frac{22}{7} + \frac{3.5}{2} + 3.7\right) cm^2$

$= \frac{22}{7} \times \frac{3.5}{2}(3.5 + 3.7) cm^2 = \frac{11}{2} \times (3.5 + 3.7) cm^2$

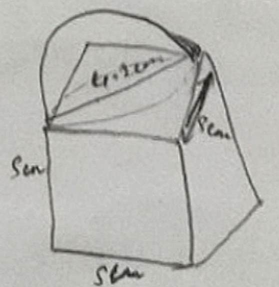
$= 39.6 cm^2$

Ex 2: TSA of cube $= 6a^2$

$= 6 \times (5)^2$

$= 6 \times 25$

$= 150 cm^2$



SA of the block = TSA of cube − base area of hemisphere + CSA of hemisphere

$= 150 + \left(\frac{22}{7} \times \frac{4.2}{2} \times \frac{4.2}{2}\right)$

$= 150 + 13.86$

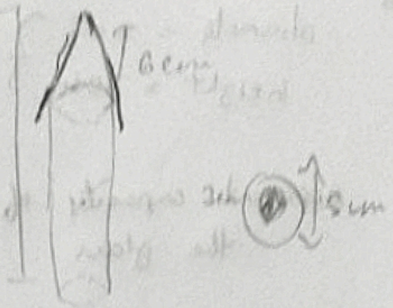
$= 163.86 cm^2$

Ex 3.

$$l = \sqrt{r^2 + h^2}$$

$$= \sqrt{2.5^2 + 6^2}$$

$$= 6.5 \text{cm}.$$



ar (to be painted orange) = CSA of cone + base area of the cone
- base area of cylinder

$$= \pi r l + \pi r^2 - \pi (r')^2$$

$$= \pi\,[20.25]\ \text{cm}^2 \Rightarrow 3.14 \times 20.25$$

$$= 63.585 \text{cm}^2$$

ar (to be painted yellow) = CSA of the cylinder
+ area of one base of the cylinder.

$$= 2\pi r' h' + \pi (r')^2$$

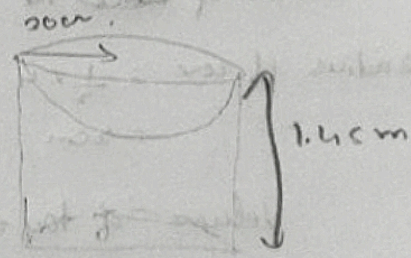
$$= \pi r' (2h' + r')$$

$$= (3.14 \times 1.5)(2 \times 20 + 1.5)$$

$$= 4.71 \times 41.5 \text{ cm}^2$$

$$= 195.465 \text{ cm}^2$$

Ex 4: TSA of bird - bath = CSA of cylinder
+ CSA of hemisphere



$$= 2\pi r h + 2\pi r^2 = 2\pi r(h + r)$$

$$= 2 \times \frac{22}{7} \times 30(145 + 30)\ \text{cm}^2$$

$$= 33000 \text{ cm}^2 \Rightarrow 3.3 \text{m}^2$$

Ex 5: Required volume = volume of cuboid + $\frac{1}{2}$ volume of the cylinder

$$= \left[15 + 7 \times 8 + \frac{1}{2} \times \frac{7}{2} \times \frac{7}{2} \times 15\right]$$

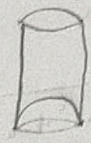
$$= 1128.75 \text{m}^2$$

Volume of air when there and machinery and workers:

$$= 1128.75 - (300.00 + 1.60)$$

$$= 827.15 \text{m}^3$$

Ex6: diameter = 5 cm } given
height = 10 cm



Apparent capacity of the glass $= \pi r^2 h$
$= 3.14 \times 2.5 \times 2.5 \times 10$
$= 196.25 \text{ cm}^3$

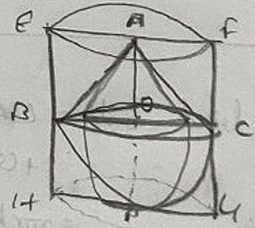
Actual capacity is less by the volume of hemisphere at the base.

$\therefore$ it is less by $\frac{2}{3}\pi r^3$
$= \frac{2}{3} \times 3.14 \times 2.5 \times 2.5 \times 2.5$
$= 32.71 \text{ cm}^3$

$\therefore$ actual capacity of glass = apparent capacity − volume of hemisphere
$= (196.25 - 32.71)$
$= 163.54 \text{ cm}^3$.

Ex7:

Height of cone = 2 cm
diameter of the base = 4 cm



Radius of cone $= \frac{1}{2} \times 4$
$= 2 \text{ cm}$

Volume of toy $= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 h$
$= \left[\frac{2}{3} \times 3.14 \times (2)^3 + \frac{1}{3} \times 3.14 \times (2)^3 \times 2\right]$
$= 25.12 \text{ cm}^3$

base of right circular cylinder = HP = BO = 2 cm
height = EH = AO + OP = (2+2)
= 4 cm

Volume required = Volume of right circular cylinder − volume of toy
$= (3.14 \times 2^2 \times 4 - 25.12)$
$= 25.12 \text{ cm}^3$