SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

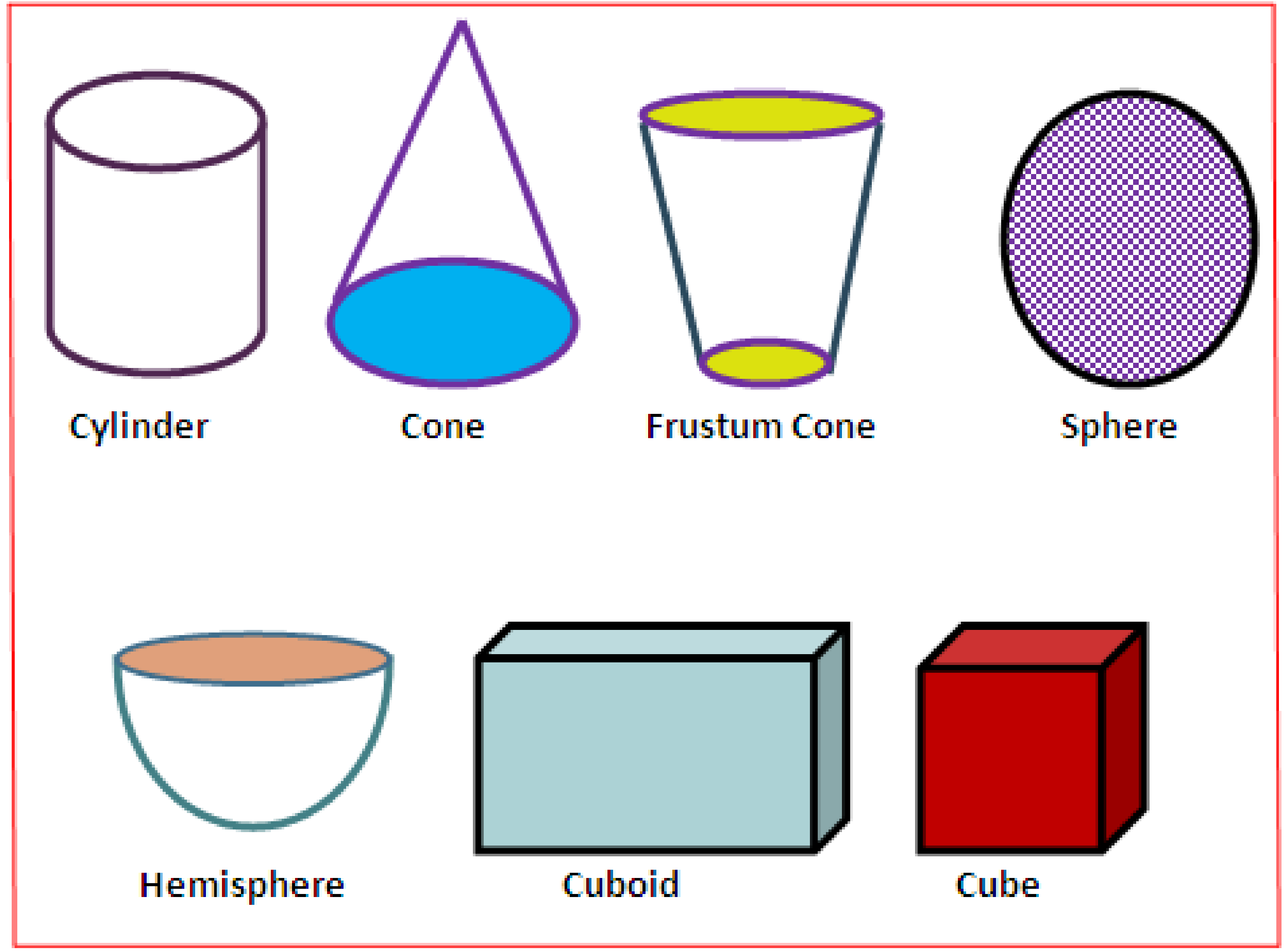
VQAR -VERBAL QUANTITATIVE APTITUDE REASONING-II

UNIT 2-QUANTITATIVE ABILITY IV

TOPIC 3: MENSURATION

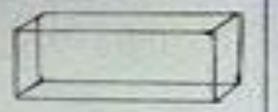
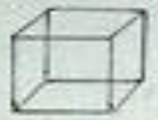
MENSURATION

The part of geometry concerned with ascertaining lengths, areas, and volumes.



MENSURATION

MENSURATION

SOLID	FIGURE	LATERAL / CURVED SURFACE AREA	TOTAL SURFACE AREA	VOLUME
CUBOID		$2(l+b)h$	$2(lb+bh+hl)$	lbh
CUBE		$4l^2$	$6l^2$	l^3
RIGHT CIRCULAR CYLINDER		$2\pi rh$	$2\pi r(r+h)$	$\pi r^2 h$
RIGHT CIRCULAR CONE		πrl $l = \sqrt{r^2+h^2}$ where l = slant height	$\pi rl + \pi r^2$ or $\pi r(l+r)$	$\frac{1}{3}\pi r^2 h$
SPHERE		$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^2$
HEMISPHERE		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$
HOLLOW CYLINDER		$2\pi(R+r)h$ where R = external radius and r = internal radius	$2\pi(R+r)h + 2\pi(R^2-r^2)$	$\pi(R^2-r^2)h$
FRUSTUM OF RIGHT CIRCULAR CONE		$\pi(R+r)l$ where R & r are radii of base and $R>r$ $l = \sqrt{h^2+(R-r)^2}$	$\pi l(R+r) + \pi R^2 + \pi r^2$	$\frac{1}{3}\pi h[R^2+r^2+Rr]$

MENSURATION

Mensuration Formulas

Perimeter	
Square	$P = 4s$
Rectangle	$P = 2(l + w)$

Circumference	
Circle	$C = 2\pi r$

Area	
Square	$A = s^2$
Rectangle	$A = lw$
Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Circle	$A = \pi r^2$

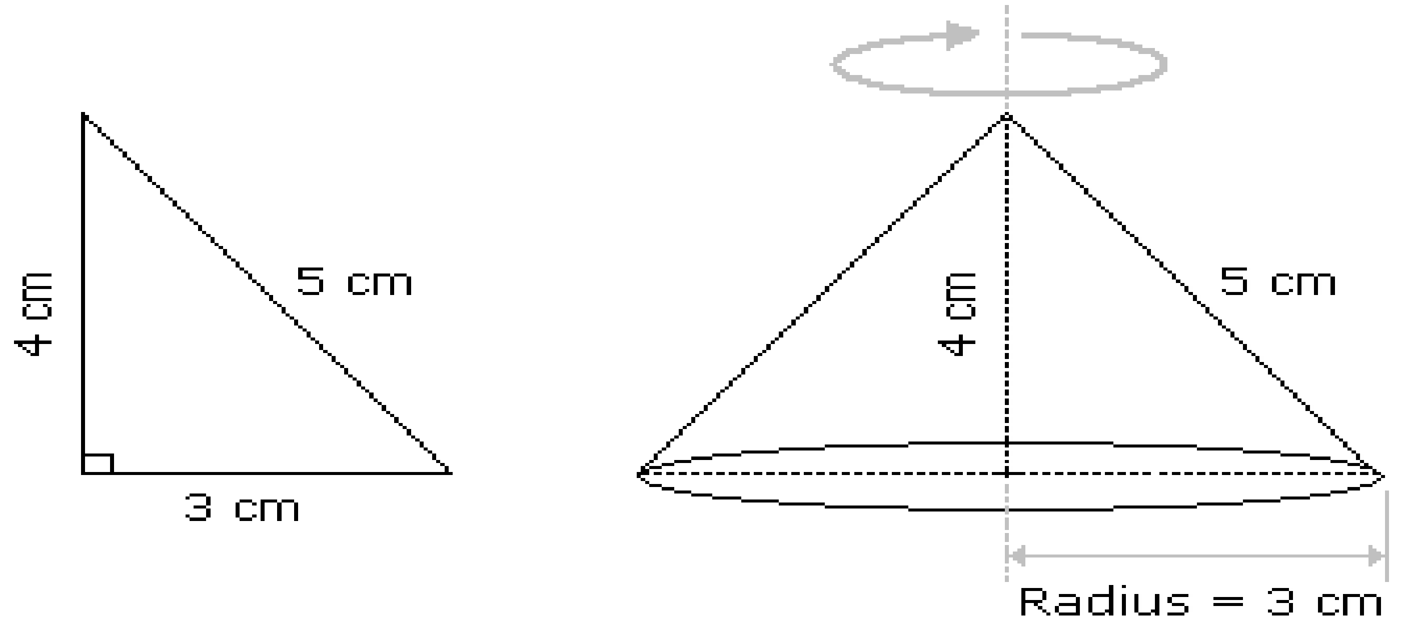
Surface Area	
Cube	$SA = 6s^2$
Cylinder	$SA = 2\pi rh + 2\pi r^2$
Cone	$SA = \pi rl$
Sphere	$SA = 4\pi r^2$

Volume	
Cube	$V = s^3$
Cylinder	$V = \pi r^2 h$
Cone	$V = \frac{1}{3}\pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$

MENSURATION

A right triangle with sides 3 cm, 4 cm and 5 cm is rotated the side of 3 cm to form a cone. The volume of the cone so formed is:

Explanation:



Clearly, we have r = 3 cm and h = 4 cm.

$$\therefore \text{ Volume} = \frac{1}{3}\pi r^2 h = \left(\frac{1}{3} \times \pi \times 3^2 \times 4\right) \text{cm}^3 = 12\pi \text{ cm}^3.$$

In a shower, 5 cm of rain falls. The volume of water that falls on 1.5 hectares of ground is:

Explanation:

1 hectare = 10,000 m^2

So, Area = (1.5 x 10000) m^2 = 15000 m^2.

Depth = $\frac{5}{100}$m = $\frac{1}{20}$m.

$\therefore$ Volume = (Area x Depth) = $\left(15000 \times \frac{1}{20}\right) m^3$ = 750 m^3.

A hall is 15 m long and 12 m broad. If the sum of the areas of the floor and the ceiling is equal to the sum of the areas of four walls, the volume of the hall is:

Explanation:

$2(15 + 12) \times h = 2(15 \times 12)$

$\Rightarrow h = \frac{180}{27} m = \frac{20}{3} m.$

$\therefore$ Volume $= \left(15 \times 12 \times \frac{20}{3}\right) m^3 = 1200\ m^3.$

MENSURATION

A hollow iron pipe is 21 cm long and its external diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weighs 8 g/cm^3, then the weight of the pipe is:

Explanation:

External radius = 4 cm,

Internal radius = 3 cm.

$$\text{Volume of iron} = \left(\frac{22}{7} \times [(4)^2 - (3)^2] \times 21\right) \text{cm}^3$$

$$= \left(\frac{22}{7} \times 7 \times 1 \times 21\right) \text{cm}^3$$

$$= 462 \text{ cm}^3.$$

$\therefore$ Weight of iron = (462 x 8) gm = 3696 gm = 3.696 kg.

MENSURATION

A boat having a length 3 m and breadth 2 m is floating on a lake. The boat sinks by 1 cm when a man gets on it. The mass of the man is:

Explanation:

Volume of water displaced $= (3 \times 2 \times 0.01)\ m^3$

$= 0.06\ m^3$.

$\therefore$ Mass of man = Volume of water displaced x Density of water

$= (0.06 \times 1000)$ kg

$= 60$ kg.

MENSURATION

A cistern 6m long and 4 m wide contains water up to a depth of 1 m 25 cm. The total area of the wet surface is:

Explanation:

Area of the wet surface = $[2(lb + bh + lh) - lb]$

$= 2(bh + lh) + lb$

$= [2\,(4 \times 1.25 + 6 \times 1.25) + 6 \times 4]\ m^2$

$= 49\ m^2.$

MENSURATION

A metallic sheet is of rectangular shape with dimensions 48 m x 36 m. From each of its corners, a square is cut off so as to make an open box. If the length of the square is 8 m, the volume of the box (in m^3) is:

Explanation:

Clearly, l = (48 - 16)m = 32 m,

b = (36 -16)m = 20 m,

h = 8 m.

∴ Volume of the box = (32 x 20 x 8) m^3 = 5120 m^3.

A cistern of capacity 8000 litres measures externally 3.3 m by 2.6 m by 1.1 m and its walls are 5 cm thick. The thickness of the bottom is:

Explanation:

Let the thickness of the bottom be x cm.

Then, $[(330 - 10) \times (260 - 10) \times (110 - x)] = 8000 \times 1000$

$\Rightarrow 320 \times 250 \times (110 - x) = 8000 \times 1000$

$$\Rightarrow (110 - x) = \frac{8000 \times 1000}{320 \times 250} = 100$$

$\Rightarrow x = 10 \text{ cm} = 1 \text{ dm}.$

A large cube is formed from the material obtained by melting three smaller cubes of 3, 4 and 5 cm side. What is the ratio of the total surface areas of the smaller cubes and the large cube?

Explanation:

Volume of the large cube = $(3^3 + 4^3 + 5^3) = 216\ cm^3$.

Let the edge of the large cube be *a*.

So, $a^3 = 216 \Rightarrow a = 6$ cm.

$\therefore$ Required ratio = $\left(\frac{6 \times (3^2 + 4^2 + 5^2)}{6 \times 6^2}\right) = \frac{50}{36} = 25 : 18$.

MENSURATION

How many bricks, each measuring 25 cm x 11.25 cm x 6 cm, will be needed to build a wall of 8 m x 6 m x 22.5 cm?

Explanation:

$$\text{Number of bricks} = \frac{\text{Volume of the wall}}{\text{Volume of 1 brick}} = \left(\frac{800 \times 600 \times 22.5}{25 \times 11.25 \times 6}\right) = 6400.$$

THANK YOU