



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

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UNIT 2-QUANTITATIVE ABILITY IV

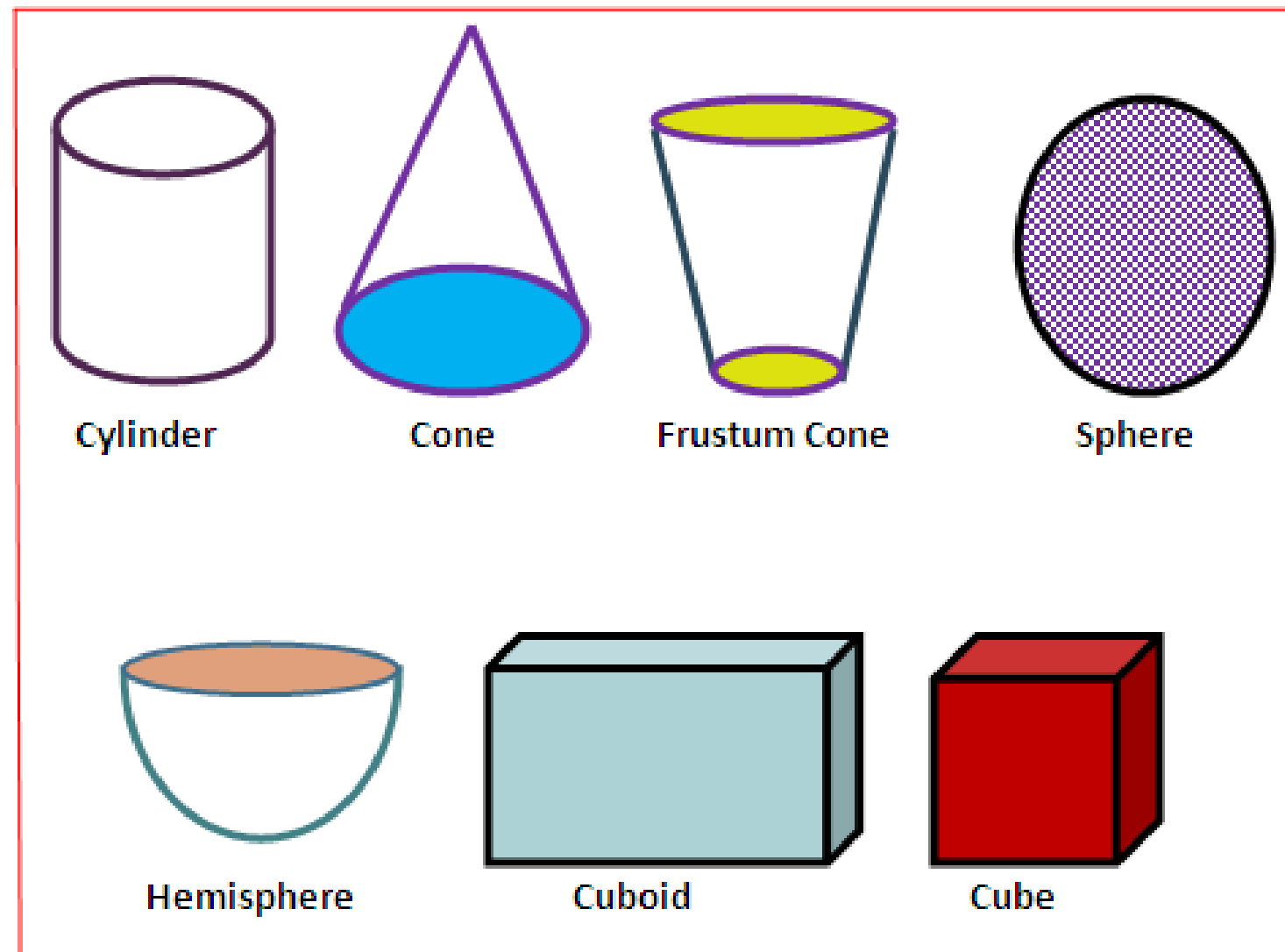
TOPIC 3: MENSURATION



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		$4\pi r^2$	$4\pi r^2$	$\frac{4}{3} \pi r^3$
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	$V = \frac{4}{3}\pi r^3$

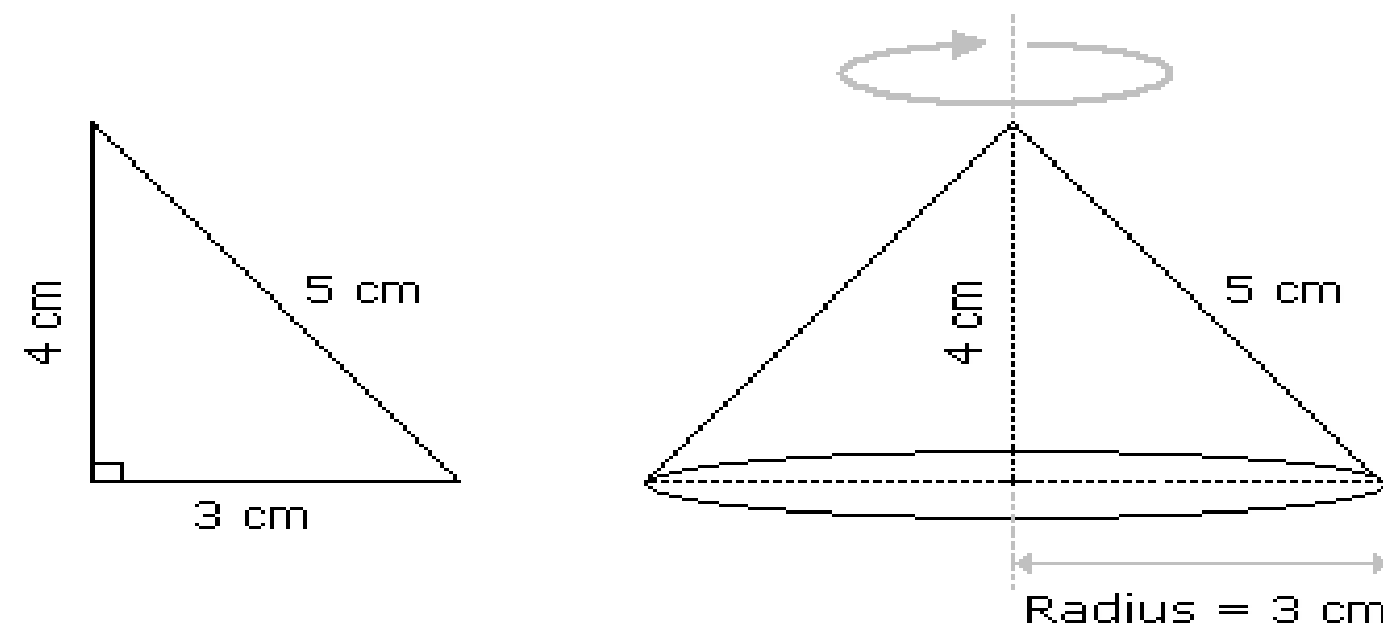


MENSURATION



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.

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



MENSURATION



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

Explanation:

$$1 \text{ hectare} = 10,000 \text{ m}^2$$

$$\text{So, Area} = (1.5 \times 10000) \text{ m}^2 = 15000 \text{ m}^2.$$

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

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



MENSURATION



A hall is 15m long and 12m 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:

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

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

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



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.

$$\begin{aligned}\text{Volume of iron} &= \left(\frac{22}{7} \times [(4)^2 - (3)^2] \times 21 \right) \text{cm}^3 \\ &= \left(\frac{22}{7} \times 7 \times 1 \times 21 \right) \text{cm}^3 \\ &= 462 \text{ cm}^3.\end{aligned}$$

$$\therefore \text{Weight of iron} = (462 \times 8) \text{ gm} = 3696 \text{ gm} = 3.696 \text{ kg}.$$



MENSURATION



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

Explanation:

$$\begin{aligned}\text{Volume of water displaced} &= (3 \times 2 \times 0.01) \text{ m}^3 \\ &= 0.06 \text{ m}^3.\end{aligned}$$

$$\begin{aligned}\therefore \text{Mass of man} &= \text{Volume of water displaced} \times \text{Density of water} \\ &= (0.06 \times 1000) \text{ kg} \\ &= 60 \text{ kg}.\end{aligned}$$



MENSURATION



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

Explanation:

$$\begin{aligned}\text{Area of the wet surface} &= [2(lb + bh + lh) - lb] \\ &= 2(bh + lh) + lb \\ &= [2(4 \times 1.25 + 6 \times 1.25) + 6 \times 4] \text{ m}^2 \\ &= 49 \text{ m}^2.\end{aligned}$$



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:

$$\text{Clearly, } l = (48 - 16)\text{m} = 32 \text{ m,}$$

$$b = (36 - 16)\text{m} = 20 \text{ m,}$$

$$h = 8 \text{ m.}$$

$$\therefore \text{Volume of the box} = (32 \times 20 \times 8) \text{ m}^3 = 5120 \text{ m}^3.$$



MENSURATION



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

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

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

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



MENSURATION



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 = $(3^3 + 4^3 + 5^3) = 216 \text{ cm}^3$.

Let the edge of the large cube be a .

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

$\therefore$ 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 $25\text{cm} \times 11.25\text{cm} \times 6\text{cm}$, will be needed to build a wall of $8\text{m} \times 6\text{m} \times 22.5\text{cm}$?

Explanation:

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



THANKYOU