



SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35



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

23GET276 – VQAR II

II YEAR/ IV SEMESTER

UNIT 2 – QUANTITATIVE ABILITY IV

TOPIC – MENSURATION



MENSURATION



1. CUBOID

Let length = l , breadth = b and height = h units. Then

- i. Volume = $(l \times b \times h)$ cubic units.
- ii. Surface area = $2(lb + bh + lh)$ sq. units.
- iii. Diagonal = $\sqrt{l^2 + b^2 + h^2}$ units.

2. CUBE

Let each edge of a cube be of length a . Then,

- i. Volume = a^3 cubic units.
- ii. Surface area = $6a^2$ sq. units.
- iii. Diagonal = $\sqrt{3}a$ units.



MENSURATION



3. CYLINDER

Let radius of base = r and Height (or length) = h . Then,

- i. Volume = $(\pi r^2 h)$ cubic units.
- ii. Curved surface area = $(2\pi rh)$ sq. units.
- iii. Total surface area = $2\pi r(h + r)$ sq. units.

4. CONE

Let radius of base = r and Height = h . Then,

- i. Slant height, $l = \sqrt{h^2 + r^2}$ units.
- ii. Volume = $\left(\frac{1}{3}\pi r^2 h\right)$ cubic units.
- iii. Curved surface area = (πrl) sq. units.
- iv. Total surface area = $(\pi rl + \pi r^2)$ sq. units.



MENSURATION



5. SPHERE

Let the radius of the sphere be r . Then,

i. Volume = $\left(\frac{4}{3}\pi r^3\right)$ cubic units.

ii. Surface area = $(4\pi r^2)$ sq. units.

6. HEMISPHERE

Let the radius of a hemisphere be r . Then,

i. Volume = $\left(\frac{2}{3}\pi r^3\right)$ cubic units.

ii. Curved surface area = $(2\pi r^2)$ sq. units.

iii. Total surface area = $(3\pi r^2)$ sq. units.

Note: 1 litre = 1000 cm^3 .



MENSURATION

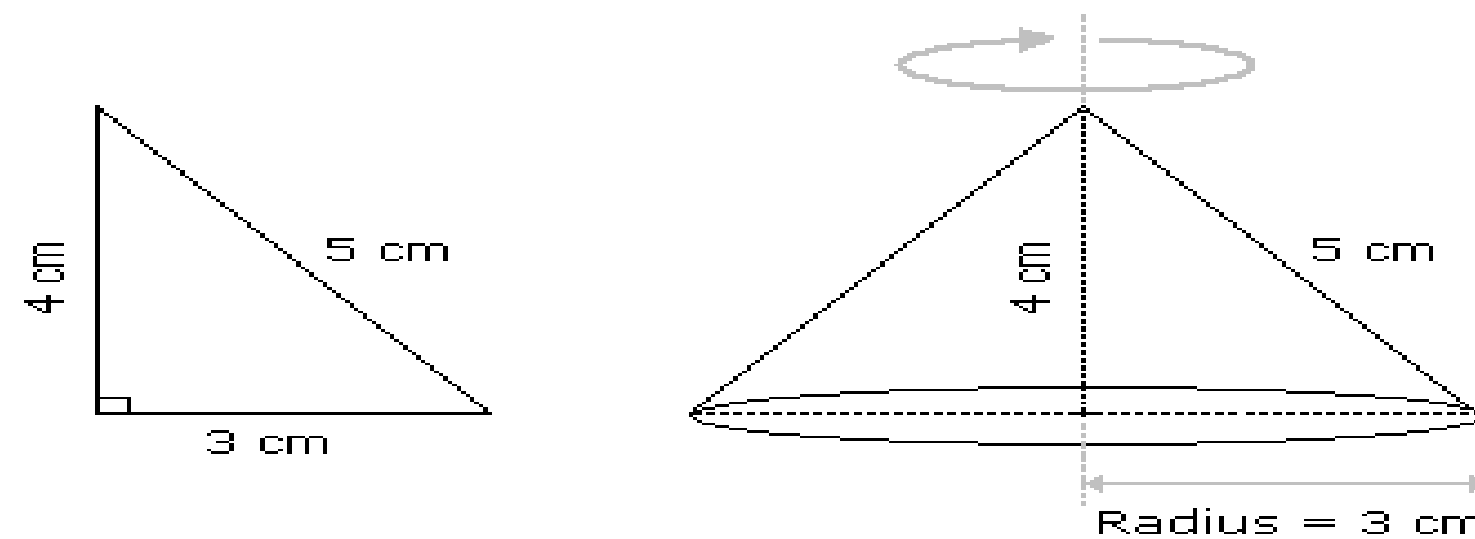


A right triangle with sides 3 cm, 4 cm and 5 cm is rotated the side of 3 cm to form a cone. The volume of the cone so formed is:

- A. $12\pi \text{ cm}^3$
- B. $15\pi \text{ cm}^3$
- C. $16\pi \text{ cm}^3$
- D. $20\pi \text{ cm}^3$

Answer: Option A

Explanation:



Clearly, we have $r = 3 \text{ cm}$ and $h = 4 \text{ cm}$.

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



MENSURATION



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

- A. 75 cu. m
- B. 750 cu. m
- C. 7500 cu. m
- D. 75000 cu. m

Answer: Option B

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



66 cubic centimetres of silver is drawn into a wire 1 mm in diameter. The length of the wire in metres will be:

- A. 84
- B. 90
- C. 168
- D. 336

Answer: Option A

Explanation:

Let the length of the wire be h .

Radius = $\frac{1}{2}$ mm = $\frac{1}{20}$ cm. Then,

$$\Rightarrow \frac{22}{7} \times \frac{1}{20} \times \frac{1}{20} \times h = 66.$$

$$\Rightarrow h = \left(\frac{66 \times 20 \times 20 \times 7}{22} \right) = 8400 \text{ cm} = 84 \text{ m}.$$



MENSURATION



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:

- A. 720
- B. 900
- C. 1200
- D. 1800

Answer: Option C

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/cm³, then the weight of the pipe is:

- A. 3.6 kg
- B. 3.696 kg
- C. 36 kg
- D. 36.9 kg

Answer: Option B

Explanation:

External radius = 4 cm,

Internal radius = 3 cm.

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

∴ Weight of iron = (462 × 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:

- A. 12 kg
- B. 60 kg
- C. 72 kg
- D. 96 kg

Answer: Option B

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

50 men took a dip in a water tank 40 m long and 20 m broad on a religious day. If the average displacement of water by a man is 4 m^3 , then the rise in the water level in the tank will be:

- A. 20 cm
- B. 25 cm
- C. 35 cm
- D. 50 cm

Answer: Option B

Explanation:

Total volume of water displaced = $(4 \times 50) \text{ m}^3 = 200 \text{ m}^3$.

\therefore Rise in water level = $\left(\frac{200}{40 \times 20} \right) \text{ m} = 0.25 \text{ m} = 25 \text{ cm}$.



MENSURATION



The slant height of a right circular cone is 10 m and its height is 8 m. Find the area of its curved surface.

- A. $30\pi \text{ m}^2$
- B. $40\pi \text{ m}^2$
- C. $60\pi \text{ m}^2$
- D. $80\pi \text{ m}^2$

Answer: Option C

Explanation:

$$l = 10 \text{ m,}$$

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

$$\text{So, } r = \sqrt{l^2 - h^2} = \sqrt{(10)^2 - 8^2} = 6 \text{ m.}$$

$$\therefore \text{Curved surface area} = \pi rl = (\pi \times 6 \times 10) \text{ m}^2 = 60\pi \text{ m}^2.$$



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:

- A. 4830
- B. 5120
- C. 6420
- D. 8960

Answer: Option B

Explanation:

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

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

$h = 8\text{ m}$.

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



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?

- A. 2 : 1
- B. 3 : 2
- C. 25 : 18
- D. 27 : 20

Answer: Option C

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

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



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?

- A. 5600
- B. 6000
- C. 6400
- D. 7200

Answer: Option C

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