Solid Geometry-02

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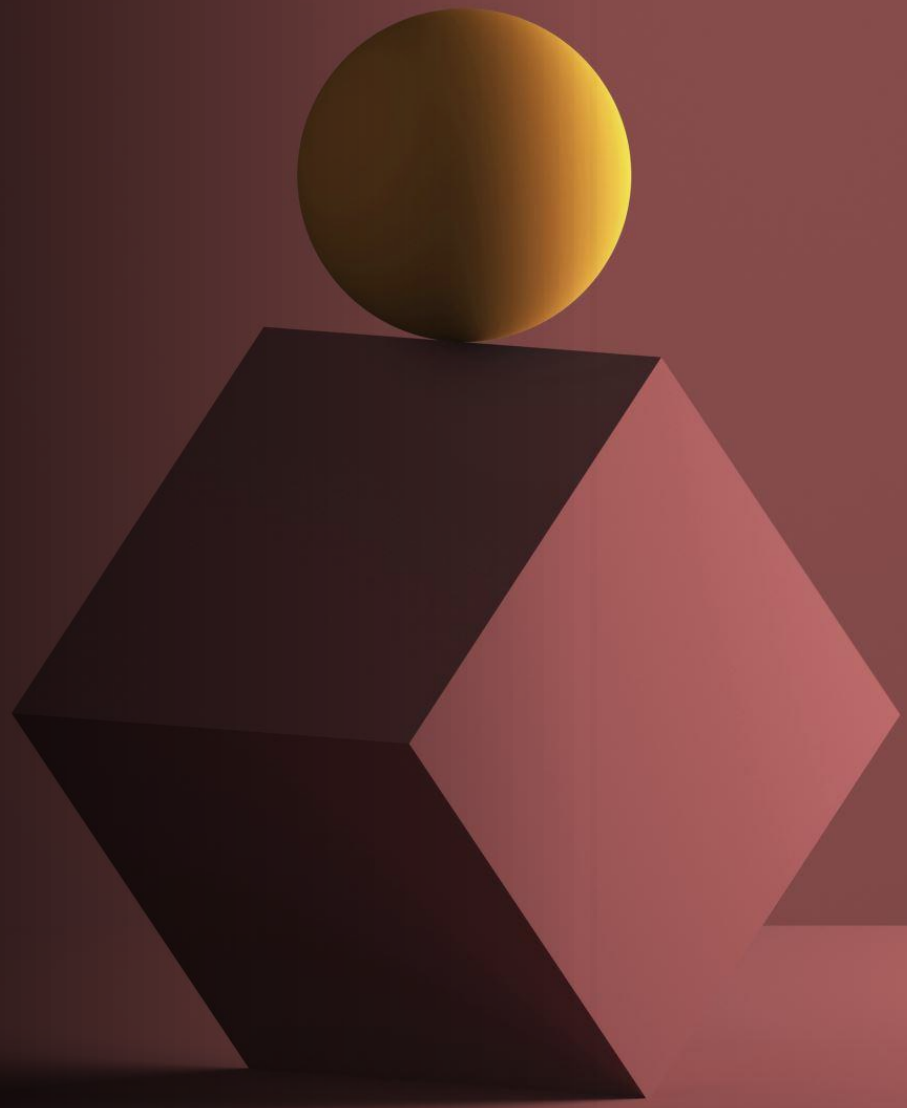
Instructor, P2A



Type-01

Cuboids Related

Q1: The length of a box is 3 meters, breadth is 2 meters 50 cm and height is 2 meters. What is the volume of the box in cubic meters? *[Dhaka Bank (TO)-22]*

Length, $a = 3\ m$

breadth, $b = 2\ m\ 50\ cm = 2.5\ m$

$\frac{50\ cm}{100} = 0.5\ m$

height, $c = 2\ m$

volume $= 3 \times 2.5 \times 2 = 15\ m^3$

Q2: The dimensions of a box are 2, 3 and 4 meters. The cost of Painting the outer sides of the box, at the rate of Tk. 3 per square meter is? *[BB (Off)-18, AB (Cash)-17]*

$a = 2,\ b = 3,\ c = 4$

$$\text{Area} = 2(ab + bc + ca)$$

$$= 2(2\times3 + 3\times4 + 4\times2)$$

$$= 2(6 + 12 + 8)$$

$$= 2 \times 26 = 52\ m^2$$

$$52 \times 3 = 156$$

Q3: The length of the diagonal of a solid 30 cm long, 24 cm broad and 18 cm high, is:

$$\sqrt{30^2 + 24^2 + 18^2}$$

$$= \sqrt{900 + 576 + 324}$$

$$= \sqrt{1800}$$

$$= \sqrt{2 \times 900} = 30\sqrt{2}$$

24
24
96
48
576

18
18

Q4: A room of size 5m×3m and height 3m requires walls and ceiling painting. What is the area to be painted? *[Agrani Bank (SO)-17]*

$2h(l+b)$

$2\times3(5+3)$

$=6\times8$

$=48$

$5\times3=15\ m^2$

$15+48=63\ m^2$

$2lb+2bh+2lh$

$lb+2bh+2lh$

Q5: The volume of a wall, 5 times as high as it is broad and 8 times as long as it is high, is 12.8 m^3. Find the breadth of the wall. *[PKB (Cash)-19]*

Let, Breadth $= x$

Height $= 5x$

Length $= 8 \times 5x = 40x$

A/Q, $x \times 5x \times 40x = 12.8$

$\Rightarrow 200x^3 = 12.8$

$x^3 = \frac{12.8}{200} = 0.064 = (0.4)^3$

$x = 0.4\ m$

Q6: 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. *[PKB (EO)-19]*

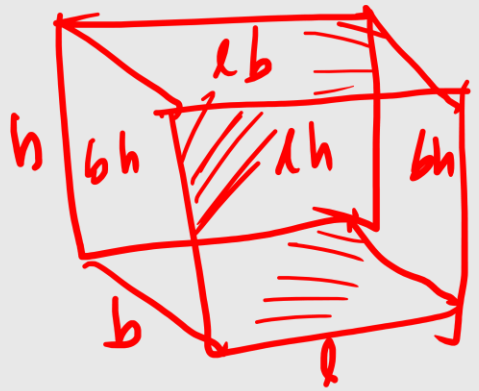
$l = 15$, $b = 12$

$2lb + 2bh + 2lh$

$2lb = 2bh + 2lh$

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

$\Rightarrow \frac{2 \times 15 \times 12}{54} = h = \frac{20}{3}$



$lb + lb = 2lb$

$15 \times 12 \times \frac{20}{3} = 1200\ m^3$

Type-02

Cube Related

Q7: If the volume of a cube is 27 cubic meters, find the surface area of the cube. *[Agrani Bank (SO)-13]*

Length = a

$a^3 = 27 = 3^3$

$a = 3$

$6a^2$

$6 \cdot 3^2$

$= 54 \text{ m}^2$

Q8: What is the volume of a cube that has a total surface area of 54?

[Agrani Bank (SO)-10]

$6a^2 = 54$

$a^2 = 9$

$a = 3$

$a^3 = 3^3 = 27$

Q9: If a cube has same volume (in cubic units) as surface area (in square units), what is the length of one side? *[UCBL (PO)-22]*

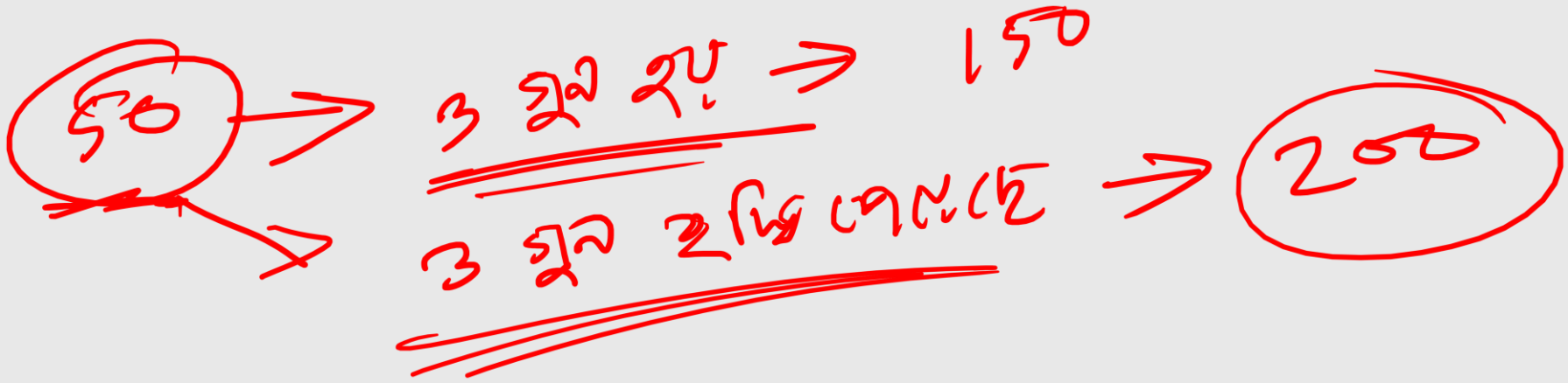
a

$$a^3 = 6a^2$$

$$\frac{a^3}{a^2} = 6$$

$$a = 6$$

Q10: A box is made in the form of a cube. If a second cubical box inside dimensions three times those of the first box, how many times as much does the second box contain? *[Sonali Bank (cash)-18, Sonali Bank (Off)-19, comb Bank (SO)-18]*


50
3 মুল হয় ⇒ 150
3 মুল হচ্ছে পেনাল্টি ⇒
200

Type-03

Cylinder Related

Q11: What is the volume of a cylinder with radius 6 and height of 7?

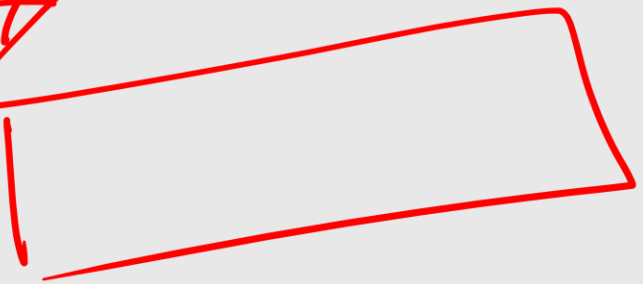
[Comb Bank (Cash)-22 (2019 Based)]

$\pi = 3.1416 = \frac{22}{7}$

$\pi r^2 h$

$= \pi \times 36 \times 7$

$= \frac{22}{7} \times 36 \times 7$

$=$ 

Q12: If the radius of cylinder is halved and height is doubled, the what will be the curved surface area? *[Sonali Bank (SO)-18]*

~~a~~ same, b. double c. Triple d. none

$2\pi rh$

$= 2\pi \frac{r}{3} \times 3 \times h$

$= 2\pi \frac{r}{2} \times 2h$

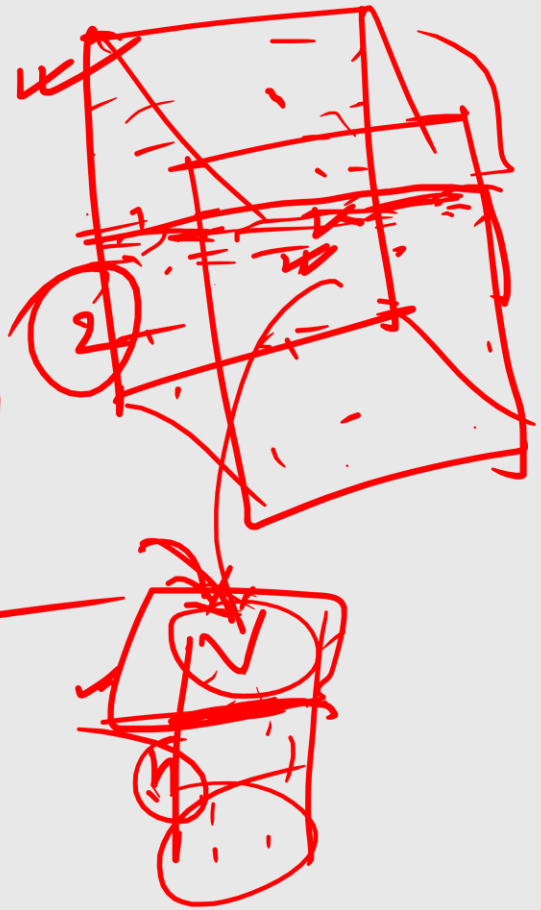
$2\pi \frac{h}{2} \times 4h$

Q13: A rectangular fish tank 25m by 9m has water in it to a level of 2m. This water is carefully poured into a cylindrical container with a diameter of 10m. How high will the water reach in the cylindrical container? *[Sonali Bank (Cash)-18, Comb Bank (SO)-18, ICB (AE)-17]*

Radius = 5 m

$25 \times 9 \times 2 = \pi \times 5^2 \times h$

$h = \frac{25 \times 9 \times 2}{\pi \times 25} = \frac{18}{\pi}$



Q14: A cylindrical rod of iron, whose height is equal to its radius, is melted and cast into spherical balls whose radius is half the radius of the rod. Find the number of balls? *[Basic bank (AM)-18, PKB (EO)-19]*

Let, the radius of cylindrical rod $= 2r$

$\therefore$ " height " $= 2r$

So, the radius of spherical balls $= r$

$\pi r^2 h = \pi \times (2r)^2 \times 2r = 8\pi r^3$

$$\frac{4}{3}\pi r^3$$

$$8\pi r^3 \div \frac{4}{3}\pi r^3$$

$$= \frac{2}{8\pi r^3} \times \frac{3}{4\pi r^3}$$

$$= 6$$

Q15: How many iron roads, each of length 7 m and diameter 2 cm can be made out of 0.88 m^3 of iron? *[IFIC bank (TSO)-18]*

$r = 1\ cm = 0.01\ m$

$h = l = 7\ m$

$\pi r^2 h = \pi \times (0.01)^2 \times 7$

$$\frac{0.88}{\frac{22}{7} \times (0.01)^2 \times 7} = \frac{\frac{88}{100}}{2 \times \frac{22}{7} \times 0.01}$$

$$= \frac{4}{\frac{1}{100}} = 400$$

Type-04

Cone Related

Q16: A sector of a circle of radius 5 cm is recast into a right circular cone of height 4 cm. What is the volume of the resulting cone? *[GIB (PO)-24]*

radius

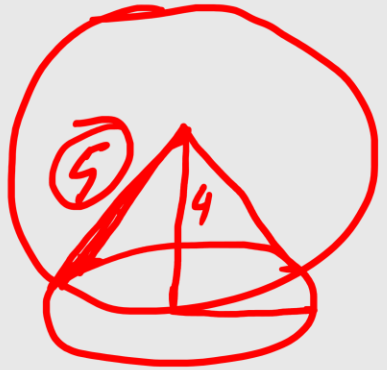
$l = 5$

$h = 4$

$l^2 = h^2 + r^2$

$r^2 = l^2 - h^2 = 25 - 16 = 9$

$r = 3$



16π

$$\frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3}\pi \times 3^2 \times 4 = 12\pi$$

Q17: Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area. *[PKB (SO)-20]*

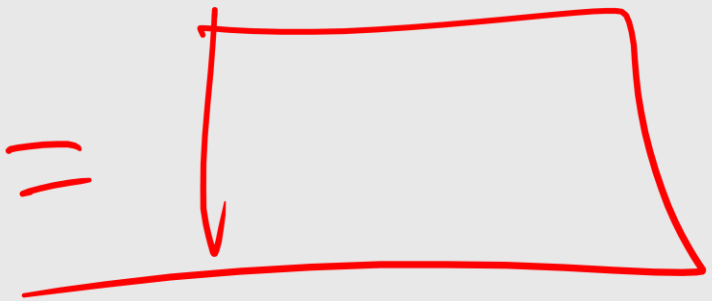
$r = \frac{}{2}$

$l = 10$

$r = \frac{10.5}{2} = 5.25$

$\pi r l$

$\Rightarrow \frac{22}{7} \times 5.25 \times 10$

$=$  cm^2

Q18: The height of a cone is 24 cm and the area of the base is 154 cm^2. What is the curved surface area (in cm^2) of the cone?

$\pi r l$

$\Rightarrow \frac{22}{7} \times 7 \times 25$

$= 550$

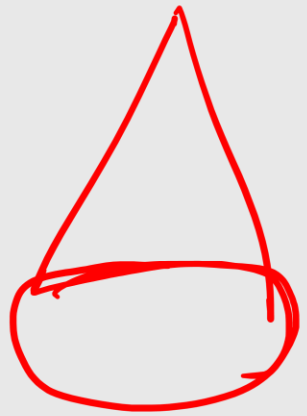
$l = \sqrt{h^2 + r^2}$

$= \sqrt{24^2 + 7^2}$

$= \sqrt{576 + 49}$

$= \sqrt{625}$

$l = 25$



$h = 24$

$\pi r^2 = 154$

$r^2 = \frac{154 \times 7}{22}$

$= 49$

$r = 7$

Type-05

Sphere & Hemisphere Related

Q19: If the total surface area of a hemisphere be 36π sq. cm, then its radius is [Comb Bank (SO)-18]

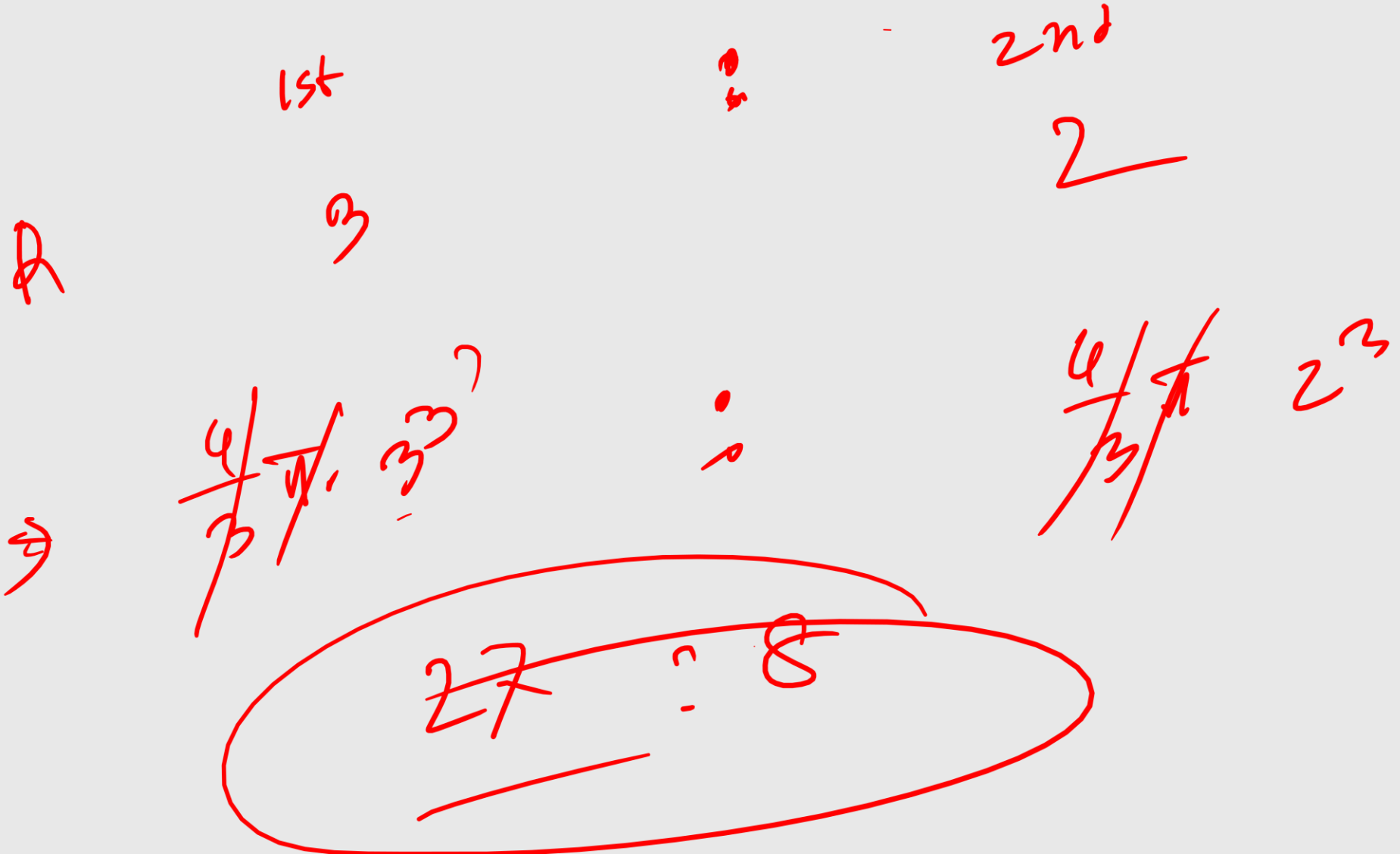
$$3\pi r^2 = 36\pi$$

$$\pi r^2 = 12$$

$$r^2 = \frac{12}{7} = \frac{12 \times 7}{22} = \frac{42}{11}$$

$$r = \sqrt{\frac{42}{11}}$$

Q20: The radii of two spheres are in the ratio 3 : 2. Their volumes will be in the ratio- *[Aggarwal-214]*



Q21: A copper wire of length 36 m and diameter 2 mm is melted to form a sphere. The radius of the sphere (in cm) is? *[Aggarwal-242]*

$h = 36\,m = 3600\,cm$

$r_1 = \frac{2}{2} = 1\,mm = 0.1\,cm$

$r_2 = ?$

$\pi r_1^2 h = \frac{4}{3}\pi r_2^3$

$(0.1)^2 \times 3600 = \frac{4}{3}(r_2)^3$

$\Rightarrow \frac{1}{100} \times 3600 = \frac{4}{3}(r_2)^3$

$(r_2)^3 = \frac{9}{36} \times \frac{3}{4}$

$(r_2)^3 = 27 = 3^3$

$r_2 = 3$

Thank You