

7. If the surface area of a sphere is 616 square cm, what is its volume?

4312/3 cubic cm

4102/3 cubic cm

1257 cubic cm

1023 cubic cm

Answer (a)

$$4\pi r^2 = 616$$

$$\text{or } 4 \times 22 \times r^2/7 = 616$$

$$\Rightarrow r = 7$$

$$\text{Volume of sphere} = \frac{4\pi r^3}{3} = \frac{4 \times 22 \times 7^3}{3 \times 7} = \frac{4312}{3}$$

$$V = 4/2 \times 22/7 \times 7 \times 7 \times 7 = 4312/3 \text{ cm}^3$$

8. The surface area of a sphere is 616 square cm. If its radius is changed so that the area gets reduced by 75%, then the radius becomes

1.6 cm

2.3 cm

2.5 cm

3.5 cm

Answer (d)

New area = 25% of original area

$$\text{or } 4\pi r^2 = 1/4 \times 616$$

$$\text{or } 4\pi r^2 = 154$$

$$\text{or } 4 \times 22 \times r^2/7 = 154$$

$$\text{or } r^2 = 49/4 = (7/2)^2$$

Therefore $r = 7/2$ or 3.5 cm

9. If the diameter of a sphere is doubled, how does its surface area change?

It increases two times

It increases three times

It increases four times

It increases eight times.

Answer (d)

If the diameter is doubled radius is also doubled

$$\frac{V_2}{V_1} = \frac{(4 \times \pi(2r)^3)/3}{(4 \times \pi(r)^3)/3} = \frac{8r^3}{r^3} = 8$$

$$\therefore V_2 = 8V_1$$

10. A sphere is inscribed in a cubical box such that the sphere is tangent to all six faces of the box. What is the ratio of the volume of the cubical box to the volume of sphere?

6π

36π

$4\pi/3$

$6/\pi$

Answer (d)

Diameter of sphere = side of cube = s

\therefore radius of the sphere $r = s/2$

$$\frac{V(\text{cube})}{V(\text{sphere})} = \frac{s^3}{(4\pi(s/2)^3)/3} = \frac{24s^3}{4\pi s^3} = \frac{6}{\pi}$$

11. What is the number of wax balls, each of radius 1 cm, that can be molded out of a sphere of radius 8 cm?

256

512

768

1024

Answer (b)

Volume of 1 sphere with radius 8 cm = volume of n spheres with radius 1 cm

$$\frac{n \times 4\pi \times (1)^3}{3} = \frac{4 \times \pi \times 8^3}{3}$$

$$\Rightarrow n = 512$$