If the radius of the sphere is increased by 100%, the volume of the corresponding sphere is increased by

(a) 200%

(b) 500%

(c) 700%

(d) 800%

Let r be the original radius of sphere. If we increased radius by 100 %. it will be $2r$.

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

Now $$V_{2r} = \frac{4}{3}\pi \times (2r)^3 = \frac{4}{3}\pi \times 8r^2$$

Thus new volume is 8 times of original volume.
Hence when the radius is increased by 100%, the corresponding volume becomes 800% and thus increase is 700%.
Thus (c) is correct option.

The base radii of a cone and a cylinder are equal. If their curved surface areas are also equal, then the ratio of the slant height of the cone to the height of the cylinder is

(a) 2 : 1

(b) 1 : 2

(c) 1 : 3

(d) 3 : 1

$$\pi rl = 2\pi rh$$

$$\frac{l}{h} = \frac{2}{1}$$

Thus (a) is correct option.

If the perimeter of one face of a cube is 20 cm, then its surface area is

(a) $120\,\text{cm}^2$

(b) $150\,\text{cm}^2$

(c) $125\,\text{cm}^2$

(d) $400\,\text{cm}^2$

Edge of cube, $a = \frac{20}{4}\,\text{cm} = 5\,\text{cm}$

Surface area $6a^2 = 6 \times 5^2\,\text{cm}^2 = 150\,\text{cm}^2$

Thus (b) is correct option.

The diameter of a sphere is 6 cm. It is melted and drawn into a wire of diameter 2 mm. The length of the wire is

(a) 12 m (b) 18 m

(c) 36 m (d) 66 m

Let the length of the wire be l. Since, metallic sphere is converted into a cylindrical shaped wire of length l, Volume of the metal used in wire is equal to the volume of the sphere.

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

$$\pi \times \left(\frac{2}{2} \times \frac{1}{10}\right)^2 \times l = \frac{4}{3} \times \pi \times \left(\frac{6}{2}\right)^3$$

$$\pi \times \frac{1}{100} \times l = \frac{4}{3} \times \pi \times 3^3$$

$$\frac{l}{100} = 4 \times 3^2 = 36$$

$$l = 3600 \text{ cm} = 36 \text{ m}$$

Thus (c) is correct option.

Ratio of volumes of two cones with same radii is

(a) $h_1 : h_2$

(b) $s_1 : s_2$

(c) $r_1 : r_2$

(d) None of these

Assertion : Total surface area of the cylinder having radius of the base 14 cm and height 30 cm is $3872\,\text{cm}^2$.

Reason : If r be the radius and h be the height of the cylinder, then total surface area $= (2\pi rh + 2\pi r^2)$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Total surface area,

$$2\pi rh + 2\pi r^2 = 2\pi r(h + r)$$

$$= 2 \times \frac{22}{7} \times 14(30 + 14) = 88(44)$$

$$= 3872\,\text{cm}^2$$

Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Thus (a) is correct option.

Twelve solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 16 cm. The diameter of each sphere is

(a) 4 cm (b) 3 cm

(c) 2 cm (d) 6 cm

Volume of the twelve solid sphere is equal to the volume of cylinder.

$$V_{12\,\text{sphere}} = V_{\text{cylinder}}$$

$$12 \times \frac{4}{3}\pi r^3 = \pi\left(\frac{2}{1}\right)^2 \times 16$$

$$16\pi r^3 = 16\pi$$

$$r^3 = 1 \Rightarrow r = 1\,\text{cm}$$

Diameter of each sphere, $d = 2r = 2 \times 1 = 2\,\text{cm}$

Thus (c) is correct option.

Assertion : If the height of a cone is 24 cm and diameter of the base is 14 cm, then the slant height of the cone is 15 cm.

Reason : If r be the radius and h be the slant height of the cone, then slant height $= \sqrt{h^2 + r^2}$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Sol :

Slant height $l = \sqrt{\left(\frac{14}{2}\right)^2 + (24)^2}$

$= \sqrt{49 + 576}$

$= \sqrt{625} = 25$

Assertion (A) is false but reason (R) is true.

Thus (d) is correct option.

The circumference of the edge of a hemisphere bowl is 132 cm. When π is taken as $\frac{22}{7}$, find the capacity of the bowl in cm^3.

Let r be the radius of bowl, then circumference of bowl,

$$2\pi r = 132$$

$$r = \frac{132 \times 7}{2 \times 22} = 21 \text{ cm}$$

Capacity i.e volume of the bowl,

$$\frac{2}{3}\pi r^3 = \frac{2}{3} \times \frac{22}{7} \times 21 \times 21 \times 21$$

$$= 19404 \text{ cm}^3$$

Three solid metallic spherical balls of radii 3 cm, 4 cm and 5 cm are melted into a single spherical ball, find its radius.

Let the radius of spherical ball be r.

Volume of spherical ball = Volume of three balls

$$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left[3^3 + 4^3 + 5^3\right]$$

$$r^3 = 27 + 64 + 125 = 216$$

$$r = 6 \text{ cm}$$

,

A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

Radius of conical heap $r = 12\,\text{m}$

Height of heap, $h = 3.5\ \text{m}$

Volume of rice,

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

$$= \frac{1}{3} \times \frac{22}{7} \times 12 \times 12 \times 3.5\,\text{m}^3$$

$$= 528\,\text{m}^3$$

Slanted height,

$$l = \sqrt{12^2 + (3.5)^2} = 12.5\,\text{m}$$

Area of canvas cloth required,

$$\pi r l = \frac{22}{7} \times 12 \times 12.5 = 471.4\,\text{m}^2$$

A glass cylinder with radius 10 cm has water to a height of 9 cm. A metal cube of 8 cm edge is immersed in it completely. Calculate the height by which water will rise in the cylinder. Use $\pi = \frac{22}{7}$

Let h be the height of water raised measured.

Volume of water displaced in cylinder $= \pi(10)^2 h$

Volume of cube,

$$\pi(10)^2 h = 8 \times 8 \times 8$$

$$h = \frac{8 \times 8 \times 8 \times 7}{22 \times 10 \times 10}$$

$$= 1.629 \text{ cm.}$$

A 5 m wide cloth is used to make a conical tent of base diameter 14 m and height 24 m. Find the cost of cloth used at the rate of Rs.25 per meter.

Slant height of tent,

$$l = \sqrt{r^2 + h^2} = \sqrt{7^2 + 24^2}$$

$$= \sqrt{625} = 25 \text{ m}.$$

Curved surface area of cone,

$$\pi rl = \frac{22}{7} \times 7 \times 25 = 550 \text{ m}^2$$

Curves surface area of tent will be required area of cloth.
Let x meter of cloth is required

$$5x = 550 \text{ or, } x = \frac{550}{5} = 110 \text{ m}.$$

Thus 110 m of cloth is required.

$$\text{Cost of cloth} = 25 \times 110 = Rs.2750.$$