EXERCISE 13.1

Write the correct answer in each of the following:

1. The radius of a sphere is 2*r*, then its volume will be

(A) $\frac{4}{3}\pi r^3$ (B) $4\pi r^3$ (C) $\frac{8\pi r^3}{3}$ (D) $\frac{32}{3}\pi r^3$

Solution:

(D) $(32\pi r^3)/3$

Explanation:

Given, the radius of a sphere is 2r.

The volume of a sphere = $(4/3) \times (\text{radius})^3$

Thus, the volume of the given sphere = $(4/3) \times \pi \times (2r)^3$

$= (4/3) \times \pi \times 8 \times r^3$

$= (32\,\pi\, r^3/3)$

Hence, option D is the correct answer.

2. The total surface area of a cube is 96 cm2. The volume of the cube is:

(A) 8 cm^3 (B) 512 cm^3 (C) 64 cm^3 (D) 27 cm^3

Solution:

(C) 64 cm^3

Explanation:

The surface area of a cube is 96 cm^2

Let the length of the cube is l cm.

Thus,

$6 \times l^2 = 96$

According to formula

$l^2 = 96/6$

$l^2 = 16$

$l = 4$

Thus the length of the cube is 4 cm.

Volume of a cube $= l^3$

$= 4^3$

$= 64$

Thus volume is 64 cm^3 which is option c.

Hence, option C is the correct answer.

3. A cone is 8.4 cm high and the radius of its base is 2.1 cm. It is melted and recast into a sphere. The radius of the sphere is:

(A) 4.2 cm (B) 2.1 cm (C) 2.4 cm (D) 1.6 cm

Solution:

(B) 2.1 cm

Explanation:

Height of cone, h = 8.4cm

Radius of base, r = 2.1cm

Thus volume of a cone = $(1/3) \times \pi \times h \times r^2$
$=(1/3) \times \pi \times 8.4 \times (2.1)^2$
Now when it is melted to form a sphere, say of radius r1 cm, the volumes of both are going to be equal.
Volume of sphere = $(4/3) \times \pi \times r_1^3$

$$\therefore \frac{4}{3}\pi \times r_1^3 = \frac{1}{3}\pi \times 2.1^2 \times 8.4$$
$$= 2.1^2 \times 8.4$$
$$r_1^3 = 2.1^2 \times 2.1$$
$$r_1^3 = 2.1^3$$
$$\therefore r_1 = 2.1\text{cm}$$

Thus the radius of the sphere is 2.1cm which is option b.
Hence, option B is the correct answer.

4. In a cylinder, radius is doubled and height is halved, curved surface area will be
(A) halved (B) doubled (C) same (D) four times
Solution:

(C) same
Explanation:
Let the radius of a cylinder = r unit
Let the height of a cylinder = h unit.
According to question,
Radius is doubled = 2r
Height is halved = h/2
Then,
Curved surface area of a cylinder = $2 \times \pi \times r \times h$
And according to the above condition,
Curved surface area = $2 \times \pi \times 2 \times r \times h/2$
$= 2 \times \pi \times r \times h$
This is same as the curved surface area of the cylinder with radius r and height h.
Hence, option C is the correct answer.

5. The total surface area of a cone whose radius is r/2 and slant height 2l is

(A) $2\pi r\,(l + r)$ (B) $\pi r\,(l + \frac{r}{4})$ (C) $\pi r\,(l + r)$ (D) $2\pi rl$

Solution:

(B) $\pi r(l+(r/4))$
Explanation:
Given, radius of a cone is r/2 and slant height is 2L.
Total surface area = $\pi \times$ radius $\times$ slant height + $\pi \times$ radius^2

$$= \pi \times \frac{r}{2} \times 2 \times l + \pi \times \left(\frac{r}{2}\right)^2$$
$$= \pi rl + \frac{\pi r^2}{4}$$
$$= \pi r\left(l + \frac{r}{4}\right)$$

Hence, option B is the correct answer