BYJU'S
The Learning App

Exercise 20(B)   Page No: 303

1. Find the volume of a cone whose slant height is 17 cm and radius of base is 8 cm.
Solution:

Given,
Slant height of the cone (l) = 17 cm
Base radius (r) = 8 cm
We know that,
$l^2 = r^2 + h^2$
$h^2 = l^2 - r^2 = 17^2 – 8^2 = 289 – 64 = 225$
h = 15 cm
Now, the volume of cone = 1/3 $\pi r^2 h$ = 1/3 x 22/7 x 8 x 8 x 15 cm^3
                                                    = 7040/7 cm^3
                                                    = 1005.71 cm^3

2. The curved surface area of a cone is 12320 cm^2. If the radius of its base is 56 cm, find its height.
Solution:

Given,
Curved surface area of the cone = 12320 cm^2
Radius of the base = 56 cm
Let the slant height be 'l'
Then,
Curved surface area = $\pi r l$ = 12320 cm^2
22/7 x 56 x l = 12320 cm^2
l = (12320 x 7)/ (22 x 56)
l = 70 cm
We know that,
$l^2 = h^2 + r^2$
$70^2 = h^2 + 56^2$
$h^2 = 4900 – 3136 = 1764$
Thus, h = 42 cm

3. The circumference of the base of a 12 m high conical tent is 66 m. Find the volume of the air contained in it.
Solution:

Given,
Circumference of the base (c) = 66 m
Height of the conical tent (h) = 12 m
Radius = c/2π = 66/ 2π = (33 x 7)/22 = 21/2 = 10.5 m
Thus, the volume of the cone tent = 1/3 $\pi r^2 h$
                                                    = 1/3 x 22/7 x (21/2)^2 x 12
                                                    = 1386 m^3
Therefore, the volume of air contained is 1386 m^3.

4. The radius and height of a right circular cone are in the ratio 5:12 and its volume is 2512 cubic cm. Find the radius and slant height of the cone. (Take π = 3.14)
Solution:
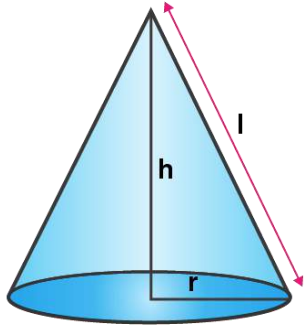
Given,
The ratio between radius and height = 5: 12
Volume of the right circular cone = 2512 cm^3
Let its radius (r) = 5x, its height (h) = 12x and slant height = l
We know that,
l^2 = r^2 + h^2 = (5x)^2 + (12x)^2 = 25x^2 + 144x^2
l^2 = 169x^2
l = 13x
Now, the volume = 1/3 πr^2 h
1/3 πr^2 h = 2512
1/3 x (3.14) x (5x)^2 x (12x) = 2512
1/3 x (3.14) x (300x^3) = 2512
x^3 = (2512 x 3)/ (3.14 x 300) = 8
x = 2
Thus,
Radius = 5x = 5 x 2 = 10 cm
Height = 12x = 12 x 2 = 24 cm
Slant height = 13x = 13 x 2 = 26 cm

5. Two right circular cones x and y are made, x having three times the radius of y and y having half the volume of x. Calculate the ratio between the heights of x and y.
Solution:
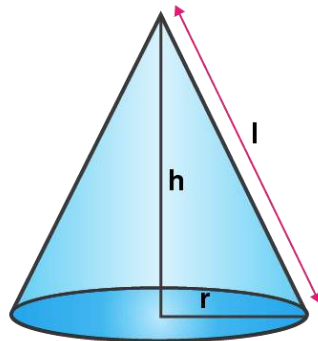
From the question,
Let radius of cone y = r
So, radius of cone x = 3r
Let volume of cone y = V
Then, volume of cone x = 2V
Let h_1 be the height of x and h_2 be the height of y.
Now,
Volume of cone x = 1/3 $\pi(3r)^2h_1$ = 1/3 $\pi9r^2h_1$ = $3\pi r^2h_1$
Volume of cone y = 1/3 πr^2h_2
So,
2V/V = $3\pi r^2h_1$/ (1/3 πr^2h_2)
2 = $3h_1$ x 3/ h_2 = $9h_1$/ h_2
h_1/h_2 = 2/9
Hence, h_1: h_2 = 2: 9

6. The diameters of two cones are equal. If their slant heights are in the ratio 5:4, find the ratio of their curved surface areas.
Solution:

Let radius of each cone = r
Given that, ratio between their slant heights = 5: 4
Let slant height of the first cone = 5x
And slant height of second cone = 4x
So, curved surface area of the first cone = πrl = πr x (5x) = $5\pi rx$
And, the curved surface area of the second cone = πr x (4x) = $4\pi rx$
Therefore,
The ratio between them = $5\pi rx$: $4\pi rx$ = 5: 4

7. There are two cones. The curved surface area of one is twice that of the other. The slant height of the latter is twice that of the former. Find the ratio of their radii.
Solution:

Let slant height of the first cone = l
So, the slant height of the second cone = 2l
Radius of the first cone = r_1
And, the radius of the second cone = r_2
Now,
Curved surface area of first cone = πr_1l
Curved surface area of second cone = $\pi r_2(2l)$ = $2\pi r_2l$
According to given condition, we have
πr_1l = 2($2\pi r_2l$)
r_1 = $4r_2$
r_1/ r_2 = 4/1
Thus, r_1: r_2 = 4: 1