RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3: The Entrancei academic team has produced a comprehensive answer for Chapter 19: Volume and Surface Area of Solids in the RS Aggarwal textbook for Class 10. Complete the NCERT exercise questions and utilize them as a guide. Solutions for Entrance NCERT Class 10 Maths problems in the exercise require assistance to be completed. For maths in class 10, Entrance published NCERT answers.

The RS Aggarwal class 10 solution for Chapter 19 Volume and Surface Area of Solids Exercise-19C is uploaded for reference only; do not copy the solutions. Before going through the solution of Chapter 19 Volume and Surface Area of Solids Exercise-19C, one must have a clear understanding of the chapter-19 Volume and Surface Area of Solids. Read the theory of chapter-19 Volume and Surface Area of Solids and then try to solve all numerical of exercise-19C.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3 Overview

Chapter 19, Exercise 19.3 of RS Aggarwal's Class 10 Maths delves into the fundamental concepts of volume and surface areas of solids. This chapter aims to equip students with the necessary skills to calculate these properties for different geometric shapes such as cubes, cuboids, cylinders, cones, and spheres.

The exercises in this chapter are structured to provide step-by-step guidance on applying specific formulas for each type of solid.

By practicing these exercises, students not only understand the theoretical aspects but also gain proficiency in solving practical problems related to these solids. The problems vary in complexity, allowing students to gradually build their understanding and problem-solving skills.

Overall, Chapter 19.3 serves as a foundational module in geometry, preparing students to tackle more advanced topics while also providing practical knowledge applicable to real-life scenarios involving spatial measurements and calculations.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3 for the ease of the students –

Question

The radii of the circular ends of a solid frustum of a cone are 18 cm and 12 cm and its height is 8 cm. Find its total surface area. [Use π=3.14.]

Solution

V=13π×h×(R2+r2+R×r)
where:
R = larger radius
r = smaller radius
h = height
V = volume
V =1/3π×8[182+122+18(12)]V=5730.265cm3

Total surface area = π[(R+r)s+(R2+r2)
where:
S = slant height
R - r = 18 - 12 = 6 cm

Pythagorean theorem:
S2=(R−r)2+h2
S=√62+82
S = 10 cm
Total surface area = π×[(18+12)(10)+182+122]
Total surface area = 2412.743 cm2

Question

A metallic bucket, open at the top, of height 24 cm is in the form of the frustum of a cone, the radii of whose lower and upper circular ends are 7 cm and 14 cm respectively. Find

(i) the volume of water which can completely fill the bucket;

(ii) the area of the metal sheet used to make the bucket.

Solution

(i). volume of frustum of cone

=13×π×h×(R2+Rr+r2)=13×227×24×(142+14×7+72)=22×87×(196+98+49)=22×87×343=22×8×4
9=8624 cm3

(ii) slant height of frustum,

l=√(R−r)2+h2=√(14−7)2+242=√72+242=√49+576=√625=25 cm

area of metallic sheet = CSA of frustum + area of base

=π×l×(R+r)+π×r2=227×25×(14+7)+227×72=5507×21+22×7=550×3+154=1650+154=1804 cm2

Question

A container, open at the top, is in the form of a frustum of a cone of height 24 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of Rs 21 per litre.

Solution

Sol :
h = 24 cm
lower end = r = 8 cm
upper end = R = 20 cm
V =π×h3×(R2+R×r+r2)
V = π×243×(202+20×8+82)
V = 176 / 7 x 624
V = 176 x 89.142 cm3
V = 15688.992 cm3
V = 15688.992cm31000
V = 15.688992 litre
Cost of milk per litre fill the container = 21 Rs
∴ Total cost of milk fill the container = 15.688992 x21 = 329.4688rs

Question

A container made of a metal sheet open at the top is of the form of frustum of cone, whose height is 16 cm and the radii of its lower and upper circular edges are 8 cm and 20 cm respectively. Find

(i) the cost of metal sheet used to make the container if it costs Rs 10 per 100 cm2

(ii) the cost of milk at the rate of Rs 35 per litre which can fill it completely.

Solution

(i)

Radius (r1) of upper end of container = 20 cm

Radius (r2) of lower end of container = 8 cm

Height (h) of container = 16 cm

Slant height (l) of frustum, l=√(r1−r2)2+h2=√(20−8)2+162=√122+162=√144+256=√400=20 cm

Capacity of container = Volume of frustum

=13πh(r21+r22+r1r2)=13×3.14×16×(202+82+20×8)=13×3.14×16×(400+64+160)=13×3.14×16×624=10449.92 cm3=10.45 litres

(ii) Cost of 1 litre milk = Rs 35

Cost of 10.45 litre milk = 10.45 × 35

= Rs 365.75

(i) Area of metal sheet used to make the container =π(r1+r2)l+πr22=π(20+8)l+π82=560π+64π=624π cm2

Cost of 100 cm2 metal sheet = Rs 10

cost of 624π cm2 metal sheet =624×3.14×10100=195.94

Therefore, the cost of the milk which can completely fill the container is

Rs 365.75 and the cost of metal sheet used to make the container is Rs 195.94.

Question

The radii of the circular ends of a solid frustum of a cone are 33 cm and 27 cm, and its slant height is 10 cm. Find its capacity and total surface area. [Take π=22/7.]

Solution

Greater radius = R = 33 cm

Smaller radius = r = 27 cm

Slant height = l = 10 cm

Using the formula for the height of a frustum:

Height =h=√l2−(R−r)2=√102−(33−27)2=√102−(6)2=√100−36=√64=8 cm

Capacity of the frustum

=13πh(R2+r2+Rr)=13×227×8(332+272+33×27)=22×83×7×2709=22704 cm3

Surface area of the frustum

=πR2+πr2+πl(R+r)=π[R2+r2+l(R+r)]=227[332+272+10(33+27)]=227[1089+729+10(60)]=22×24 187=7599.43cm2

Question

A buket is in the form of a frustum of a cone. Its depth is 15 cm and the diameters of the top and the bottom are 56 cm and 42 cm respectively. Find how many litres of waer the bucket can hold. [Take π=22/7.]

Solution

Greater diameter of the frustum = 56 cm

Greater radius of the frustum = R = 28 cm

Smaller diameter of the frustum = 42 cm

Radius of the smaller end of the frustum = r = 21 cm

Height of the frustum = h = 15 cm

Capacity of the frustum

=13πh(R2+r2+Rr)=13×227×15(282+212+28×21)=22×57×1813=28490 cm3=28.49 litres

Question

A bucket made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of the bucket if the cost of metal sheet used is Rs 15 per 100 cm2. [Use π=3.14.]

Solution

Height of the bucket, h = 16 cm (Given)

Let the radii of the upper and lower ends of the bucket be r1 and r2 respectively.

Given, r1 = 20 cm and r2 = 8 cm.

Slant height of bucket , l =√h2+(r1−r2)2=√162+(20−8)2=√162+122=√256+144==√400=20 cm

Surface are of bucket

= Curved surface area of the bucket + Area of base of the bucket

=π(r1+r2)l+πr22=π[(r1+r2)l+r22]=227[(20 cm+8 cm)20 cm+(20 cm)2]=227(28×20 cm2+400 cm2)=227(560 cm2+400 cm2)=227×960 cm2=3017.14 cm2 (Approx)

Given, cost of 100 cm2 metal sheet = Rs 15

Cost of the bucket =15100×3017.14=452.60 (Approx)

Thus, the cost of the bucket is approximately Rs 452.60.

Question

A bucket made up of a metal sheet is in the form of frustum of a cone. Its depth is 24 cm and the diameters of the top and bottom are 30 cm and 10 cm respectively. Find the cost of milk which can completely fill the bucket at the rate of Rs 20 per litre and the cost of metal sheet used if it costs Rs 10 per 100 cm2 [Use π=3.14.]

Solution

Greater diameter of the bucket = 30 cm

Radius of the bigger end of the bucket = R = 15 cm

Diameter of the smaller end of the bucket = 10 cm

Radius of the smaller end of the bucket = r = 5 cm

Height of the bucket = 24 cm

Slant height, l =√h2+(R−r)2=√242+(15−5)2=√242+(10)2=√576+100=√676=26 cm

Capacity of the frustum

=13πh(R2+r2+Rr)=13×3.14×24(152+52+15×5)=3.14×8×325=8164 cm3=8.164 litres

A litre of milk cost Rs. 20.

So, total cost of filling the bucket with milk =8.164×20=Rs.163.28

Surface area of the bucket

=πr2+πl(R+r)=π[52+26(15+5)]=3.14[25+26(20)]=3.14[25+520]=1711.3cm2

Cost of 100 cm2 of the metal sheet is Rs. 10.

So, cost of metal used for making the bucket =1711.3100×10=Rs.171.13

Question

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 m3. The breadth of the wall is

(a) 30 cm (b) 40 cm (c) 22.5 cm (d) 25 cm

Solution

Let the breadth of the wall be x metres.

Then, Height = 5x metres and Length = 40x metres.

x * 5x * 40x = 12.8

→x3=12.8200

\(x= 0.4m = **40cm \)**

(b) 40 cm

Question

The area of the base of a rectangular tank is 6500 cm2 and the volume of water contained in it is 2.6 m3. The depth of water in the tank is

(a) 3.5 m (b) 4 m (c) 5 m (d) 8 m

Solution

Given
l x b = 6500 cm2=0.65cm2
l x b x h = 2.6m3
0.65 x h = 2.6

h =
h = 4m

Question

How many bricks each measuring (25 cm×11.25 cm×6 cm) will be required to construct a wall (8 m×6 m×22.5 cm)?

(a) 8000 (b) 6400 (c) 4800 (d) 7200

Solution

Number of bricks =

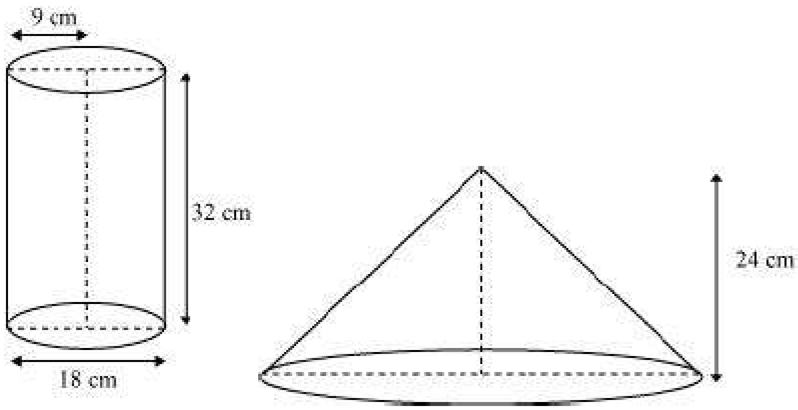
= (800 x 600 x 22.5)×
= 6400

Question.

A cylindrical bucket, 32 cm high and with a radius of a base of 18 cm, is filled with sand. This bucket is emptied on the ground, and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

Solution:

The diagram will be as-



Given,

Height (h_1) of cylindrical part of the bucket = 32 cm

Radius (r_1) of circular end of the bucket = 18 cm

Height of the conical heap ((h_2) = 24 cm

Now, let "r_2" be the radius of the circular end of the conical heap.

We know that volume of the sand in the cylindrical bucket will be equal to the volume of sand in the conical heap.

∴ The volume of sand in the cylindrical bucket = Volume of sand in the conical heap

$\pi \times r_1^2 \times h_1 = (⅓) \times \pi \times r_2^2 \times h_2$

$\pi \times 18^2 \times 32 = (⅓) \times \pi \times r_2^2 \times 24$

Or, r_2= 36 cm

And,

Slant height (l) = $\sqrt{(36^2+24^2)} = 12\sqrt{13}$ cm.

Question.

Water in a canal, 6 m wide and 1.5 m deep, flows at a speed of 10 km/h. How much area will it irrigate in 30 minutes if 8 cm of standing water is needed?

Solution:

It is given that the canal is the shape of a cuboid with dimensions as:

Breadth (b) = 6 m and Height (h) = 1.5 m

It is also given that

The speed of canal = 10 km/hr

Length of canal covered in 1 hour = 10 km

Length of canal covered in 60 minutes = 10 km

Length of canal covered in 1 min = (1/60)x10 km

Length of canal covered in 30 min (l) = (30/60)x10 = 5km = 5000 m

We know that the canal is cuboidal in shape. So,

The volume of the canal = lxbxh

= 5000x6x1.5 m^3

= 45000 m^3

Now,

The volume of water in the canal = Volume of area irrigated

= Area irrigated x Height

So, Area irrigated = 56.25 hectares

∴ The volume of the canal = lxbxh

45000 = Area irrigatedx8 cm

45000 = Area irrigated x (8/100)m

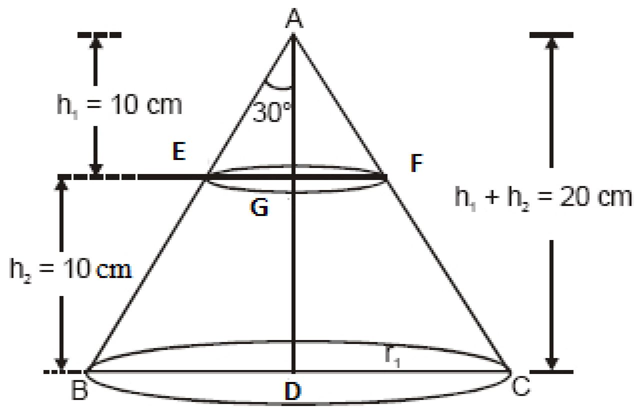
Or, Area irrigated = 562500 m^2 = 56.25 hectares.

Question.

A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained is drawn into a wire of diameter 1/16 cm, find the length of the wire.

Solution:

The diagram will be as follows



Consider AEG

$$\frac{EG}{AG} = \tan 30^\circ$$

$$EG = \frac{10}{\sqrt{3}}\,cm = \frac{10\sqrt{3}}{3}$$

In ΔABD,

$$\frac{BD}{AD} = \tan 30^\circ$$

$$BD = \frac{20}{\sqrt{3}} = \frac{20\sqrt{3}}{3}\,cm$$

Radius (r_1) of upper end of frustum = (10√3)/3 cm

Radius (r_2) of lower end of container = (20√3)/3 cm

Height (r_3) of container = 10 cm

Now,

Volume of the frustum = (⅓)×π×h($r_1^2+r_2^2+r_1r_2$)

$$= \frac{1}{3}\times\pi\times10\left[\left(\frac{10\sqrt{3}}{3}\right)^2 + \left(\frac{20\sqrt{3}}{3}\right)^2 + \frac{\left(10\sqrt{3}\right)\left(20\sqrt{3}\right)}{3\times3}\right]$$

Solving this, we get

Volume of the frustum = 22000/9 cm^3

The radius (r) of wire = (1/16)×(½) = 1/32 cm

Now,

Let the length of the wire be "l".

The volume of wire = Area of cross-section x Length

= $(\pi r^2) \times l$

= $\pi(1/32)^2 \times l$

Now, Volume of frustum = Volume of wire

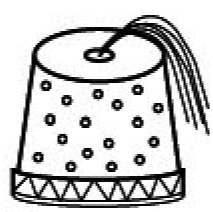
$22000/9 = (22/7) \times (1/32)^2 \times l$

Solving this, we get,

l = 7964.44 m

Question

A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it. [Use π=22/7.]



Radius (r2) at upper circular end = 4 cm

Radius (r1) at lower circular end = 10 cm

Slant height (l) of frustum = 15 cm

Area of material used for making the fez = CSA of frustum + Area of upper circular end

=π(r1+r2)l+πr22=π(10+4)×15+π(4)2=π(14)×15+16π=210π+16π=226π=226×227=71027 cm2

Therefore, the area of material used for making it is 71027 cm2

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3

The RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.3 on Volume and Surface Areas of Solids offer several benefits to students:

Structured Learning: The solutions provide a structured approach to learning about volumes and surface areas of different solids. Each type of solid (cube, cuboid, cylinder, cone, sphere) is covered with clear explanations and step-by-step solutions.

Clarity of Concepts: The solutions help clarify fundamental concepts such as how to calculate volume and surface area using specific formulas for each solid. This clarity aids in understanding the underlying principles of geometry.

Comprehensive Coverage: The exercises cover a range of problems from basic to advanced levels, ensuring that students develop a thorough understanding of the topic. This variety helps in reinforcing concepts and building problem-solving skills.

Practice Opportunities: Through numerous examples and exercises, students get ample practice applying formulas and solving problems related to volumes and surface areas of solids. This practice is crucial for improving proficiency and confidence in the subject.

Preparation for Exams: The exercises are designed to align with typical exam formats, preparing students effectively for their Class 10 Mathematics exams. They familiarize students with the types of questions they might encounter and equip them with the necessary skills to tackle them.