RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1: The Physics Wallah academic team has produced a comprehensive answer for Chapter 19 Volume and Surface Area of Solids in the RS Aggarwal class 10 textbook. Complete the NCERT exercise questions and utilise them as a guide. Solutions for Physics Wallah NCERT Class 10 Maths problems in the exercise require assistance to be completed. Class 10 Math NCERT solutions were uploaded by Physics Wallah.

Before reading the RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1, make sure you understand the chapter-19 Volume and Surface Area of Solids. Read the chapter 19 Volume and Surface Area of Solids theory and then attempt to solve all the numerical problems in exercise 19A. The chapter 19 Volume and Surface Area of Solids Exercise-19A solution for RS Aggarwal class 10 is uploaded for reference only; do not copy the solutions.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1 Volume and Surface Areas of Solids Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1 focuses on the fundamental concepts of volume and surface areas of solids. This chapter is crucial as it lays the groundwork for understanding three-dimensional geometry and its applications in real-world scenarios.

InRS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1, students typically start by revisiting the basic definitions and formulas related to calculating the volume and surface area of different solid shapes such as cubes, cuboids, cylinders, cones, and spheres. The exercises are structured to help students grasp these formulas through practical problems that require application and understanding of geometric principles.

The chapter emphasizes the importance of understanding the distinction between volume (the amount of space occupied by a solid object) and surface area (the total area that the surface of the object occupies). This understanding is crucial not only for theoretical knowledge but also for practical applications in fields such as architecture, engineering, and everyday problem-solving.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1 for the ease of the students –

Q. Two cubes each of volume 27 cm3 are joined end to end to form a solid. Find the surface area of the resulting cuboid.

Solution

Given
volume of one cube = 27cm3
side of a cube is = a
a3 = 27
a = 3√27
a = 3
now we got side of cuboid
l = 3+3= 6
b = 3
h = 3
surface area of cuboid = 2 (lb+bh+hl)
= 2 (6×3+3×3+3×3)
= 2 (36)
= 2×36
= 72 cm2

Q.

The volume of a hemisphere is 242512 cm3. Find its curved surface area.

Solution

Given : Volume of hemisphere = 242512cm3 or 2425.5cm3
Volume of hemisphere = 2/3πr³
2425.5 = 23×227×r3
r³ = 2425.5×2144
r³ = 50935.544
r³ = 1157.625
r = 10.5 cm
Now,
Curved Surface Area of hemisphere = 2πr²
= 2×227×10.5×10.5
= 693 cm2
CSA of hemisphere is 693 cm2

Q.

(i) 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 metre.

Solution

TSA OF A HEMISPHERE = $3\pi r^2$
$3\pi r^2=462$
$3\times227\times r^2=462$
$667r^2=462$
$r^2=462\times766$
$r^2=49$
$r=\sqrt{49}=7$

volume of hemisphere $=23\pi r^3$
$23\times227\times7\times7\times7=718.6cm^3$

(ii) The radius and height of a solid right-circular cone are in the ratio of 5 : 12. If its volume is 314 cm3, find its total surface area. [Take $\pi=3.14$.]

same as above

Q.

If the volumes of two cones are in the ratio of 1 : 4 and their diameters are in the ratio of 4 : 5, find the ratio of their heights.

Solution

Here, d1d2=45

⇒r1r2=45

Now, V1V2=13πr21h113πr22h2=r21h1r22h2

⇒V1V2=r21r22×h1h2

⇒14=(45)2×h1h2

⇒h1h2=2564

Q.

The sum of the radius of the base and the height of a solid cylinder is 37 metres. If the total surface area of the cylinder be 1628 sq metres, find its volume.

Solution

Let r and h be the radius and height of the solid cylinder respectively.

Given, r + h = 37 cm

Total surface area of the cylinder = 1628 cm2 (Given)

$\therefore$ 2 πr (r + h) = 1628
⇒ 2 πr × 37 = 1628
⇒ r = 7 cm

Now, r + h = 37 cm
⇒7 + h = 37
⇒ h = 37 – 7 = 30 cm

Volume of the cylinder = πr2h=227×72×30=4620cm3

Q.

The surface area of a sphere is 2464 cm2. If its radius be doubled, what will be the surface area of the new sphere?

Solution

The surface area of a sphere is given by 4πr2

So, it is proportional to the square of the radius.

If the radius is doubled, surface area will become 4 times.

New surface area = 4×2464=9856 cm2

Q.

A military tent of height 8.25 m is in the form of a right circular cylinder of base diameter 30m and height 5.5m surmounted by a right circular cone of same base radius. Find the length of canvas used in making the tent, if the breadth of the canvas is 1.5m.

Solution

Given,

Height of the military tent =8.25m

Height of the circular cylinder 4=5.5m

As, Height of the military tent = Height of the circular cylinder + Height of the right circular cone

So, Height of the right circular cone =8.25−5.5

Therefore, height of the right circular cone =2.75m

We know that,

Slant height of the cone(l)= √h2+r2

where, r= radius of base and h= altitude height of cone

radius of cylinder = radius of cone

Therefore radius of cone =302=15m

l= √h2+r2

l= √152+2.752

l= √225+7.5625

Slant height, l=15.25m

Surface area of cone= π×r×l =3.14×15×15.25=718.3

Surface area of cylinder = 2π×r×h =2×3.14×15×5.5=518.1

Area of the canvas = Surface area of cone + Surface area of cylinder

=718.9+518.57

=1236.47m2

∴ Length of canvas =1236.471.5=824.3m

Q.

A tent is in the shape of a right circular cylinder up to a height of 3 m and conical above it. The total height of the tent is 13.5 m and the radius of its base is 14 m. Find the cost of cloth required to make the tent at the rate of Rs 80 per square metre. [Take π=227.]

Solution

CSA of cylinder =2πrh
2×227×14×3=264m2

radius = 14 m
height = 13.5 - 3 = 10.5

l2=r2+h2

142+10.52196+110.25=306.25l√306.25l=17.5m

CSA of cone =πrl

227×14×17.5=770m2

total area =264+770=1034m2

cost of cloth per square m = Rs 80

cost of cloth =1034m2=80×1034=82720

Q.

A circus tent is cylindrical to a height of 3 m and conical above it. If its base radius is 52.5 m and the slant height of the conical portion is 53 m, find the area of canvas needed to make the tent. [Take π=227]

Solution

Height = h = 3 metres

Slant height = l = 53 metres

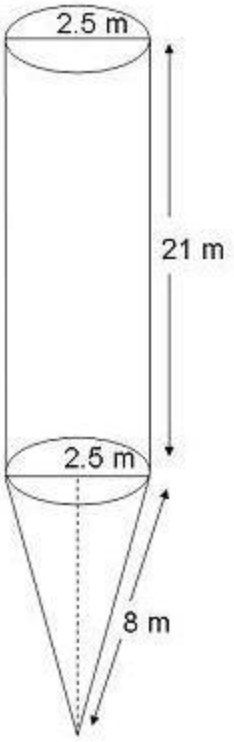
Radius = r = 52.5 metres

Area of canvas required = C.S.A of cone = πrl
= 227 × 52.5 × 53
= 8745 m²

Q.

A rocket is in the form of a circular cylinder closed at the lower end and a cone of the same radius is attached to the top. The radius of the cylinder is 2.5 m, its height is 21 m and the slant height of the cone is 8 m. Calculate the total surface area of the rocket.

Solution



Cylindrical portion:

Radius, r = 2.5 m

Height, h = 21 m

Surface area $=2\pi rh=2\times227\times2.5\times21=330$ m2

Conical portion:

Radius, r = 2.5 m

Slant height, l = 8 m

Curved surface area $=\pi rl=227\times2.5\times8=62.86$ m2

Circular top:

Radius = 2.5 m

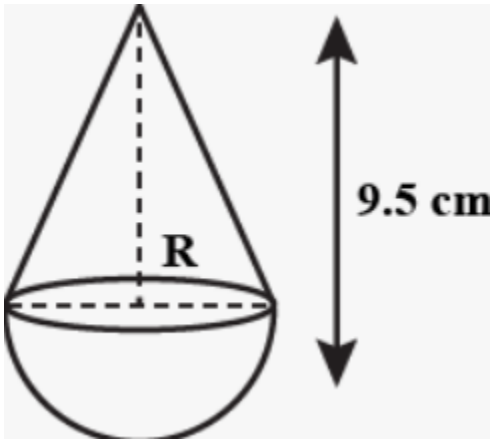
Area $=\pi r2=227\times2.52=19.64$ m2

Total surface area of the rocket $=330+62.86+19.64=412.5$ m2

Q.

A solid is in the shape of a cone surmounted on a hemisphere, the radius of each of them being 3.5 cm and the total height of the solid is 9.5 cm. Find the volume of the solid.

Solution



Total height of the solid =9.5 cm
Radius of the cone = Radius of the hemisphere =r=3.5 cm

Radius of the hemisphere = height of hemisphere =3.5 cm

Height of cone,(h) = total height of the solid - height of the hemisphere

h=9.5−3.5=6 cm

The volume of the solid = volume of cone + volume of the hemisphere

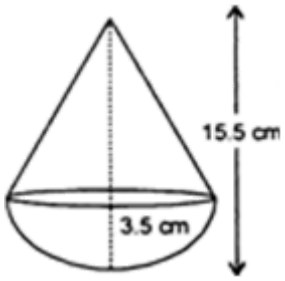
=13πr2h+23πr3
=13πr2(h+2r)
=13×227×3.5×3.5×(6+2×3.5)
=13×227×3.5×3.5×(6+7)
=13×227×3.5×3.5×(13)
=13×22×.5×3.5×(13)
=500.53
=166.83 cm3

Hence, the volume of the solid is 166.83 cm3

Q.

A toy is in the form of a cone of radius 3. 5 cm mounted on a hemisphere of same radius on its circular face. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Solution



Radius of cone = radius of hemisphere, r = 3.5 cm

Height of the cone, h = 15.5 -3.5 = 12 cm

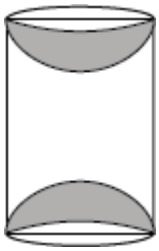
slant height, l=√r2+h2=√3.52+122=√12.25+144=√156.25=12.5 cm

Total surface area of the toy = CSA of hemisphere + CSA of cone

=2πr2+πrl=πr[2r+l]=227×3.5[2×3.5+12.5]=11[7+12.5]=11×19.5=214.5 cm2

Q.

A wooden article was made by scooping out a hemisphere from each end of a cylinder, as shown in the figure. If the height of the cylinder is 20cm and its base is of diameter 7cm, find the total surface area of the article when it is ready.



Solution

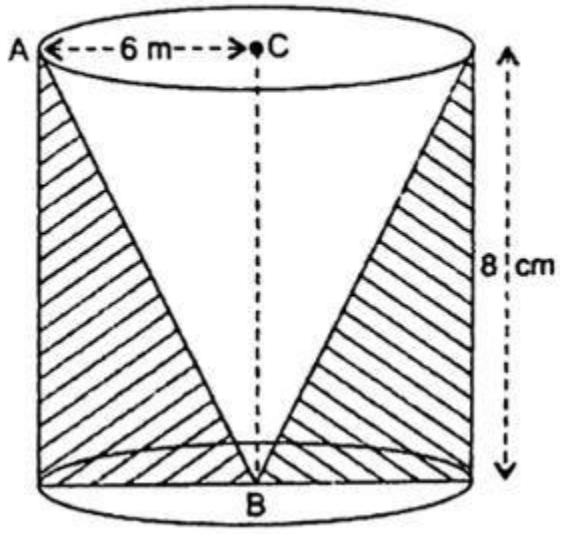
Height of the cylinder =20cm
Base radius of the cylinder =3.5cm

The total surface area would be the sum of the curved surface area of cylinder and the surface areas of 2 hemispheres which is given by
2πrh+2×2πr2=2πrh+4πr2=2πr(h+2r)=2×227×3.5×(20+2×3.5)=22×27=594 cm2

Q.

From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of height 8 cm and of base radius 6 cm is hollowed out. Find the volume of the remaining solid. Also, find the total surface area of the remaining solid. [Take π=3.14.]

Solution



Volume of the remaining solid = Volume of cylinder - volume of the cone

Volume of the remaining solid =πr2h−13πr2h=23πr2h=23×3.14×(6)2×8=602.88 cm3

Slant height of cone, AB=√BC2+AC2=√82+62=√64+36=10 cm

Total surface area of the remaining solid = curved surface area of cylinder + area of base of cylinder + curved surface area of cone
=2πrh+πr2+πrl=2π×6×8+π×62+π×6×10=96π+36π+60π=192π=192×3.14=602.88 cm2

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.1 on Volume and Surface Areas of Solids offer several benefits to students:

Structured Learning: The solutions provide a structured approach to learning the concepts of volume and surface areas of different solids. Each problem is systematically solved, helping students understand step-by-step how to apply formulas and methods to solve problems.

Clarity and Explanation: The solutions offer clear explanations for each step, making it easier for students to grasp the underlying concepts. This clarity aids in building a strong foundation in geometry, which is essential for higher-level math and real-world applications.

Practice and Application: The exercise provides ample practice problems that cover various types of solids such as cubes, cuboids, cylinders, cones, and spheres. This extensive practice helps reinforce learning and enhances problem-solving skills.

Variety of Problems: RS Aggarwal Solutions include a variety of problems ranging from straightforward calculations to more complex problems involving multiple steps. This variety ensures that students are exposed to different types of scenarios, preparing them to tackle diverse challenges.

Exam Preparation: The solutions are designed to align with the exam pattern and requirements, making them an excellent resource for exam preparation. Students can practice solving problems similar to those that may appear in their exams, thereby boosting their confidence.