RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4: 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 utilise them as a guide. Solutions for Entrancei NCERT Class 10 Maths problems in the exercise require assistance to be completed. For maths in class 10, Entrancei published NCERT answers.

The RS Aggarwal class 10 solution for chapter 19 Volume and Surface Area of Solids Exercise-19D is uploaded for reference only. Before going through the solution of chapter-19 Volume and Surface Area of Solids Exercise-19D, 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-19D.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4(D) Volume and Surface Areas of Solids Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4 focuses on the volume and surface areas of solids. This chapter provides comprehensive problems that help students understand the calculations involved in determining the volume and surface area of various geometric shapes like spheres, cylinders, cones, and cuboids. The exercise emphasizes practical application, making it easier for students to grasp the concepts by solving real-world problems.

The solutions provided in this exercise are step-by-step, ensuring that students can follow along and understand each calculation's rationale. This approach helps reinforce the learning process and builds a solid foundation for solving more complex problems in geometry. Overall, Exercise 19.4 is crucial for mastering the concepts of volume and surface areas of solids, which are fundamental in higher mathematics and practical applications.

RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4 for the ease of the students –

Question
The diameter of a copper sphere is 18cm. The sphere is melted and is drawn into a long wire of uniform circular cross-section. If the length of the wire is 108m, find its diameter.

Solution

Let radius of wire be 'r',then diameter=2r. Now, volume of wire=volume of sphere
⇒πr2h=43πR3⇒r2×10800=43×(9)3⇒r2=4×9×9×910800×3=0.09
⇒r=√0.09=0.3㎝, therefore, diameter=2×0.3=0.6㎝

Question
A spherical cannon ball, 28 cm in diameter is melted and cast into a right circular conical mould, the base of which is 35 cm in diameter. Find the height of the cone.
Solution

Radius of cannon ball =14 cm
Volume of cannon ball=4πr33
Radius of conical mould=352 cm
Volume of conical mould=13πr2h

Since material of cannon ball is used to make right circular mould, Hence
⇒Volume of sphere=volumeofcone43πr3=13πr2h4×14×14×14=352×352×hh=4×2×2×14×14×1435×35h=35.84cm

Question
A hemispherical bowl of internal radius 9cm is full of liquid. This liquid is to be filled into a cylindrical shaped small bottle each of diameter 3cm and height 4cm. How many bottles are necessary to empty the bowl.
Solution

Number of bottles = Volume of bowl / Volume of bottle
= (23π) / (9.3π)
= 1.5 / 0.24
= 54

Question
Find the volume and surface area of a sphere whose radius is:
4.2 cm
Solution

It is given that

Radius of the sphere =4.2 cm

We know that

Volume of the sphere =43πr3

By substituting the values

Volume of the sphere =43×227×4.23

So we get

Volume of the sphere =310.464 cm3

We know that

Surface area of the sphere =4πr2

By substituting the values

Surface area of the sphere =4×227×4.22

So we get

Surface area of the sphere =221.76 cm2

Question
Find the volume and surface area of a sphere whose radius is: 5m
Solution

It is given that

Radius of the sphere =5 cm

We know that

Volume of the sphere =43πr3

By substituting the values

Volume of the sphere =43×227×53

So we get

Volume of the sphere =523.81 m3

We know that

Surface area of the sphere =4πr2

By substituting the values

Surface area of the sphere =4×227×52

So we get

Surface area of the sphere =314.28 m2

Question
The volume of a sphere is 38808 cm3. Find its radius and hence its surface area.
Solution

We know that

Volume of the sphere =43πr3

By substituting the values

38808=43×227×r3

On further calculation

r3=(38808×3×7)88

so we get

r3=9261

By taking cube root

r=21cm

We know that

Surface area of the sphere =4πr2

By substituting the values

Surface area of the sphere =4×227×212

So we get

Surface area of the sphere =5544 cm2

Therefore, the radius of the sphere is 21cm and the surface area is 5544 cm2

Question

From a solid cylinder whose height is 2.4 cm and diameter is 1.4 cm, a conical cavity of the

same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2.

Solution

From the question, we know the following:

The diameter of the cylinder = diameter of conical cavity = 1.4 cm

So, the radius of the cylinder = radius of the conical cavity = 1.4/2 = 0.7

Also, the height of the cylinder = height of the conical cavity = 2.4 cm

$$\therefore \text{Slant height of the conical cavity } (l) = \sqrt{h^2 + r^2}$$
$$= \sqrt{(2.4)^2 + (0.7)^2}$$
$$= \sqrt{5.76 + 0.49} = \sqrt{6.25}$$
$$= 2.5 \text{ cm}$$

Now, the TSA of the remaining solid = surface area of conical cavity + TSA of the cylinder

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

$= \pi r(l+2h+r)$

$= (22/7)\times 0.7(2.5+4.8+0.7)$

$= 2.2\times 8 = 17.6$ cm^2

So, the total surface area of the remaining solid is 17.6 cm^2

Question

Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

Solution

For Sphere 1:

Radius (r_1) = 6 cm

$\therefore$ Volume (V_1) = $(4/3)\times\pi\times r_1^3$

For Sphere 2:

Radius (r_2) = 8 cm

∴ Volume (V_2) = $(4/3)\times\pi\times r_2^3$

For Sphere 3:

Radius (r_3) = 10 cm

∴ Volume (V_3) = $(4/3)\times \pi\times r_3^3$

Also, let the radius of the resulting sphere be "r"

Now,

The volume of the resulting sphere = $V_1+V_2+V_3$

$(4/3)\times\pi\times r^3 = (4/3)\times\pi\times r_1^3+(4/3)\times\pi\times r_2^3 +(4/3)\times\pi\times r_3^3$

$r^3 = 6^3+8^3+10^3$

$r^3 = 1728$

r = 12 cm

Question

How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm × 10 cm × 3.5 cm?

Solution

It is known that the coins are cylindrical in shape.

So, height (h_1) of the cylinder = 2 mm = 0.2 cm

Radius (r) of circular end of coins = 1.75/2 = 0.875 cm

Now, the number of coins to be melted to form the required cuboids be "n"

So, Volume of n coins = Volume of cuboids

$n \times \pi \times r^2 \times h_1 = l \times b \times h$

$n\times\pi\times(0.875)^2\times0.2 = 5.5\times10\times3.5$

Or, n = 400

Question

How many spheres 12cm in diameter can be made from a metallic cylinder of diameter 8cm and height 90cm?
Solution

It is given that

Diameter of the sphere =12cm

Radius of the sphere =122=6cm

We know that

Volume of the sphere =43πr3

By substituting the values

Volume of the sphere =43×227×63

So we get

Volume of the sphere =905.142 cm3

It is given that

Diameter of the cylinder =8cm

Radius of the cylinder =82=4cm

Height of the cylinder =90cm

We know that

Volume of the cylinder =πr2h

By substituting the values

Volume of the cylinder =227×42×90

So we get

Volume of the cylinder =4525.714 cm3

We know that

Number of spheres = Volume of cylinder / Volume of sphere

By substituting the values

Number of spheres =4525.714905.142=5

Therefore, 5 spheres can be made from a metallic cylinder.

Question
The outer diameter of a spherical shell is 12cm and its inner diameter is 8cm. Find the volume of a metal contained in the shell. Also, find its outer surface area.
Solution

It is given that

Outer diameter of spherical shell =12cm

Radius of spherical shell =122=6cm

Inner diameter of spherical shell =8cm

Radius of spherical shell =84=2cm

We know that

Volume of outer shell =43πr3

By substituting the values

Volume of outer shell =43×227×63

So we get

Volume of outer shell =905.15 cm3

Volume of inner shell =43πr3

By substituting the values

Volume of outer shell =43×227×43

So we get

Volume of outer shell =268.20 cm3

So the volume of metal contained in the shell = Volume of outer shell - Volume of inner shell

By substituting the values

Volume of metal contained in the shell =905.15−268.20=636.95 cm3

We know that

Outer surface area =4πr2

By substituting the values

Outer surface area =4×227×62

On further calculation

Outer surface area =452.57 cm2

Therefore, the volume of metal contained in the shell is 636.95 cm3 and the outer surface area is 452.57 cm2.

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

The slant height of a frustum of a cone is 4 cm, and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the surface area of the frustum.

Solution

Given,

Slant height (l) = 4 cm

Circumference of upper circular end of the frustum = 18 cm

∴ $2\pi r_1 = 18$

Or, $r_1 = 9/\pi$

Similarly, the circumference of the lower end of the frustum = 6 cm

∴ $2\pi r_2 = 6$

Or, $r_2 = 3/\pi$

Now, the surface area of the frustum = $\pi(r_1+r_2) \times l$

= $\pi(9/\pi+3/\pi) \times 4$

= $12\times4 = 48$ cm^2

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4

The RS Aggarwal Solutions for Class 10 Maths Chapter 19 Exercise 19.4, focusing on Volume and Surface Areas of Solids, offer several benefits to students:

Comprehensive Understanding: The solutions provide detailed step-by-step explanations, helping students understand the principles behind calculating volume and surface areas of various solids such as spheres, cylinders, cones, and cuboids.

Problem-Solving Skills: By working through these problems, students enhance their problem-solving abilities, learning how to approach and solve complex geometry problems systematically.

Concept Clarity: The solutions clarify fundamental concepts by breaking down complicated problems into manageable steps, ensuring that students grasp the underlying mathematical principles.

Exam Preparation: Practicing these exercises prepares students for exams by familiarizing them with the types of questions that may appear, improving their speed and accuracy.

Confidence Building: Successfully solving these problems boosts students' confidence in their mathematical abilities, encouraging them to tackle more challenging problems.