MATHS

NCERT - NCERT MATHEMATICS(ENGLISH)

SURFACE AREAS AND VOLUMES

Solved Examples

1. A child playing with building blocks, which are of the shape of cubes, has built a structure

as shown in Fig. 13.25. If the edge of each cube is 3 cm, find the volume of the structure built by the child.

Watch Video Solution

2. The pillars of a temple are cylindrically shaped (see Fig. 13.26). If each pillar has a circular base of radius 20 cm and height 10 m, how much concrete mixture would be required to build 14 such pillars?

Watch Video Solution

3. A hemispherical dome of a building needs to be painted (see Fig. 13.21). If the circumference of the base of the dome is 17.6 m, find the cost of painting it, given the cost of painting is Rs 5 per 100 cm^2

Watch Video Solution

4. Monica has a piece of canvas whose area is $551\, m^2$. She uses it to have a conical tent made, with a base radius of 7 m. Assuming

that all the stitching margins and the wastage incurred while cutting, amounts to approximately $1\ m^2$, find the volume of the tent that can be made with it.

Watch Video Solution

5. Find the volume of a sphere of radius 11.2 cm

Watch Video Solution

6. At a Ramzan Mela, a stall keeper in one of the food stalls has a large cylindrical vessel of base radius 15 cm filled up to a height of 32 cm with orange juice. The juice is filled in small cylindrical glasses (see Fig. 13.27) of radius 3 cm up to a height of 8 cm, and sold for Rs 15 each. How much money does the stall keeper receive by selling the juice completely?

Watch Video Solution

7. The height and the slant height of a cone are 21 cm and 28 cm respectively. Find the volume of the cone

Watch Video Solution

8. A shot-putt is a metallic sphere of radius 4.9 cm. If the density of the metal is $7.8\ g\ per cm^2$, find the mass of the shot-putt.

Watch Video Solution

9. Find (i) the curved surface area and (ii) the total surface area of a hemisphere of radius 21 cm.

Watch Video Solution

10. Find the surface area of a sphere of radius 7 cm.

Watch Video Solution

11. A corn cob (see in figure), shaped somewhat like a cone, has the radius of its broadest end as 2.1 cm and length as 20cm. If each $1\ cm^2$ of the surface of the cob carries an average of four grains, find how many grains you would find on the entire cob?

Watch Video Solution

12. Mary wants to decorate her Christmas tree. She wants to place the tree on a wooden box

covered with coloured paper with picture of Santa Claus on it (see Fig. 13.4). She must know the exact quantity of paper to buy for this purpose. If the box has length, breadth and height as 80 cm, 40 cm and 20 cm respectively how many square sheets of paper of side 40 cm would she require?

Watch Video Solution

13. Savitri had to make a model of a cylindrical kaleidoscope for her science project. She

wanted to use chart paper to make the curved surface of the kaleidoscope. (see Fig 13.10). What would be the area of chart paper required by her, if she wanted to make a kaleidoscope of length 25cm with a 3.5cm radius?

Watch Video Solution

14. Hameed has built a cubical water tank with lid for his house, with each outer edge 1.5 m long. He gets the outer surface of the tank

excluding the base, covered with square tiles of side 25 cm (see Fig. 13.5). Find how much he would spend for the tiles, if the cost of the tiles is Rs 360 per dozen.

Watch Video Solution

15. A wall of length 10 m was to be built across an open ground. The height of the wall is 4 m and thickness of the wall is 24 cm. If this wall is to be built up with bricks whose dimensions

are $24\,cm \times 12\,cm \times 8\,cm$, how many bricks would be required?

Watch Video Solution

16. A hemispherical bowl has a radius of 3.5 cm. What would be the volume of water it would contain?

Watch Video Solution

17. The hollow sphere, in which the circus motorcyclist performs his stunts,has a diameter of 7 m. Find the area available to the motorcyclist for riding.

Watch Video Solution

18. The height of a cone is 16 cm and its base radius is 12 cm. Find the curved surface area and the total surface area of the cone

Watch Video Solution

19. Find the curved surface area of a right circular cone whose slant height is 10 cm and base radius is 7 cm

Watch Video Solution

Exercise 13 5

1. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

Watch Video Solution

2. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold? ($1\ m^3 = 1000l$)

Watch Video Solution

3. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?

Watch Video Solution

4. A matchbox measures $4\,cm \times 2.5\,cm \times 1.5\,cm$. What will be the volume of a packet containing 12 such boxes

Watch Video Solution

5. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20m \times 15m \times 6m$. For how many days will the water of this tank last?

Watch Video Solution

6. A godown measures $40m \times 25m \times 10m$. Find the maximum number of wooden crates each measuring $1.5m \times 1.25m \times 0.5m$ that can be stored in the godown.

Watch Video Solution

7. Find the cost of digging a cuboidal pit 8 m long, 6 m broad and 3 m deep at the rate of

$Rs\ 30\ per\ m^3$.

Watch Video Solution

8. The capacity of a cuboidal tank is 50000 litres of water. Find the breadth of the tank,if its length and depth are respectively 2.5 m and 10 m

Watch Video Solution

9. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

Watch Video Solution

Exercise 13 4

1. A right circular cylinder just encloses a sphere of radius r (see Fig. 13.22). Find(i)

surface area of the sphere,(ii) curved surface area of the cylinder,(iii) ratio of the areas obtained in (i) and (ii).

Watch Video Solution

2. A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

Watch Video Solution

3. A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin-plating it on the inside at the rate of Rs 16 per $100cm^2$.

Watch Video Solution

4. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.

Watch Video Solution

5. The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas.

Watch Video Solution

6. Find the radius of a sphere whose surface area is $154\ cm^2$

Watch Video Solution

7. Find the surface area of a sphere of radius:

(i) 10.5 cm (ii) 5.6 cm (iii) 14 cm

Watch Video Solution

8. Find the total surface area of a hemisphere of radius 10 cm

Watch Video Solution

9. Find the surface area of a sphere of radius:

10.5 cm (ii) 5.6 cm (iii) 14 cm

Watch Video Solution

Exercise 13 7

1. Find the volume of the right circular cone with(i) radius 6 cm, height 7 cm (ii) radius 3.5 cm, height 12 cm

Watch Video Solution

2. Find the capacity in litres of a conical vessel with(i) radius 7 cm, slant height 25 cm (ii) height 12 cm, slant height 13 cm

Watch Video Solution

3. The height of a cone is 15 cm. If its volume is $1570\ cm^3$, find the radius of the base.

Watch Video Solution

4. If the volume of a right circular cone of height 9 cm is $48\pi cm^3$, find the diameter of its base.

Watch Video Solution

5. The volume of a right circular cone is $9856cm^3$. If the diameter of the base is 28 cm. Find (i) height of the cone (ii) slant height of the cone (iii) curved surface area of the cone

Watch Video Solution

6. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm.Find the volume of the solid so obtained.

Watch Video Solution

7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 5 cm, then find the volume of the solid so obtained. Find also the ratio of the volumes of the two solids obtained in by revolving about the side 12 cm and 5 cm

Watch Video Solution

8. A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas required

Watch Video Solution

9. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilolitres?

Watch Video Solution

Exercise 13 6

1. A patient in a hospital is given soup daily in a cylindrical bowl of diameter 7 cm. If the bowl is filled with soup to a height of 4 cm, how

much soup the hospital has to preparedaily to serve 250 patients?

Watch Video Solution

2. A soft drink is available in two packs – (i) a tin can with a rectangular base of length 5 cm and width 4 cm, having a height of 15 cm and (ii) a plastic cylinder with circular base of diameter 7 cm and height 10 cm. Which container has greater capacity and by how much?

Watch Video Solution

3. The inner diameter of a cylindrical wooden pipe is 24 cm and its outer diameter is 28 cm. The length of the pipe is 35 cm. Find the mass of the pipe, if 1 cm^3 of wood has a mass of 0.6 g.

Watch Video Solution

4. The circumference of the base of a cylindrical vessel is 132 cm and its height is 25

cm.How many litres of water can it hold? ($1000cm^3 = 1l$)

Watch Video Solution

5. A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite.

Watch Video Solution

6. The capacity of a closed cylindrical vessel of height 1 m is 15.4 litres. How many square metres of metal sheet would be needed to make it?

Watch Video Solution

7. It costs $Rs\ 2200$ to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of $Rs\ 20\ per\ m^2$, find

(i) inner curved surface area of the vessel,

(ii) radius of the base,

(iii) capacity of the vessel

Watch Video Solution

8. If the lateral surface of a cylinder is $94.2\ cm^2$ and its height is 5 cm, then find(i) radius of its base (ii) its volume.

Watch Video Solution

Exercise 13 1

1. A small indoor greenhouse (herbarium) is made entirely of glass panes (including base) held together with tape. It is 30 cm long, 25 cm wide and 25 cm high. (i) What is the area of the glass? (ii) How much of tape is needed for all the 12 edges?

Watch Video Solution

2. Shanti Sweet Stall was placing an order for making carboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions $25cm \times 20cm \times 5cm$ and the smaller of dimensions $15cm \times 12cm \times 5cm$. For all the overlaps, 5% of the total surface area is required extra. If the cost of the carboard is Rs. 4 for $1000cm^2$, find the cost of carboard required for supplying 250 boxes of each kind.

Watch Video Solution

3. The paint in a certain container is sufficient to paint an area equal to $9.\ 375\ m^2$. How many bricks of dimensions $22.\ 5\ cm\ \times\ 10\ cm\ \times\ 7.\ 5\ cm$ can be painted out of this container?

Watch Video Solution

4. A cubical box has each edge 10 cm and another cuboidal box is 12.5 cm long, 10 cm wide and 8 cm high.(i) Which box has the

greater lateral surface area and by how much?

(ii) Which box has the smaller total surface area and by how much?

Watch Video Solution

5. The length, breadth and height of a room are 5 m, 4 m and 3 m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of $Rs\ 7.\ 50\ per\ m^2$.

Watch Video Solution

6. The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of $Rs\ 10\ per\ m^2$ is Rs 15000, find the height of the hall.[Hint : Area of the four walls = Lateral surface area.]

Watch Video Solution

7. A plastic box 1.5 m long, 1.25 m wide and 65 cm deep is to be made. It is to be open at the top. Ignoring the thickness of the plastic sheet, determine:

(i) The area of the sheet required for making the box.

(ii) The cost of sheet for it, if a sheet measuring 1 m^2 costs Rs 20.

Watch Video Solution

8. Parveen wanted to make a temporary shelter for her car, by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up).

Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5m, with base dimensions 4m x 3m ?

Watch Video Solution

Exercise 13 2

1. In Fig. 13.12, you see the frame of a lampshade. It is to be covered with a

decorative cloth. The frame has a base diameter of 20 cm and height of 30 cm. A margin of 2.5 cmis to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade

Watch Video Solution

2. The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a

cylinder with a base, using cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm. The Vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required to be bought for the competition?

Watch Video Solution

3. The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find(i) its inner curved surface

area,(ii) the cost of plastering this curved surface at the rate of Rs 40 per m^2.

Watch Video Solution

4. Curved surface area of a right circular cylinder is $4.4m^2$. If the radius of the base of the cylinder is 0.7 m, find its height.

Watch Video Solution

5. A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of Rs 12.50 per m^2.

Watch Video Solution

6. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a

playground. Find the area of the playground in m^2.

Watch Video Solution

7. A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. Find its (i) inner curved surface area,(ii) outer curved surface area,(iii) total surface area

Watch Video Solution

8. It is required to make a closed cylindrical tank of height 1 m and base diameter 140 cm from a metal sheet. How many square metres of the sheet are required for the same?

Watch Video Solution

9. The curved surface area of a right circular cylinder of height $14\,cm$is $88\,cm^2$. Find the diameter of the base of the cylinder.

Watch Video Solution

10. Find

(i) the lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.

(ii) how much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in making the tank

Watch Video Solution

11. In a hot water heating system, there is a cylindrical pipe of length 28 m and diameter 5 cm. Find the total radiating surface in the system.

Watch Video Solution

Exercise 13 8

1. A capsule of medicine is in the shape of a sphere of diameter 3.5 mm. How

muchMedicine $\left(\in \ mm^3 \right)$ is needed to fill this capsule?

Watch Video Solution

2. Find the volume of a sphere whose radius is(i) 7 cm (ii) 0.63 m

Watch Video Solution

3. The diameter of a metallic ball is 4.2 cm. What is the mass of the ball, if the density of

the metal is $8.9\ g\ per\ cm^3$?

Watch Video Solution

4. Find the amount of water displaced by a solid spherical ball of diameter(i) 28 cm (ii) 0.21 m

Watch Video Solution

5. How many litres of milk can a hemispherical bowl of diameter 10.5 cm hold?

Watch Video Solution

6. The diameter of the moon is approximately one-fourth of the diameter of the earth.What fraction of the volume of the earth is the volume of the moon?

Watch Video Solution

7. Find the volume of a sphere whose surface area is 154 cm^2

Watch Video Solution

8. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m,then find the volume of the iron used to make the tank

Watch Video Solution

9. Twenty seven solid iron spheres, each of radius r and surface area S are melted toform a sphere with surface area S'.Find the(i)

radius r' of the new sphere, (ii) ratio of S and S'.

Watch Video Solution

10. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of $Rs\ 498.96$. If the cost of white-washing is $Rs\ 2.00$ per square metre, find the (i) inside surface area of the dome, (ii) volume of the air inside the dome.

Watch Video Solution

Exercise 13 3

1. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of $40\ cm$ and height $1\ m$. If the outer side of each of the cones is to be painted and the cost of painting is $12\ per\ m^2$, what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$)

Watch Video Solution

2. A conical tent is 10 m high and the radius of its base is 24 m. Find(i) slant height of the tent.(ii) cost of the canvas required to make the tent, if the cost of $1\ m^2$ canvas is Rs 70.

Watch Video Solution

3. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m? Assume that the extra

length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm

A. 63

B. 64

C. 65

D. 66

Answer: A

Watch Video Solution

4. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively.Find the cost of white-washing its curved surface at the rate of Rs 210 per $100\ m^2$.

Watch Video Solution

5. A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.

Watch Video Solution

6. Diameter of the base of a cone is 10.5 cm and its slant height is 10 cm. Find its curved surface area.

Watch Video Solution

7. Find the total surface area of a cone, if its slant height is 21 m and diameter of its baseis 24 m.

Watch Video Solution

8. Curved surface area of a cone is $308\ cm^2$ and its slant height is 14 cm. Find (i) radius of the base and (ii) total surface area of the cone.

Watch Video Solution

Exercise 13 9

1. The front compound wall of a house is decorated by wooden spheres of diameter 21

cm, placed on small supports as shown in Fig 13.32. Eight such spheres are used for this purpose, and are to be painted silver. Each support is a cylinder of radius 5cm and height 7cm and is painted black.Find the cost of paint required if silver paint cost 25 paisa per cm^2 and black paint cost 5 paisa per cm^2

Watch Video Solution

2. The diameter of a sphere is decreased by 25%. By what per cent does its curved surface

area decrease?

A. $63.75\ \%$

B. $53.75\ \%$

C. $44.75\ \%$

D. $43.75\ \%$

Answer: D

Watch Video Solution

3. A wooden bookshelf has external dimensions as follows: Height = 10 cm, Depth = 25cm, Breadth = 85 cm (See in Figure). The thickness of the plank is 5 cm everywhere. The external faces are to be polished and the inner faces are to be painted. If the rate of polishing is 20 paise per cm^2 and the rate of painting is 10 paise per cm^2 . Find the total expenses required for polishing and painting the surface of the bookshelf.

Watch Video Solution