MATHS

BOOKS - SWAN PUBLICATION

SURFACE AREAS AND VOLUMES

Exercise 13 1

1. A plastic box 1.5 m long, 1.25 m wide and 65 cm deep is to be made. It is opened 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 $1m^2$ costs Rs 20.

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2. 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 7.50 per m^2 .

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3. 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.

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4. The paint in a certain container is sufficient to paint an area equal to $9.375m^2$. How many bricks of dimensions 22.5 cm x 10 cm x 7.5 cm can be painted out of this container ?

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5. A cubical box has each edge 10 cm a cuboidal box is 10 cm wide, 12. 5 cm long 8 cm high. Which box has the greater lateral surface area and hy how much ?

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6. 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. What is the surface area of the glass ?

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7. Shanti Sweets Stall was placing an order for making cardboard boxes for paking their sweets. Two sizes of boxes were required. The bigger of dimensions 25 cm by 20 cm by 5 cm and the smaller of dimensions 15 cm by 12 cm by 5 cm. 5% of the total surface area is required extra, for all the overlaps. If the cost

of the cardboard is Rs 4 for 1000 cm^2, find the cost of cardboard required for supplying 250 boxes of each kind.

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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 2.5 m. with base dimensions 4 m x 3 m ?

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Exercise 13 2

1. The curved surface area of a right circular cylinder of height 14 cm is $88cm^2$. Find the diamter of the base of the cylinder.

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2. 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?

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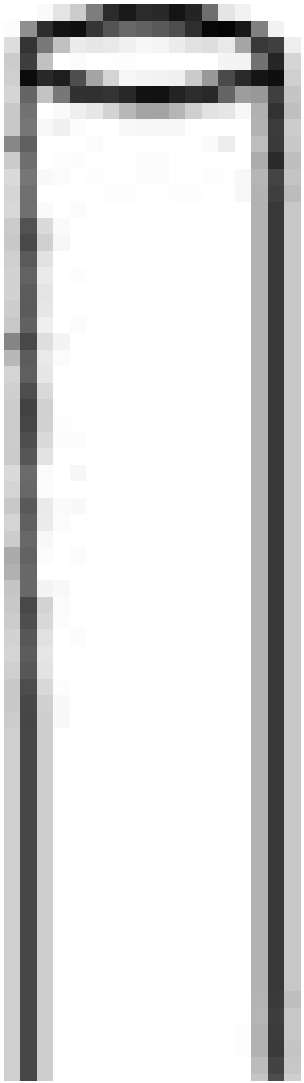
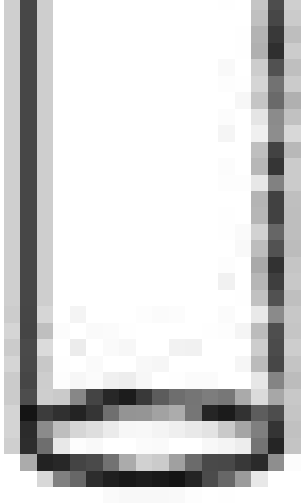
3. A metal pipe is 77cm long . The inner diameter of a cross section is 4cm , the outer diamtere being 4.4 cm (see fig) find its

(i) inner curved surface area.

(ii) outer curved surface area.

(iii) Total surface area.





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4. 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.

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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 ₹ 12.50 per m^2 .Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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

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7. The inner diameter of a circular well is 3.5 m it is 10m deep Find :

its inner curved surface area.

(ii) the cost of plastering this curved at the rate of Rs. 40 perm^2

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8. 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. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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9. Find:- how much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in

making the tank. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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10. In Fig., 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 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade. Assume $\pi = \frac{22}{7}$

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11. 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 cardborad. If there were 35 competitors, how much cardboard was required to be bought for the competiton ?

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Exercise 13 3

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

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2. Find the total surface area of cone , if its height is 35m and diameter of its base is 20m..

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3. 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. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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4. 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 ₹ 70. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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5. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (use π = 3.14).

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6. The slant height and base diameter of a conical tomb are 25 m and 14 m, respectively. Find the cost of whitewashing its curved surface at the rate of Rs 210 per $100m^2$.

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7. 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. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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8. 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 Rs 12 per m^2, what will be the cost of painting all these

cones (use $\pi = 3.14$, and take $\sqrt{1.04} = 1.02$)

?

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Exercise 13 4

1. Find the surface area of a sphere radius :

(i) 10.5cm

(ii) 5.6cm

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2. Find the surface area of a sphere of diameter :

(i) 14cm (ii) 21 cm

(iii) 3.5m

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3. Find the total surface area of a hemisphere of radius 10cm. (Use $\pi = 3.14$)

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

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5. 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 $100cm^2$

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

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7. The diameter of the moon is approximately one fourth the diamter of the earth. Find the ratio of their surface area.

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8. 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.

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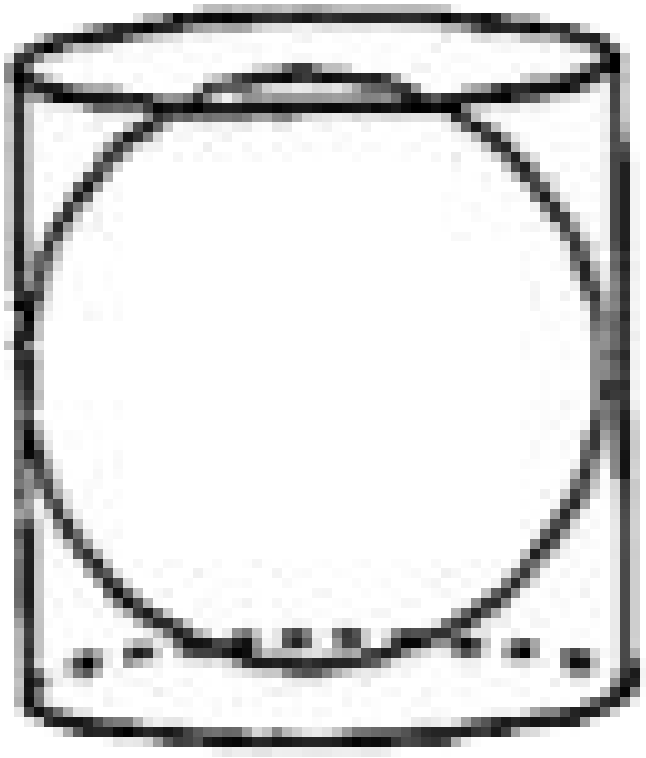
9. A right circular cylinder just incloses a sphere of radius r (see fig.) Find.

(i) Surface area of the sphere.

(ii) Curved surface are of the cylinder.

(iii) Ratio of the area obtained in (i)and (ii).



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Exercise 13 5

1. A matchbox 4 cm x 2.5 cm x 1.5 cm. What will be the volume a packet containing 12 such boxes ?

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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 = 1000 l).

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3. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 389 cubic metre of a liquid ?

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4. 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.

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5. 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. ($1000l = 1m^3$)

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

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7. A godown measures $40m \times 25m \times 15m$. Find the maximum number of wooden crates each measruing $1.5m \times 1.25m \times 0.5m$ that can be stored in the godown.

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8. 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.

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9. 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?

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Exercise 13 6

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

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2. The inner diameter of a cylindrical wooden pipe is 24 cm and its out 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.

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3. 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? Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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4. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find radius of its base. (Use π = 3.14)

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5. It costs Rs. 2200 ot 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.

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6. The capacity of a closed cylindrical vessel of height 1m is 15.4 litres. How many square metres of metal sheet would be needed to make it ? ($1000l = 1m^3$)

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7. 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 diameter of graphite is 1 mm. If the length of the pencil is 14 cm, find the volumes of the wood and that of the graphite.

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8. 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 prepare daily to serve 250 patients ?

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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

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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.

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3. The height of a cone is 15 cm. If its volume is $1570cm^3$, find the radius of the base. (Use π = 3.14)

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

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5. A conical pit of top diameter 3.5m is 12 m deep. Its capacity in kilo litres is :

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6. The volume of a right circular cone is 9856 cm^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

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7. 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. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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8. If the triangle ABC in the Question above 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 above and this Questions. Assume $\pi = \frac{22}{7}$, unless stated otherwise.

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9. 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.

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Exercise 13 8

1. Find the volume of a sphere whose radius is

(i) 7 cm (ii) $0 \cdot 63$m

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2. Find the amount of water displaced by a solid spherical ball of diameter. (i) 28 cm (ii) $0 \cdot 21$ m

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3. The diameter of a metallic ball is $4 \cdot 2$ cm. What is the mass of the ball, if the density f the metal is $8 \cdot 9$ g per cm^3 ?

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4. The diameter of moon is approx, one fourth of the diameter of the earth. What fraction of volume of the earth is the volume of the moon ?

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5. How many litres of milk can a hemispherical bowl of diameter $10 \cdot 5$ cm hold ?

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6. 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.

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

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8. A done of a building in the form of a hemisphere. From inside, it was white-washd at the cost of Rs. $498 \cdot 96$. If the cost of white - washing is Rs. 2.00 per square metre, find the

(i) inside surface area of the done

(ii) volume of the air inside the done.

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

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

medicine (in mm^3) is needed to fill this capsule ?

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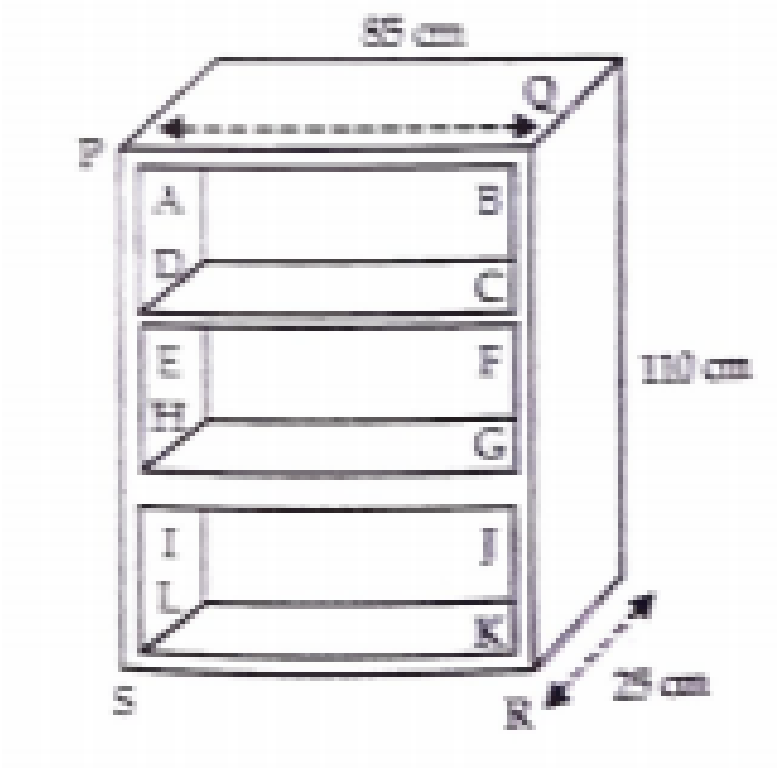
Exercise 13 9 Optional

1. A wooden bookshelf has external dimensions as follows: Height =110 cm, Depth = 25 cm, Breadth = 85 cm. 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.



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2. find the volume of a cylinder with radius 7 cm and height 7cm

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3. If diameter of a sphere is decreased by 25% then what percent does its curved surface area decrease ?

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Objective Type Questions Answer The Following Questions

1. How many faces are there in a cuboid ?

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2. How many edges are there in a cuboid ?

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3. How many faces are there in a cuboid ?

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4. Write the formula for calculating the total surface area of a cuboid.

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5. Write the formula for calculating the curved surface area of a cuboid.

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6. Write the formula for calculating the total surface area of a cube. .

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7. What do you call the area of the sheet by which the cylinder is made?

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8. Write the formula for finding the curved surface area of a cylinder.

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9. Write the formula for finding the total surface area of a cylinder.

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10. Write the formula for finding the lateral surface area of a cone.

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Objective Type Questions Fill In The Blanks

1. Total surface area of a cone = ...

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2. Surface area of a sphere = ...

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3. Curved surface area of a hemisphere = ...

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4. total surface area of a hemisphere = ...

Watch Video Solution

5. Volume of a cube = ...

Watch Video Solution

6. Volume of a cylinder = ...

Watch Video Solution

7. Volume of a cone = ...

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