MATHS

BOOKS - SUPER COMPANION MADE EASY

SURFACE AREAS AND VOLUMES

Exercise 15 1

1. 2 cubes each of volume $64cm^3$ are joined end to end . Find the surface area of the

resulting cuboid.

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2. A vessel is in the from a hollow hemisphere mounted by a hollow cylinder . The diameter of the hemisphere is 14cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

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3. A toy in the form of a cone of radius 3.5cm mounted on a hemisphere of same radius . The total height of the toy is 15.5cm . Find the total surface area of the toy.

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4. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have ? Find the surface area of the solid

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5. A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter l of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid.

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6. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each

of its ends (see fig). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.

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7. A rent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4m respectively , and the slant height of the top is 2.8m, find the area of the canvas used for making the tent. Also. find the cost of the

canvas of the tent at the rate of Rs $500 \text{per} m^2$ (Note that the base of the tent will not be covered with canvas.)

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8. From a solid cylinder whose height is 2.4cm and diameter 1.4cm, 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.

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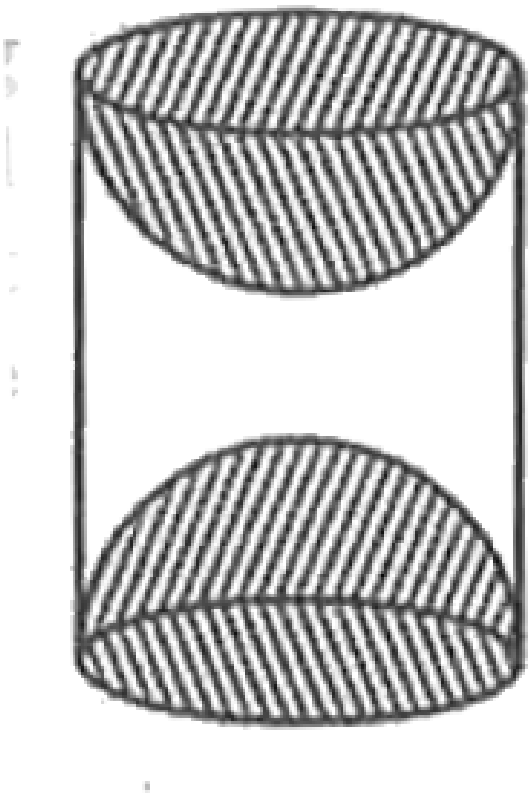
9. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder ,as shown in Fig . If the height of the cylinder is 10 cm and its base is of radius 3.5cm, find

the total surface area of the article.



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Exercise 15 2

1. A solid in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π.

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2. Rachel, an engineering student, was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a

thin aluminum sheet. The diameter of the model is 3 cm and its length is 12 cm . If each cone has a height of 2cm , find the volume of air contained in the model that Rachel made . (Assume of outer and inner dimensions of the model to be nearly the same .

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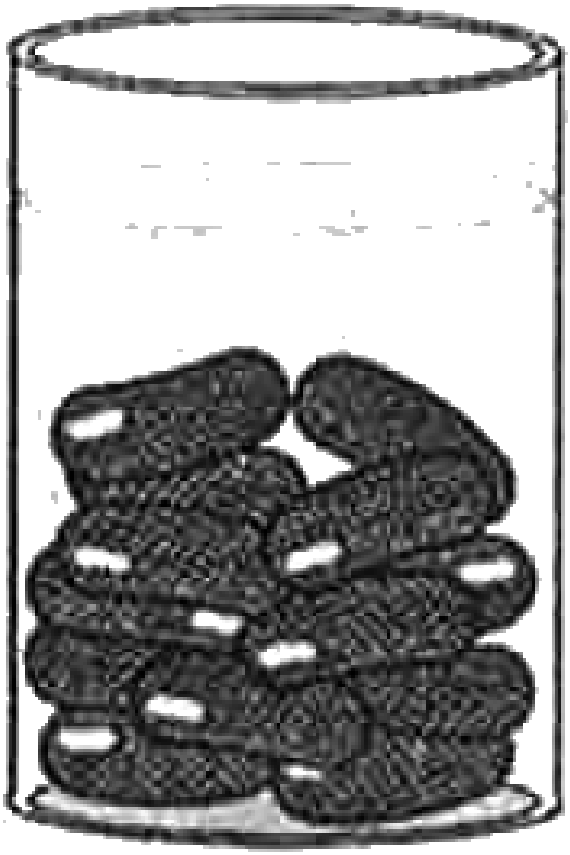
3. A gulab jamun , contains sugar syrup up to about 30% of its volume . Find approximately how much syrup would be found in 45 gulab

jamuns , each shaped like a cylinder with two hemispherical ends with length 5 cm diameter 2.8 cm (see fig) .



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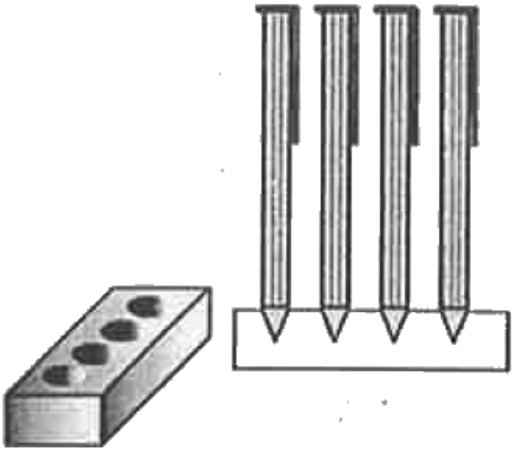
4. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid depressions are 15 cm by 10 cm 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4cm . Find the volume of wood

in the entire stand (see fig).



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5. A vessel is the from of an inverted cone. Its height is 8 cm and the radius of its top, which is open ,is 5 cm. It is filled with water uo to the

brim . When lead shots, each of which is a sphere of radius 0.5cm are dropped into the vessel, one - fourth of the water flows. out. find the number of lead shots dropped in the vessel.

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6. A solid iron pole consists of a cylinder of a height 220cm and base diameter 24cm , which is surmounted by another cylinder of height 60cm and radius 8cm . Find the mass of the

pole , given that $1cm^3$ of iron has approximately 8g mass. (Use $\pi = 3.14$)

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7. A solid consisting of a right circular cone of height 120cm and radius 60cm standing ona hemisphere of radius 60 cm is place upright in a right circular cylinder full of water such that it touchs the bottom .Find the volume of water left in the cylinder , If the radius of the cylinder is 60 cm and its height is 180cm.

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8. A spherical glass vessel has a cylindrical neck 8cm long, 2cm in diameter, the diameter of the spherical part is 8.5cm. By measuring the amount of water it holds, a child finds its volume to bt $354cm^3$ Check whether she is correct , taking the above as the inside measurements , and $\pi = 3.14$.

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Exercise 15 3

1. A metallic sphere of radius 4.2cm is melted and recast into the shape of a cylinder of radius 6cm. Find the height of the cylinder.

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

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3. A 20 m deep well with diameter 7m is dug and the earth from digging is evenly spread out ot form a platform 22m by 14m. Find the height of the platform.

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4. A well of diameter 3cm is due 14cm deep . The earth taken out of it has been spread

evenly all around it in the shape of a circular ring of width 4cm to from an embankment. Find the height of the embankment.

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5. A container shaped like a right circular cylinder having diameter 12cm and height 15cm is full of ice. Cream . The ice. cream is to be filled into cones of height 12cm and diameter 6 cm , having a hemispherical shape

on the top. Find the number of such cones which can be filled with ice cream.

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6. How many silver coins, 1.75cm in diameter and thickness 2mm, must be melted to from a cuboid of dimensions $5.5cm \times 10cm \times 3.5cm$?

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7. A cylindrical bucket , 32cm high and with radius of base 18cm , 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 24cm , find the radius and slant height of the heap.

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8. Water in a canal , 6m wide and 1.5cm deep, is flowing with a speed of 10km/h. How much are

a will it irrigate in 30 minutes , if 8cm of standing water is needed ?

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9. A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank in her field , which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3km/h, in how much time will the tank be filled ?

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Exercise 15 4

1. A drinking glass is in the shape of a frustum of a cone of height 14cm . The diameters of its two circular ends. are 4cm and 2cm . Find the capacity of the glass.

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2. The slant height of a frustum of a cone is 4cm and the perimeters (circumference) of its

circular ends are 18cm and 6cm . Find the curved surface area of the frustum.

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3. A Fez , the cap used by the Turks is shaped like the frustum of a cone (see fig) . If its radius on the open side is 10cm , radius at the upper base is 4cm and its slant height is 15cm , find the area of material used for making it.

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4. A container , openedfrom the top and made up of a metal sheet, is in the from 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 total cost of milk which can completely fill the container at the rate of $Rs20$ per liter . Also find the cost of metal sheet used to make the conatainer, if it costs $Rs8$ per $100cm^2$

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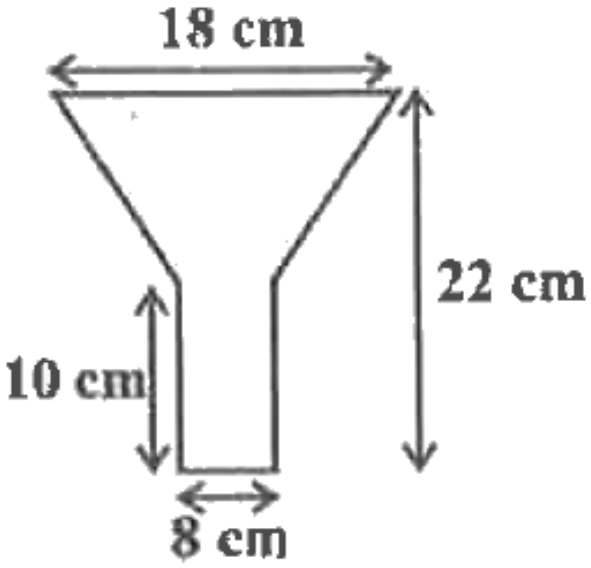
5. A metallic right circular cone 20cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm find the length of the wire.



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Exercise 15 5

1. A copper wire, 3mm in diameter , is wound about a cylinder whose length is 12cm, and diameter 10cm, so as to cover the curved surface of the cylinder . Find the length and mass of the wire, assuming the density of copper to be $8.88 g per cm^3$

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2. A right triangle, whose sides are 3cm and 4cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed (choose value of π as found appropriate.)

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3. A cistern , internally measuring $150cm \times 120m \times 110cn$ has $129600cm^3$ of water in it .porous bricks are placed in the

water until the cistern is full to the brim . Each brick absorbs one - seventeenth of its own volume of water . How many bricks can be put in without overflowing the water , each brick being $22.5cm \times 7.5cm \times 6.5cm$?

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4. An oil funnel made of tin sheet consists of a 10 cm long cylindrical portion attached to a frustum of a cone. If the total height is 22 cm, diameter of the cylindrical portion is 8 cm and

the diameter of the top of the funnel is 18 cm, find the area of the tin sheet required to make the funnel (see Fig).

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