



# MATHS

**BOOKS - OSWAAL PUBLICATION**

**MATHS (KANNADA ENGLISH)**

**SURFACE AREA AND VOLUMES**

**Topic 1 Area And Choice Questions Multiple  
Choice Questions**

1. Write the formula to calculate the curved surface area of the frustum of a cone .

A.  $\pi_1(r_1 + r_2)l$

B.  $\pi_1(r_1 + r_2)h$

C.  $\pi_1(r_1 - r_2)l$

D.  $\pi_1(r_1 - r_2)h$

**Answer: A**



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2. If the circumference of the base of a cylinder is 44 cm and height 20 cm , then its lateral surface area is :

A.  $440\text{sq. cm}$

B.  $880\text{sq. cm}$

C.  $88\text{sq. cm}$

D.  $44\text{sq. cm}$

**Answer: B**



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3. The height of a hollow cylinder is 7 cm and its radius is 3.5 cm . Then the surface area is :

A.  $231cm^2$

B.  $154cm^2$

C.  $308cm^2$

D.  $115.5cm^2$

**Answer: B**



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4. The area of the base of a circular cylinder is 154 sq. cm and height is 10 cm . Volume is :

A. 144c. c.

B. 1540c. c.

C. 154c. c.

D. 15.4c. c.

**Answer: B**



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5. The volume ( $V$ ) of a cylinder with radius of its base ( $r$ ) and height ( $h$ ), is calculate using the formula :

A.  $V = \frac{1}{3}\pi r^2 h$

B.  $V = 2\pi r h$

C.  $V = \pi r^2 h$

D.  $V = \pi r h$

**Answer: C**



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6. If  $V = \pi r^2 h$ , then  $r$  is equal to :

A.  $\pm \sqrt{\frac{Vh}{\pi}}$

B.  $\pm \sqrt{\frac{\pi h}{V}}$

C.  $\pm \sqrt{\frac{V}{\pi h}}$

D.  $\pm \sqrt{\frac{\pi V}{h}}$

**Answer: C**



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7. A rectangular sheet of metal 44cm long and 20cm broad is rolled along its length into a cylinder. Find the curved surface area of the cylinder.



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8. The formula used to find the total surface area of a solid cylinder is :

A.  $2\pi rh$

B.  $\pi r^2(r + h)$



C.  $\pi r(r + h)$

D.  $2\pi r(r + h)$

**Answer: D**



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9. The volume of a cylinder is  $1540\text{cm}^3$  . Its height is 10 cm. The area of its base is :

A.  $15400\text{sq. cm}$

B.  $154\text{sq. cm}$

C.  $1540\text{sq. cm}$

D.  $1550\text{sq. cm}$

**Answer: B**



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**10.**  $A = 2\pi r(r + h)$  . This formula can be used to find:

A. lateral surface area of a cylinder

B. total surface area of cylinder

C. volume of a cylinder

D. surface area of sphere

**Answer: B**



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**11.** The formula to find the curved surface area of a cylinder is :

A.  $2\pi r h$

B.  $\pi r^2 h$

C.  $2\pi r^2 h$

D.  $2\pi r(r + h)$

**Answer: A**



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**12.** The height of water level in a circular well is 7 m and its diameter is 10 cm . Volume of water stored inn the well is :

A. 550 cubic m

B. 70 cubic m

C. 35 cubic m

D. 110 cubic m

**Answer: A**



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**13.** The radii of two cylinders are in the ratio 2:3 and their heights are in the ratio 5:3. The ratio of their volume is :

A. 27: 20

B. 20: 27

C. 9: 4

D. 4: 9

**Answer: B**



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**Topic 1 Area And Choice Questions Very Short  
Answer Type Questions**

1. Write the formula to find the total surface area of the cone whose radius is 'r' units and slant height is 'l' units.



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2. The height of a right circular cylinder is 14 cm, and the radius of its base is 2 cm. Find its curved surface area .



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3. Write the formula to find the total surface area of the cone whose radius is ' $r$ ' units and slant height is ' $l$ ' units.



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4. Find the lateral surface area of a hollow cylinder of outer radius  $R$ , inner radius  $r$  and height  $h$ .



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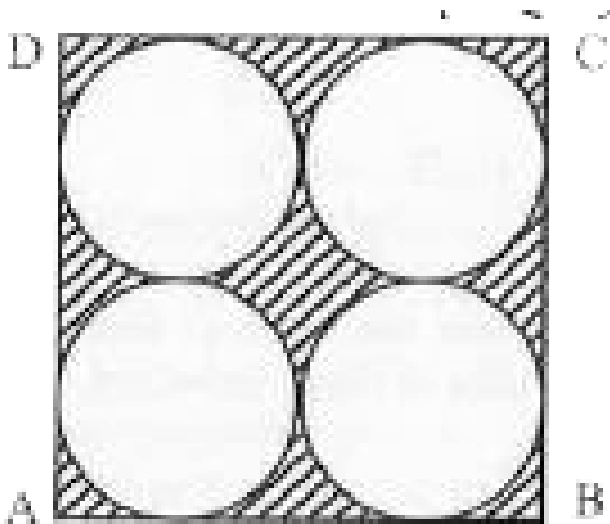


5. Find the volume of right circular cylinder of base radius  $r$  and height  $2r$  .



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6. Find the area of the shaded region in the figur, where ABCD is a square of side 14 cm .





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7. Diameter of garden roller is 1.4 m and length 2 m takes 5 revolutions to complete the garden, find the area of the garden?



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8. The radii of two right circular cylinders are in the ratio 2:3 and the ratio of their curved

surface areas is  $5:6$  . Find the ratio of their heights.



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9. A mansion has 12 right cylindrical pillars each having radius 50cm and height 3.5m. Find the cost to paint the lateral surface of the pillars at Rs.20 per square metre.



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**10.** The volume of a cube is  $64\text{cm}^3$ . Find the total surface area of the cube.



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**11.** The height of a right circular cylinder is 14 cm and the radius of its base is 2 cm. Find its :  
(a) CSA (b) TSA



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# Topic 1 Area And Choice Questions Long Answer Type Questions I

1. A solid cylinder has a total surface area of  $462\text{cm}^2$  . If its curved surface area is one third of its total surface area, find the radius and height of the cylinder.



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2. The radius of the base of a right circular cylinder is doubled and the height is halved .

What is the ratio of volume of the new cylinder to the original cylinder ?



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**3.** The radii of two right circular cylinders are in the ratio of  $2:3$  and their heights are in the ratio of  $5:4$ . Calculate the ratio of their curved surface areas and ratio of their volumes.



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## Topic 1 Area And Choice Questions Long Answer Type Questions li

1. The inner diameter of a cylindrical wooden pipe is 24 cm and its outer diameter is 28 cm. The pipe is 35 cm long . Find the mass of the pipe if  $1\text{cm}^3$  of wood has a mass of 0.6 gm .



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## Topic 2 Area And Volume Of Cone Multiple Choice Questions

1. The circumference of the circular base of a cone is 50 cm. If the slant height of it of it 10 cm, the curved surface area of the cone is :

A.  $125\text{sq. cm}$

B.  $2500\text{sq. cm}$

C.  $500\text{sq. cm}$

D.  $250\text{sq. cm}$

**Answer: d**



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2. A solid cylinder and a cone have the same radius and height . If the volume of cylinder is 27 cc, then the volume of cone is :

A. 9 c.c

B. 27 c.c

C. 81 c.c

D. 3 c.c

**Answer: a**



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3. The revolution of a right triangle about one of the sides containing the right angle generates solid called:

A. cone

B. cylinder

C. sphere

D. cube

**Answer: a**



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4. The number of plane surface in a solid cone is :  
is :

A. 0

B. 1

C. 3

D. 2

**Answer: b**



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5. The volume of a solid cone is  $60\text{cm}^3$  and the area of the base is  $20\text{cm}^2$ . Then the height is :

A. 6 cm

B. 9 cm

C. 12 cm

D. 18 cm

**Answer: b**



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6. If  $l^2 = r^2 + h^2$ , then the value of h is :

A.  $\pm \sqrt{l^2 - r^2}$

B.  $\pm \sqrt{r^2 - l^2}$

C.  $\pm \sqrt{l^2 + r^2}$

D.  $\pm \sqrt{l - r}$

**Answer: a**



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7. The volume of a cone is  $90\text{cm}^3$ . The volume of a cylinder whose height and radius is same as that of the cone is :

A.  $30\text{cm}^3$

B.  $45\text{cm}^3$

C.  $90\text{cm}^3$

D.  $270\text{cm}^3$

**Answer: d**



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8. The curved surface area of a cone is  $440 \text{ sq. cm}$ . If the slant height is  $14 \text{ cm}$ . Then its radius is :

A.  $5 \text{ cm}$

B.  $10 \text{ cm}$

C.  $12 \text{ cm}$

D.  $14 \text{ cm}$

**Answer: b**



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9. Formula to find the curved surface area of a cone is :

A.  $\pi r^2 l$

B.  $\pi r l$

C.  $\pi r (r + l)$

D.  $2\pi r l$

**Answer: b**



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10. The height of a cone with slant height 15 cm and radius 9 cm is :

A. 6 cm

B. 3 cm

C. 5 cm

D. 12 cm

**Answer: d**



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11. Area of the base a cone is 300 sq. Cm and height is 15, then the volume is :

A.  $4500\text{cm}^3$

B.  $450\text{cm}^3$

C.  $150\text{cm}^3$

D.  $1500\text{cm}^3$

**Answer: d**



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12. If  $r$ ,  $h$  and  $l$  are the radius, height and slant height respectively of a cone, then which of the following relations is correct ?

A.  $r^2 = h^2 + l^2$

B.  $h^2 = l^2 = r^2$

C.  $l^2 = h^2 + r^2$

D.  $l^2 = h^2 - r^2$

**Answer: c**



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13. The curved surface area of a cone whose circumference of the base is 66 cm and slant height is 12 cm is :

A.  $396\text{sq. Cm}$

B.  $792\text{sq. Cm}$

C.  $78\text{sq. Cm}$

D.  $54\text{sq. Cm}$

**Answer: a**



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## Topic 2 Area And Volume Of Cone Very Short Answer Type Questions

1. Find the curved surface area of a cone of base radius  $r$  and height  $h$  .



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2. If the height of a cone is equal to diameter of its base, then what is the volume of cone ?



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## Topic 2 Area And Volume Of Cone Short Answer Type Questions

1. The diameter of the base of cylinder is 2 m and height is 1.8 m is method to recast a cone of diameter 3 m, find the height of cone .



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2. The curved surface of a cone is  $308\text{cm}^2$  and its slant height is 14 cm . Find the radius of the base and the total surface area of the cone .



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3. The slant and diameter of the base of a conical tomb are 25 m and 14 m respectively. Find the cost of painting its curved surface area at the rate of  $RS50$  per square meter.



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4. A right circular cone is of the height 3.6 cm and radius of its base is 1.6 cm . It is melted

and recasted into a right circular cone with radius of its base 1.2 cm. Find the height of the cone so formed.



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5. Find the volume of the cone having radius 7 cm and height 18 cm.



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6. The radius of a cone is 7 cm and slant height is 10 cm. Find the total surface area of the cone.



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7. Find the curved surface area of a cone, if its slant height is 60 cm and the radius of its base is 21 cm.



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8. The radius of a cone is 7 cm and area of curved surface is  $176\text{cm}^2$ . Find the slant height .



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9. The area of the curved surface of a cone is  $60\pi\text{cm}^2$  . If the slant height of the cone is 8 cm, find the radius of the base .



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**10.** A clown'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.



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**11.** Find the ratio of the surface areas of two cones if their diameters of the bases are equal and slant heights are in the ratio 4:3 .



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**12.** Two cones have their heights in the ratio 1:3 and the radii of their bases in the ratio 3:1. Find the ratio of their volumes.



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**13.** A right angled triangle of which the sides containing the right angle are 6.3 cm and 10 cm in length, is made to turn around on the longer side. Find the volume of the solid thus generated .



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14. Find the volume of a right circular cone with radius 5 cm, height 7 c



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## Topic 2 Area And Volume Of Cone Long Answer Type Questions I

1. A right triangle whose sides are 15 cm and 20 cm is made to revolve about its hypotenuse

. Find the volume and the surface area of the double cone so formed. (use  $\pi = 3.14$ )



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## Topic 3 Area And Volume Of Frustum Very Short Answer Type Question

1. Find the volume of a frustum of cone if radii of circular bases as  $R$  and  $r$  and height  $h$ .



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2. Dust bin in the form of frustum having radii 15 cm and 8 cm respectively and its depth is 63 cm. Find its volume?



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3. The slant height of the frustum of a cone is 5 cm and the radii of the circular ends are 10cm and 4 cm. Find its curved surface area.



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## Topic 3 Area And Volume Of Frustum Long Answer Type Questions I

1. From the top of a cone of base radius 12 cm and height 20 cm. a small cone of base radius 3cm is to be cut off. How far down the vertex is the cuts should be made ? Find the volume of the frustum so obtained .



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2. A bucket is in the shape of a frustum with the top and bottom circles of radii 15 cm and 10 cm . Its depth is 12 cm . Find its curved surface area and total surface area . (Express the answer in terms of  $\pi$ )



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3. 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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## Topic 3 Area And Volume Of Frustum Long Answer Type Questions li

1. From the top of a cone of abse radius 24 cm and height 45 cm, a cone of slant height 17 cm is cutoff. What is the volume of the remaining frustum of the cone ?



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2. A wooden article was made by scooping out a hemisphere from one end of a cylinder and a cone from other as shown in the figure . If the height of cylinder is 40 cm , radius is 7 cm and height of cone is 24 cm, find the volume of wooden article .



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3. A flower vase is in the form of a frustum of a cone. The perimeter of the ends are  $44$  cm and  $8.4\pi$  cm . If the depth is  $14$  cm, find how much water it can hold .



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4. A solid consisting of a right circular cone of height  $120$ cm and radius  $60$ cm standing on a hemisphere of radius  $60$  cm is placed upright in a right circular cylinder full of water such that

it touches 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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5. 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 be  $354\text{cm}^3$  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 to 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 form 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 form a cuboid of dimensions  $5.5\text{cm} \times 10\text{cm} \times 3.5\text{cm}$  ?



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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 area 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 container , opened from the top and made up of a metal sheet, is in the form 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 container, if it costs  $Rs8$  per  $100cm^2$



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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  $8.88\text{gpercm}^3$



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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  $\pi$  as found appropriate.)



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3. A cistern , internally measuring  $150\text{cm} \times 120\text{m} \times 110\text{cn}$  has  $129600\text{cm}^3$  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  $22.5\text{cm} \times 7.5\text{cm} \times 6.5\text{cm}$  ?



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4. In one fortnight of a given month, there was a rainfall of 10 cm in a river valley . If the area of the valley is 7, 280 sq . Km show that the total rainfall was approximately equivalent to the addition to the normal water of three rivers each 1072 km long, 75 m wide and 3m deep.



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5. Derive the formula for the volume of the frustum of a cone, using the symbols explain.



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