Surface Areas and Volumes (www.sangyaonline.com)

1) Water in a canal, 6m wide and 1.5m deep is flowing with a speed of 10 km/hr. How much area will it irrigate in 30min, if 8cm of standing water is needed? **56.25hect.**

2) A cone of maximum size is carved out from a cube of edge 14cm. Find the surface area of the remaining solid after the cone is carved out. **$(1022+154\sqrt{5})cm^2$**

3) Two dairy owners A and B sell flavoured milk filled to capacity in mugs of negligible thickness, which are cylindrical in shape with a raised hemispherical bottom. Two mugs are 14cm high and have diameter of 7cm. Both A and B sell flavoured milk at the rate of ₹80 per litre. The diary owner A uses the formula $\pi r^2 h$ to find the volume of milk in the mug and charges ₹43.12 for it. The diary owner B is of the view that the price of actual quantity of milk should be charged. What according to him should be the price of one mug of milk? ($\pi = 22/7$) **₹35.93**

4) A cylindrical pipe has inner diameter of 4cm and water flows through it at the rate of 20m per minute. How long would it take to fill a conical tank of radius 40cm and depth 72cm? **4.8min**

5) Find the no. of spherical lead shots, each of diameter 6cm that can be made from a solid cuboid of lead having dimensions 24cm × 22cm × 12cm. **56**

6) A wooden souvenir is made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10cm and its base is of radius 3.5cm, then find the total cost of polishing the souvenir at the rate of ₹10per cm². **₹ 3740**

7) 50 circular discs, each of radius 7cm and thickness 0.5cm are placed one above the other. Find the total surface area of the solid so formed. Find how much space will be left in a cubical box of side 25cm if the solid formed is
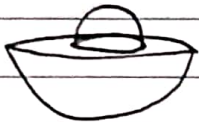
placed inside it.

8) Volumes of two spheres are in the ratio 27:64. What is the ratio of their surface areas? $\qquad$ 9:16

9) Two cubes each of volume $27cm^3$ are joined end to end. Find the surface area of the resulting cuboid. $\qquad$ $90cm^2$

10) A 20m deep well with diameter 7m is dug and the earth taken out from digging is evenly spread out to form a platform of dimensions $22m \times 14m$. Find the height of the platform $(\pi = 22/7)$. $\qquad$ 2.5m

11) Areas of three adjacent faces of a solid cuboid are $11cm^2, 20cm^2$ and $55cm^2$ respectively. The cuboid is melted and recast into spheres each of radius 0.5cm. Find the no. of spheres so obtained. $\qquad$ 210

12) A cylinder and a cone have equal radii of their bases and equal heights. If their C.S.A are in the ratio 8:5, S.T the ratio of radius of each of its height is 3:4

13) A solid metallic cylindrical rod of diameter 1cm and length 8cm is drawn into a cylindrical wire of length 18m of uniform thickness. Find the thickness of the wire. $\qquad$ $\frac{1}{15}cm$

14) The height and radius of a solid cylinder are 15cm and 3cm respectively. Two equal cones each of radius 3cm and height 4cm are cut off, one from each circular end of the cylinder. Find the surface area of the remaining solid. $\qquad$ $120\pi cm^2$

15) A cylinder and a cone are of same base radius and of same height. Find the ratio of the volume of cylinder to that of cone.

16) A cylinder, cone and a hemisphere have equal base and have same height. What is the ratio of their volumes? $\qquad$ 3:1:2

17) A hemispherical tank of diameter 3m is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to make the tank half empty? $\qquad$ $16\frac{1}{2}$ min

18) A cylindrical tub, whose diameter is 12cm and height 15cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with

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conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cone **6cm**

19) The radii of two circles are 12cm and 6cm respectively. Find the radius of a circle whose area is equal to the sum of the areas of the two circles. **20cm**

20) The height of a cone is 60cm. A small cone is cut off at the top by a plane parallel to the base and its volume is $\frac{1}{64}$ of the volume of original cone. What is the height from the base at which the section is made ?

21)

A toy is in the shape of a solid hemisphere mounted on a bigger solid hemisphere. Radius of bigger hemisphere is 2cm and that of the smaller is 1cm. Find the total surface area of the toy **286/7 cm²**

22) Dimensions of a solid Cuboid are 4.4m, 2.6m and 1m. It is melted and recasted into a hollow cylindrical pipe of inner radius of 30cm and outer radius of 35cm. Find the length of the pipe. **112m**

23) Rainwater collected on the roof of a building of dimensions 22m×20m is drained into a Cylindrical tank of base diameter 2m and height 3.5m. If the tank is full with water, find the height of rainwater collected on the roof. **2.5m**

24) The height of a cone is 20cm. A plane parallel to its base cuts the cone. If the volume of smaller cone so obtained is $\frac{1}{8}$ of the volume of whole cone then, find the height of smaller cone. **10cm**

25) A sphere of diameter 18cm is dropped into a cylindrical vessel of diameter 36cm, partly filled with water. If the sphere is completely submerged, then Calculate the rise of water level (in cm) **3cm**

26) Two cubes, each of side 4cm are joined end to end. Find the surface area of the resulting cuboid. **160cm²**

27) From a solid cylinder whose height is 15cm and diameter 16cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid ($\pi = 3.14$)

1381.6cm²

28) Two cubes each of volume 27cm³ are joined end to end to form a solid. Find the surface area of the resulting cuboid.

90cm²

29) A cone of height 20cm and radius of base 5cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the diameter of the sphere.

10cm

30) Water is flowing at the rate of 15km/hour through a pipe of diameter 14cm into a cuboidal pond which is 50m long and 44m wide. In what time will the level of water in the pond rise by 21cm?

2 hrs

31) If the area of a circle is equal to sum of areas of two circles of diameters 10cm and 24cm, calculate the diameter of the larger circle (in cm)

26cm

32)

A milkman was serving his customers using two types of mugs A and B of inner diameter 5cm to serve the customers. The height of the mugs is 10cm. He decided to serve the customers in 'B' type of mug.

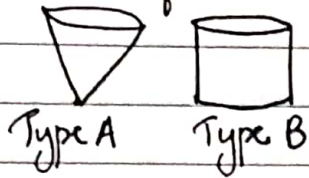(a) Find the volume of the mugs of both types. **186.44cm³**

(b) Which mathematical concept is used in the above problem?

33) From a solid cylinder of height 7cm and base diameter 12cm, a conical cavity of same height and same base diameter is hollowed out. Find the total surface area of the remaining solid ($\pi = 22/7$)

551.01cm²

34) A solid is in the shape of a cone surmounted on a hemisphere, the radius of each of them being 3.5cm and the total height of solid is 9.5cm. find the volume of the solid ($\pi = 22/7$)

166.83cm³

35) A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. find the

ratio of the volume of the smaller cone to the whole cone $1:8$

36)

Type A   Type B

An ice-cream seller sells his ice creams in two ways : (A) in a cone of $r = 5cm$, $h = 8cm$. (B) In a cup in shape of cylinder with $r = 5cm$, $h = 8cm$.

He charges the same price for both but prefers to sell his ice-cream in a cone (a) find the volume of the cone and the cup (b) which out of the two has more capacity? $471.43 cm^3$ $628.57 cm^3$

37) A hemispherical tank, full of water, is emptied by a pipe at the rate of $\frac{25}{7}$ litres per sec. How much time will it take to empty half the tank if the diameter of the base of the tank is 3m? $16\frac{1}{2}$ mins

38) A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14cm and the total height of the vessel is 13cm. Find the total (inner) surface area of the vessel ($\pi = \frac{22}{7}$) $572 cm^2$

39) A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10cm, and its base is of radius 3.5cm, find the volume of wood in the toy. ($\pi = 22/7$) $205.3 cm^3$

40) Water is flowing through a cylindrical pipe of internal diameter 2cm into a cylindrical tank of base radius 40cm, at the rate of 0.4m/s. Determine the rise in level of water in the tank in half an hour. $45cm$

41) A toy is in the form of a cone mounted on a hemisphere of same radius 7cm. If the total height of the toy is 31cm, find its total surface area ($\pi = 22/7$) $858 cm^2$

42) A solid cone of base radius 10cm is cut into two parts through the mid-points of its height, by a plane parallel to its base. Find the ratio in the volumes of small cone and the whole cone.

43) Water running in a cylindrical pipe of inner diameter 7cm is collected in a container at the rate of 192.5 litres/min.

Find the rate of flow of water in the pipe in km/hr ($\pi = 22/7$)

<div align="right">3km/hr</div>

44) Find the number of solid spheres, each of diameter 6cm that can be made by melting a solid metal cylinder of height 45cm and diameter 4cm.
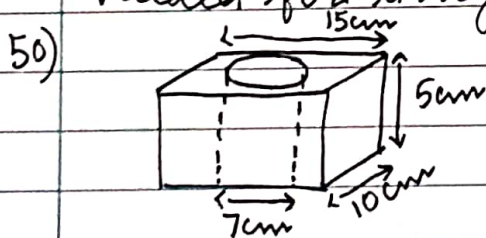
45) A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank which is 10m in diameter and 2m deep. If the water flows through the pipe at the rate of 4km per hour, in how much time will the tank be filled completely?

<div align="right">75mins</div>

46) Sushant has a vessel in the form of an inverted cone, open at the top, of height 11cm and radius of top as 2.5cm and is full of water. Metallic spherical balls each of diameter 0.5cm are put in the vessel due to which $\frac{2}{5}$ th of the water in the vessel flows out. Find how many balls were put in the vessel. Sushant made the arrangement so that the water flows out can irrigates the flower beds.

<div align="right">440balls</div>

47) From a solid cylinder of height 2.8cm and diameter 4.2cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid ($\pi = 22/7$)

<div align="right">73.9 2cm²</div>

48) If the total surface area of a solid hemisphere is 462cm², find its volume ($\pi = 22/7$)

<div align="right">718.6 cm³</div>

49) Water in a canal, 6m wide and 1.5m deep, is flowing at a speed of 4km/hr. How much area will it irrigate in 10 minutes, if 8cm of standing water is needed for irrigation?

<div align="right">7.5hectare</div>

50)

From a Cuboidal solid metallic block of dimensions 15cm ×10cm ×5cm, a cylindrical hole of diameter 7cm is drilled out. Find the surface area of the remaining block ($\pi = 22/7$)

<div align="right">583cm²</div>

51) A well of diameter 4m is dug 14m deep. The earth taken

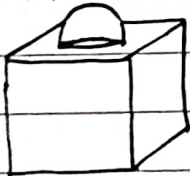out is spread evenly all around the well to form a 40cm high embankment. Find the width of the embankment.

52) Water is flowing at the rate of 2·52 km/hr through a cylindrical pipe into a cylindrical tank, the radius of whose base is 40cm. If the increase in the level of water in the tank in half an hour is 3.15m, find the internal diameter of the pipe. 4cm

53) Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4·2m and height 4m with the conical upper part of same diameter but of height 2.8m, and the canvas to be used costs ₹100 per sq. m, find the amount the associations will have to pay ($\pi = 22/7$) ₹ 379500

54) A hemispherical bowl of internal diameter 36cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer.

55) From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10cm and its base is of radius 4.2cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4cm thickness. Find the length of the wire ($\pi = \frac{22}{7}$) 158.4cm

56)

A decorative block made up of two solids — a cube and a hemisphere. The base of the block is a cube of side 6cm and the hemisphere fixed on the top has a diameter of 3·5cm. Find the total surface area of the block ($\pi = 22/7$) 225.625cm²

57) The sum of the radius of base and height of a solid right

circular cylinder is 37cm. If the total surface area of the solid cylinder is 1628 sq.cm. Find the volume of the cylinder $(\pi = 22/7)$. **4620cm³**

58) A conical vessel, with base radius 5cm and height 24cm is full of water. This water is emptied into a cylindrical vessel of base radius 10cm. Find the height to which the water will rise in the cylindrical vessel $(\pi = 22/7)$. **2cm**

59) A sphere of diameter 12cm is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by 35/9 cm. Find the diameter of the cylindrical vessel. **18cm**
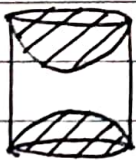
60) Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? **9cm**

61) The 3/4 th part of a Conical vessel of internal radius 5cm and height 24cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10cm. Find the height of water in cylindrical vessel. **1.5cm**

62) The dimensions of a solid iron cuboid are 4.4m × 2.6m × 1.0m. It is melted and recast into a hollow cylindrical pipe of 30cm inner radius and thickness 5cm. Find the length of the pipe. **112m**

63) In a rain-water harvesting system, the rain water from a roof of 22m × 20m drains into a cylindrical tank having diameter of base 2m and height 3.5m. If the tank is full, find the rainfall in cm. **2.5cm**

64)

A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10cm and its base is of radius 3.5cm. Find the total surface area of the article. **374cm²**

65) A heap of rice is in the form of a cone of base diameter 24m and height 3.5m. Find the volume of the rice.

How much canvas cloth is required to just cover the heap? $471.43m^2$

66) Two cubes have their volumes in the ratio 1:27. Find the ratio of their surface areas.   1:9

67) A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank in his field which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3 km/hr in how much time will the tank be filled?   100m

68) A cone of height 24cm and radius of base 6cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere and hence find the Surface area of this sphere.   6cm
$452.5 cm^2$