

VAISHALI EDUCATION POINT

(QUALITY EDUCATION PROVIDER)

BY Prof. RAHUL MISHRA

M:9999907099,9818932244

SURFACE AREA & VOLUMES

Class :- X

Subject :- Maths

General Instructions

QNo.	Questions
1	A rectangular piece of paper 55m long and 22cm wide is rotated completely along its width. Find the volume of cylinder so formed.
2	A solid cube is cut into two cuboids of equal volumes. Find the ratio of the total surface area of the given cube and that of one of the cuboids.
3	How many spherical bullets can be made out of a solid cube of lead whose edge measures 44cm, each bullet being 4cm in diameter? $\left(\pi = \frac{22}{7}\right)$
4	If h, c and v respectively are the height, the curved surface area and volume of a cone, prove that $3\pi Vh^3 - c^2h^2 + 9v^2 = 0$.
5	The diameter of a sphere is 42cm. It is melted and drawn into a cylindrical wire of 28cm diameter. Find the length of the wire.
6	The diameter of a sphere is 42cm. It is melted and drawn into a cylindrical wire of 28cm diameter. Find the length of the wire.
7	A hemisphere of lead of radius 8cm is cast into a right circular cone of base radius 6cm. Determine the height of the cone.
8	A tent of height 3.3m is in the form of right circular cylinder of diameter 12m and height 2.2m, surmounted by a right circular cone of the same diameter. Find the cost of canvas of the tent at the rate of Rs. 500 per m^2 .
9	A room in the form of a cylinder, surmounted by a hemispherical vaulted dome, contains $17.7 m^3$ of air and the internal diameter of the building is equal to the height of the crown of the vault above the floor. Find the height. $\left(x = \frac{22}{7}\right)$.
10	A solid sphere of radius 6cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5cm and its height is 32cm, find the uniform thickness of the cylinder.
11	If the radius of base of a right circular cylinder is halved, keeping the same height, find the ratio of the volume of reduced cylinder to that of the original cylinder.
12	Diameter of road roller 1m 40cm long is 80cm. If it takes 600 revolutions to level a play ground, find the cost of levelling this ground at the rate of 75 paise per square metre.
13	Water flows out through a circular pipe whose internal radius is 1cm at the rate of 80cm/second into an empty cylindrical tank, the radius of whose base is 40cm. By how much will the level of water rise in the tank in half an hour.
14	A cylindrical pipe has inner diameter of 7cm and water flows through it at 192.5 litres per minute. Find the rate of flow in km/hr.

- 15 A bucket has top and bottom diameter of 40cm and 20cm respectively find the volume of bucket if its depth is 12cm.
- 16 The height of a cone is 30cm. A small cone is cut of at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone, at which height above the base is the section made?
- 17 The diameter of the top of a bucket is 32cm and that of its bottom is 20cm. If height of the bucket is 21cm. Find the cost of the tin sheet used in making this bucket at the rate of Rs. 1.50 per dm^2 .
- 18 A solid is in the form of a right circular cylinder with a hemisphere at one end and a cone at the other end. The radius of the common base is 3.5 cm and the height of cylindrical and conical portion are 10cm and 6cm respectively. Find the total surface area of the solid.
- 19 A well of diameter 3m is dug 14m deep. The earth taken out of it has been spread evenly all round it to a width of 4m to form an embankment. Find the height of embankment.
- 20 A hemispherical tank of radius $1\frac{3}{4}\text{m}$ is full of water. It is connected by a cylindrical pipe which empties it at the rate of 7 litres per second. Find the time it will take to empty the tank completely.
- 21 Right circular cylinder having diameter 12cm and height 15cm is full of ice-cream. The ice-cream is to be filled in cones of height 12cm and diameter 6cm having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream.
- 22 From a solid cylinder of height 20 cm and diameter 12 cm, a conical cavity of height 8 cm and radius 6 cm is hollowed out. Find the total surface area of the remaining solid.
 $\left[\text{Use } \pi = \frac{22}{7} \right]$ **(2011)**
- 23 A toy is in the shape of a solid cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 21 cm respectively, and the height of cone is 15 cm, then find the total surface area of the toy. [$\pi = 3.14$, be taken] **(2011)**
- 24 From a solid cylinder whose height is 15 cm and diameter 16 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. [Take $\pi = 3.14$] **(2011)**
- 25 Two cubes, each of side 4 cm are joined end to end. Find the surface area of the resulting cuboid. **(2011)**
- 26 A hemispherical depression is cut out from one face of a cubical wooden block of edge 21 cm, such that the diameter of the hemisphere is equal to the edge of the cube. Determine the volume and total surface area of the remaining block. **(2010)**
- 27 A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7}\text{cm}^3$. The radii of its lower and upper circular ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs. 1.40 per square centimetre. $\left[\text{Use } \pi = \frac{22}{7} \right]$ **(2010)**

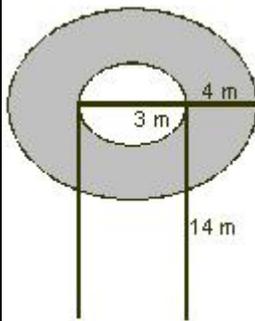
OR

A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. $\left[\text{Use } \pi = \frac{22}{7} \right]$

28 The radii of the circular ends of a bucket of height 15 cm are 14 cm and r cm ($r < 14$ cm). If the volume of bucket is 5390 cm^3 , then find the value of r . $\left[\text{Use } \pi = \frac{22}{7} \right]$ **(2011)**

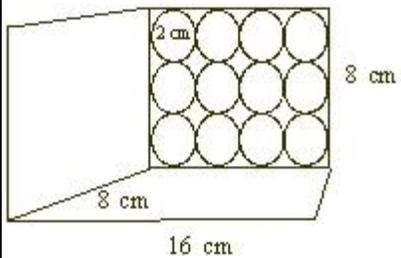
29 How many spherical lead shots each having diameter 3 cm can be made from a cuboidal lead solid of dimensions $9 \text{ cm} \times 11 \text{ cm} \times 12 \text{ cm}$? **(2010)**

30 A well of diameter 3 m and 14 m deep is dug. The earth, taken out of it, has been evenly spread all around it in the shape of a circular ring of width 4m to form an embankment. Find the height of the embankment. **(2010)**



OR

21 glass spheres each of radius 2 cm are packed in a cuboidal box of internal dimensions $16 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm}$ and then the box is filled with water. Find the volume of water filled in the box.



31 Find the length of the diagonal of the largest cube that can be inscribed in a sphere of radius 35 cm.

32 A cube is inscribed in a sphere of diameter 'd' units. What is the length of the side of the largest cube so inscribed?

33 A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

34 The diameter of the base of a cone is 14 cm and its slant height is 25 cm. What is the vertical height?

35 The diameter and height of a cylinder and a cone are equal. Write the ratio of volume of cylinder to the volume of the cone.

36 The volumes of two spheres are in the ratio 64 : 27. Find their radii if the sum of their radii is 21 cm.

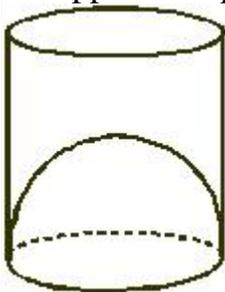
37 The base radii of two right circular cones of the same height are in the ratio 3 : 5. Find the ratio of their volumes.

- 38 A cylinder, a cone and a hemisphere are of equal base and have the same height. What is the ratio of their volumes?
- 39 If the radius of the base of a right circular cylinder is halved, keeping the height same, find the ratio of the volume of the reduced cylinder to that of the original cylinder.
- 40 A cylindrical tank has a capacity of 6160 cu.m. Find its depth if the diameter of its base is 28 m. Also, find the area of the inside curved surface of the tank $\left(\text{Take } \pi = \frac{22}{7}\right)$.
- 41 The radius of the base and the height of a solid right circular cylinder are in the ratio 2 : 3 and its volume is 1617 cu.m. Find the total surface area of the cylinder $\left(\text{Use } \pi = \frac{22}{7}\right)$.
- 42 The radius and height of a right circular cone are in the ratio of 3 : 4. If its volume is 301.44 cm^3 , find the radius and the slant height of the cone $\left(\text{Take } \pi = 3.14\right)$.
- 43 The internal and external diameters of a hollow hemispherical vessel are 42 cm and 45.5 cm respectively. Find its capacity and also its outer curved surface area.
- 44 50 circular plates, each of radius 7 cm and thickness 0.5 cm are placed one above the other to form a solid right circular cylinder. Find the total surface area and volume of the cylinder so formed.
- 45 A solid metallic cylinder of radius 14 cm and height 21 cm is melted and recast into 72 equal small spheres. Find the radius of one such sphere.
- 46 How many spherical bullets can be made out of a solid cube of lead whose edge measures 44 cm, each bullet being 4 cm in diameter? $\left(\text{Use } \pi = \frac{22}{7}\right)$
- 47 The diameter of a sphere is 42 cm. It is melted and drawn into a cylindrical wire of 28 mm diameter. Find the length of the wire.
- 48 The diameters of the internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, find the height of the cylinder.
- 49 The largest sphere is carved out of a cube of side 7 cm. Find the volume of the sphere.
- 50 A well, of diameter 3 m, is dug 14 m deep. The earth taken out of it has been spread evenly all around it to a width of 4m, to form an embankment. Find the height of the embankment $\left(\text{Take } \pi = \frac{22}{7}\right)$.
- 51 A cylindrical jar of radius 6 cm contains oil. Iron spheres each of radius 1.5 cm are immersed in the oil. How many spheres are necessary to raise the level of the oil by two centimetres?
- 52 A solid metal cone, with radius of base 12 cm and height 24 cm, is melted to form spherical solid balls of diameter 6 cm each. Find the number of balls thus formed.
- 53 A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones, each of diameter 7 cm and height 3 cm. Find the number of cones so formed.
- 54 A spherical cannon ball 28 cm in diameter is melted and recast into a right circular conical mould, base of which is 35 cm in diameter. Find the height of the cone correct to one place of decimal.
- 55 A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If

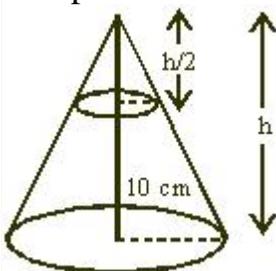
the external radius of the base of the cylinder is 5 cm and its height is 32 cm, find the uniform thickness of the cylinder.

- 56 How many spherical lead shots each 4.2 cm in diameter can be obtained from a rectangle solid of lead with dimensions 66 cm, 42 cm, 21 cm $\left(\text{Use } \pi = \frac{22}{7}\right)$
- 57 The internal and external radii of a hollow sphere are 3 cm and 5 cm respectively. The sphere is melted to form a solid cylinder of height $2\frac{2}{3}$ cm. Find the diameter and curved surface area of the cylinder.
- 58 A hemisphere of lead of radius 8 cm is casted into a right circular cone of base radius 6 cm. Determine the height of the cone, correct up to two places of decimals.
- 59 A solid cylinder of diameter 12 cm and height 15 cm is melted and recast into toys with the shape of a right circular cone mounted on a hemisphere of radius 3 cm. If the height of the toy is 12 cm, find the number of toys so formed.
- 60 A right circular cylinder having diameter 12 cm and height 15 cm is full of ice-cream. The ice-cream is to be filled in cones of height 12 cm and diameter 6 cm having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream.
- 61 The radius of a sphere is 7 cm. If the radius be increased by 50%, find by how much per cent its volume is increased.
- 62 A rectangular sheet of paper 44 cm \times 18 cm is rolled along its length and a cylinder is formed. Find the volume of the cylinder $\left(\text{Use } \pi = \frac{22}{7}\right)$.
- 63 If h, c and V respectively are the height, the curved surface and volume of a cone, prove that $3\pi Vh^3 - c^2h^2 + 9V^2 = 0$.
- 64 A hemispherical bowl of internal diameter 30 cm contains some liquid. This liquid is to be filled into cylindrical shaped bottles each of diameter 5 cm and height 6 cm. Find the number of bottles necessary to empty the bowl.
- 65 An iron solid sphere of radius 3 cm is melted and recast into small spherical balls of radius 1 cm each. Assuming that there is no wastage in the process, find the number of small spherical balls made from the given sphere.
- 66 The internal and external diameter of a hollow hemispherical shell are 6 cm and 10 cm respectively. It is melted and recast into a solid cone of base diameter 14 cm. Find the height of the cone so formed.
- 67 The radii of the internal and external surfaces of a metallic shell are 3 cm and 5 cm respectively. It is melted and recast into a solid right circular of height $10\frac{2}{3}$ cm. Find the diameter of the base of the cylinder.
- 68 A solid cylinder of diameter 12 cm and height 15 cm is melted and recast into 12 toys in the shape of a right circular cone mounted on a hemisphere. Find the radius of the hemisphere and the total height of the toy if height of the conical part is 3 times its radius.
- 69 A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter of the sphere.

- 70 A cylindrical container is filled with ice-cream, whose diameter is 12 cm and height is 15 cm. The whole ice-cream is distributed to 10 children in equal cones having hemispherical tops. If the height of conical portion is twice the diameter of its base, find the volume of the sphere.
- 71 Spherical marbles of diameter 1.4 cm each are dropped into a cylindrical beaker of radius 3.5 cm containing some water. Find the number of marbles that should be dropped into the beaker so that the water level in the beaker rises by 5.6 cm.
- 72 A cylindrical tub of radius 12 cm, contains water to a depth of 20 cm. A spherical iron ball is dropped in the tub and thus the level of water is raised by 6.75 cm. What is the radius of the ball?
- 73 A sphere of diameter 12 cm 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 $\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel.
- 74 A conical vessel whose internal radius is 5 cm and height 24 cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10 cm. Find the height to which the water rises in the cylindrical vessel.
- 75 A sphere of diameter 5 cm is dropped into a cylindrical vessel partly filled with water. The diameter of the base of the vessel is 10 cm. If the sphere is completely submerged, by how much will the level of water rise?
- 76 500 persons took dip in a rectangular swimming pool which is 80 m long and 50 m wide. What is the rise in the level of water in the pool, if average displacement of water by a person is 0.04 m^3 ?
- 77 The rainwater from a roof $22 \text{ m} \times 20 \text{ m}$ drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the vessel is just full, find the rainfall in cm.
- 78 A juice seller serves his customers using a glass as shown in fig. The inner diameter of the cylindrical glass is 5 cm, but the bottom of the glass has a hemispherical portion raised which reduces the capacity of the glass. If the height of the glass is 10 cm, find the apparent capacity of the glass and its actual capacity (Use $\pi = 3.14$).



- 79 In fig, a cone of radius 10 cm is divided into two parts by drawing a plane through the mid-point of its axis, parallel to its base. Compare the volumes of the two parts.



- 80 A hollow cone is cut by a plane parallel to the base and the upper portion is removed.

	If the curved surface of the remainder is of the curved surface of the whole cone, find the ratio of the line segments into which the altitude of the cone is divided by the plane.
--	---