

SURFACE AREAS AND VOLUMES

MCQ

1. A Surahi is the combination of
(a) a sphere and a hemisphere (b) a sphere and a cylinder
(c) two hemisphere (d) a hemisphere and cylinder
2. A shuttle cock used for playing badminton has the shape of the combination of
(a) a cylinder and a sphere (b) a sphere and a cone
(c) a cylinder and a hemisphere (d) frustum of cone and hemisphere
3. A solid piece of iron in the form of a cuboid of dimensions 49 cm x 33 cm x 24 cm is melted to form a solid sphere. The radius of the sphere is
(a) 21 cm (b) 23 cm (c) 25 cm (d) 19 cm
4. If two solid hemisphere of same base radius r are joined together along their bases, then surface area of this new solid is
(a) $4\pi r^2$ (b) $6\pi r^2$ (c) $3\pi r^2$ (d) $8\pi r^2$
5. Twelve solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 16 cm. The diameter of each sphere is
(a) 4 cm (b) 3 cm (c) 2 cm (d) 6 cm

6. A hollow cube of internal edge 22 cm is filled with spherical marbles of diameter 0.5 cm and it is assumed that $\frac{1}{8}$ space of the cube remains unfilled. Then the no. of marbles that the cube can accommodate is
 (a) 142296 (b) 142396 (c) 142496 (d) 142596
7. A mason construction a wall dimensions 270 cm x 300 cm x 350 cm with the bricks each of size 22.5 cm x 11.25 cm x 8.75 cm and it is assumed that $\frac{1}{8}$ space is covered by the mortar. Then the number of bricks used to construct the wall is
 (a) 11100 (b) 11200 (c) 11000 (d) 11300
8. The radii of the top and bottom of a bucket of slant height 45 cm and 28 cm and 7cm respectively, the curved surface area of the bucket is
 (a) 4950 cm² (b) 4951 cm² (c) 4952 cm² (d) 4953 cm²
9. Volumes of two sphere are in the ratio 64 : 27. The ratio of their surface areas is
 (a) 3 : 4 (b) 4 : 3 (c) 9 : 16 (d) 16 : 9
10. A right circular cylinder of radius r cm and the height h cm ($h > 2r$) just enclose a sphere of diameter
 (a) r cm (b) 2r cm (c) h cm (d) 2h cm
11. A medicine capsule is in the shape of a cylinder of diameter 0.5 cm with two hemisphere stack to each of its ends. The length of entire capsule is 2 cm. The capacity of the capsule is
 (a) 0.36 cm³ (b) 0.35 cm³ (c) 0.34 cm³ (d) 0.33 cm³
12. The radii of the ends of a frustum of a cone 40 cm high are 20 cm and 11 cm. Its slant height is
 (a) 41 cm (b) $20\sqrt{5}$ cm (c) 49 cm (d) $\sqrt{521}$ cm
13. A sphere of radius 6 cm is dropped into a cylindrical vessel partly filled with water the radius of the vessel is 8 cm. If the sphere is submerged completely, then the surface of the water rises by
 (a) 4.5 cm (b) 4 cm (c) 3 cm (d) 2 cm
14. A solid consists of a circular cylinder with an exact fitting right circular cone placed at the top. If the height of the cone is h and the total volume of the solid is 3 times the volume of the cone, then the height of the circular cylinder is
 (a) 2h (b) $\frac{2h}{3}$ (c) $\frac{3h}{2}$ (d) 4h

SHORT TYPE QUESTIONS (2 marks each)

- A cone of height 24 cm and radius of base 6 cm is made up of modelling clay, find the volume of cone.
- The cylindrical cans have equal base areas. If one of the can is 15 cm high & other is 20 cm high, find the ratio of their volumes.
- In a box whose dimensions are 12 cm x 4 cm x 3 cm, what is the length of the longest stick that can be placed ?
- Find the volume of a cylinder whose height is 12 cm & radius is 5 cm.
- It costs Rs.2200 to 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 m², find inner curved surface area of the vessel.
- The height of a right circular cone is 12 cm & the radius of its base is 4.5 cm. Find the slant height.
- A conical military tent having the diameter of the base is 24 m and slant height of the tent is 13 m, find the curved surface area of the cone.
- A jokers cap is in the form of a right circular cone of base radius 7 cm & the slant height is 25 cm. Find the area of the cap.
- The radius of the sphere is 6 cm. Find the volume of sphere.
- Find the radius of the sphere whose surface area is 154 cm².
- Two cubes have their volume in the ratio 1 : 64. What is the ratio of their surface areas ?
- A sphere of maximum volume is cut out from a solid hemisphere of radius 7 cm. What is the ratio of the volume of the hemisphere to that of the cut out sphere.

13. If the areas of circular bases of a frustum of a cone are 4 cm^2 & 9 cm^2 respectively & the height of the frustum is 12 cm, then find the volume of the frustum (take $\pi = \frac{22}{7}$)
14. The radii of the bases of a cylinder and a cone are in the ratio 3 : 5 & their heights are in the ratio 3 : 4. What is the ratio of their volumes ?
15. A cone & a sphere have equal radii and equal volume. What is the ratio of the diameter of the sphere to the height of the cone ?
16. Determine the ratio of the volume of a cube to that of a sphere which will exactly fit inside cube.
17. One iron solid is a cuboid of dimensions 30 cm x 30 cm x 42 cm. If it is melted & cubes each of side 3 cm & moulded from it. Find the number of cubes formed.
18. A granary is in the shape of a cuboid of size 8 m x 6 m x 3 m. If a bag of grain occupies a space of 0.65 m^3 . How many bags can be stored in the granary ?
19. 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.
20. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm & the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

LONG TYPE QUESTIONS (4 marks each)

1. The diameter of internal & external surface of a hollow spherical shell are 6 cm & 10 cm respectively. If it is melted & recast into a solid cylinder of height $2\frac{2}{3}$ cm, find the diameter of the cylinder.
2. A solid metallic sphere of diameter 28 cm is melted & recast into a number of smaller cones, each of diameter $4\frac{2}{3}$ cm & height 3 cm. Find the number of cones so formed.
3. Solid spheres of diameter 6 cm are dropped into a cylindrical beaker containing some water & are fully submerged. If the diameter of the beaker is 18 cm and the water rises by 40 cm, find the number of solid spheres dropped in the water.
4. A toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm, find the total surface area of the toy. (use $\pi = \frac{22}{7}$)
5. A toy is in the shape of a right circular cylinder with a hemisphere on one end & a cone on the other. The radius & height of the cylindrical part are 5 cm & 13 cm respectively. The radii of the hemispherical and conical part are the same as that of the cylindrical part. Find the surface area of the toy if the total height of the toy is 30 cm.
6. 4 right circular cylindrical vessels each having diameter 21 cm & height 38 cm are full of ice cream. The ice cream is to be filled in cones of height 12 cm & diameter 7 cm having a hemispherical shape on the top. Find the total number of such cones which can be filled with ice cream.
7. A circus tent is cylindrical to a height of 3 m & conical above it. If its base radius is 52.5 m & slant height of the conical portion is 53 m, find the area of the canvas needed to make the tent.
8. A hollow cone is cut by a plane parallel to the base & the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ th of the curved surface of the whole cone, find the ratio of the line segments into which the cone's altitude is divided by the plane.
9. If the radii of the ends of a bucket, 45 cm high, are 28 cm & 7 cm. Find its capacity & surface area.
10. If the radii of the ends of a bucket, 45 cm high are 28 cm & 7 cm, determine the capacity & total surface area of bucket.
11. Water flows at the rate of 10 m per minute through a pipe having its diameter as 5 mm. How much time will it take to fill a conical vessel whose diameter of base is 40 cm & depth is 24 cm ?
12. 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 rises by 5.6 cm.

13. A bucket is in the form of a frustum of a cone holds 28.49 litres of milk the radii of the top & bottom are 28 cm & 21 cm respectively. Find the height of the bucket.
14. From a solid cylinder whose height is 8 cm & radius 6 cm, a conical cavity of height 8 cm and of base radius 6 cm is hollowed out. Find the volume of the remaining solid correct to two places of decimals. Also find the total surface area of the remaining solid. (take $\pi = 3.1416$)
15. A juice seller serves his customers using a glass. 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. (take $\pi = 3.14$)
16. An inverted cone of vertical height 12 cm & radius of base 9 cm contains water to a depth of 4 cm. Find the area of the interior surface of the cone not in contact with water. (use $\pi = 22/7$)
17. How many meters of cloth 1 m 10 cm wide, will be required to make a conical circus tent whose height is 12 m and radius of whose base is 10 m ? Also determine the cost of the cloth at Rs.7 per m.
18. The internal & external diameters of a hollow hemispherical vessel are 25 cm and 24 cm respectively. The cost of paint 1 cm² of the surface is Rs.0.05. Find the total cost of painting the vessel.
19. The volumes of 2 spheres are in the ratio 64 : 27. Find their radii if sum of radii is 21 cm.
20. 3 cubes of metal whose edges are in the ratio 3 : 4 : 5 are melted down into a single cube whose diagonal is $12\sqrt{3}$ cm. Find the edges of the three cubes.

Value Based Questions.

1. A manufacturer involved ten children in colouring playing top (lattu) which is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area they had to paint if 50 playing tops were given to them.
 - a) How is child labour an abuse for the society?
 - b) What steps can be taken to abolish child labour?
2. A teacher brings clay in the classroom to teach the topic “mensuration”. She forms a cylinder of radius 6 cm and height 8 cm with the clay. Then she moulds that cylinder into a sphere. Find the radius of the sphere formed.
 - a) Do teaching aids enhance teaching learning process? Justify your answer.
3. A night camp was organized for class X students for two days and their accommodation was planned in tents. Each tent 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 4 m respectively and the slant height of the top is 2.8 m., 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 per m² (Note that the base of the tent will not be covered with canvas).
 - a) Is camping helpful to students in their development? Justify your answer.
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 - b) Is camping helpful to students in their development? Justify your answer.
6. An ice cream seller gives ice cream in cylindrical cups of radius 8 cm and height 15 cm. He offers his customers the ice-cream in two conical cups of same radius and height instead of cylindrical cup for the same price. Is the ice cream seller giving the same quantity of ice cream in the same amount? Justify your answer.
Which human value is the ice- cream seller violating?

7. A milk container is made of a metal sheet 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 cost of milk which the container can hold when fully filled at Rs. 20 per litre and the cost of the metal sheet used in making the container, at Rs. 8 per 100cm^2 (Take $\pi = 3.14$)
If the milkman uses plastic sheet instead of metal sheet at the rate of Rs. 2 per 100cm^2 to reduce his cost, find the cost of the plastic sheet used to make the container. Is his act justifying? Why should we reduce the use of plastics?
8. A teacher prepares a conical bucket as a teaching aid for her lesson. If the radii of the circular ends of the teaching aid which is 45 cm high are 28 cm and 7 cm, find the area of the sheet used in the teaching aid and its capacity. How does teaching aid contribute to the teaching – learning process? Give at least two ways
9. Harshit donates some part of his income to an orphanage every month. In a particular month, he wishes to donate toys for the children. Each toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm. Find the total surface area of the toy. Also find the cost of 50 such toys if the cost of material used in the toy is Rs. 5 per 100cm^2 and the cost of making is Rs. 10 per toy [Use $\pi = 22/7$]
What value of Harshit are reflected here? Justify your answer.

CIRCLE

MCQ

- Number of tangents that can be drawn through a point on the circle is
(a) 3 (b) 2 (c) 1 (d) 0
- The word tangent came from the Latin word
(a) tang (b) tangere (c) tangrant (d) axyere
- The word tangent was introduced by
(a) De Moivre (b) Aryabhata (c) Disradi (d) Thomas Fincke
- Number of tangents to circle which are parallel to a secant is
(a) 1 (b) 2 (c) 3 (d) infinite
- $C(0, r_1)$ and $C(0, r_2)$ are two concentric circles with $r_1 > r_2$. AB is a chord of $(0, r_1)$ touching $C(0, r_2)$ at c then
(a) $AB = r_1$ (b) $AB = r_2$ (c) $AB = BC$ (d) $AB = r_1 + r_2$
- From a point Q, the length of the tangent to a circle is 12 cm and the distance of Q from the centre is 13 cm. The radius of circle
(a) 7 cm (b) 6.5 cm (c) 5 cm (d) 9 cm
- TP and TQ are two tangents to a circle with centre O, so that $\angle POQ = 100^\circ$, then $\angle PTQ$ is equal to
(a) 60° (b) 70° (c) 80° (d) 90°
- TP and TQ are two tangents to a circle with centre O, so that $\angle POQ = 120^\circ$, OPT is equal to
(a) 50° (b) 60° (c) 80° (d) 90°
- Two concentric circles are of radii 13 cm and 15 cm. The length of chord of a larger circle which touches the smaller circle is
(a) 12 cm (b) 20 cm (c) 24 cm (d) 26 cm
- A quadrilateral ABCD is drawn to circumscribe a circle. If $AB = 12$ cm, $BC = 15$ cm, $CD = 14$ cm, then AD is equal to
(a) 10 cm (b) 11 cm (c) 12 cm (d) 14 cm
- A triangle ABC is drawn to circumscribe a circle. If $AB = 13$ cm, $BC = 14$ cm and $AE = 7$ cm, then AC is equal to
(a) 12 cm (b) 15 cm (c) 11 cm (d) 16 cm
- A right $\triangle ABC$ right angled at A drawn to circumscribe a circle of radius 5 cm with centre O. If $AB = 17$ cm, $AC = 18$ cm, then OC is equal to
(a) 10 cm (b) 9 cm (c) 12 cm (d) 13 cm