

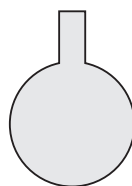
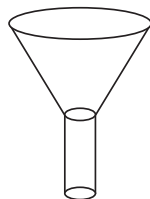
SURFACE AREAS AND VOLUMES

OBJECTIVE SECTION

[BASIC/STANDARD]

I. MULTIPLE CHOICE QUESTIONS

- A funnel (see fig.) is the combination of:
(a) a cone and a cylinder frustum of cone and a cylinder
(b) frustum of a cone and a cylinder
(c) a hemisphere and a cylinder
(d) a hemisphere and a cone
- If a marble of radius 2.1 cm is put into a cylindrical cup full of water of radius 5 cm and height 6 cm, then how much water flows out of the cylindrical cup?
(a) 38.8 cm^3 (b) 55.4 cm^3 (c) 19.4 cm^3 (d) 471.4 cm^3
- A cubic ice cream brick of edge 22 cm is to be distributed among some children by filling ice cream cones of radius 2 cm and height 7 cm upto its brim. How many children will get the ice cream cones ?
(a) 163 (b) 263 (c) 363 (d) 463
- The radii of the ends of frustum of a cone of height h cm are r_1 cm and r_2 cm. The volume in cm^3 of the frustum of the cone is
(a) $\frac{1}{3}\pi h[r_1^2 + r_2^2 + r_1 r_2]$ (b) $\frac{1}{3}\pi h[r_1^2 + r_2^2 - r_1 r_2]$
(c) $\frac{1}{3}\pi h[r_1^2 - r_2^2 + r_1 r_2]$ (d) $\frac{1}{3}\pi h[r_1^2 - r_2^2 - r_1 r_2]$
- The volume of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is:
(a) 9.7 cm^3 (b) 77.6 cm^3 (c) 58.2 cm^3 (d) 19.4 cm^3
- A cylindrical pencil sharpened at one edge is the combination of:
(a) a cone and a cylinder
(b) frustum of a cone and a cylinder
(c) a hemisphere and a cylinder
- A surahi (see fig.) is the combination of:
(a) a sphere and a cylinder (b) a hemisphere and a cylinder
(c) two hemisphere (d) a cylinder and a cone.



8. A plumbline (*sahul*) is the combination of (see figure)

- (a) a cone and a cylinder
- (b) a hemisphere and a cone
- (c) frustum of a cone and a cylinder
- (d) sphere and cylinder



9. The shape of a glass (tumbler) (see fig.) is usually in the form of:

- (a) a cone
- (b) frustum of a cone
- (c) a cylinder
- (d) a sphere



10. The shape of a *gilli*, in the *gilli-danda* game (see fig.), is a combination of:

- (a) two cylinder
- (b) a cone and a cylinder
- (c) two cones and a cylinder
- (d) two cylinders and a cone



11. A shuttle cock used for playing badminton has the shape of the combination of:

- (a) a cylinder and a sphere
- (b) a cylinder and a hemisphere
- (c) a sphere and a cone
- (d) frustum of a cone and a hemisphere

12. A cone is cut through a plane parallel to its base and then the cone that is formed on one side of that plane is removed. The new part that is left over on the other side of the plane is called:

- (a) a frustum of a cone
- (b) cone
- (c) cylinder
- (d) sphere

13. 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 number of marbles that the cube can accommodate is:

- (a) 142296
- (b) 142396
- (c) 142496
- (d) 142596

14. A metallic spherical shell of internal and external diameters 4 cm and 8 cm, respectively is melted and recast into the form a cone of base diameter 8 cm. The height of the cone is:

- (a) 12 cm
- (b) 14 cm
- (c) 12 cm
- (d) 18 cm

15. A solid piece of iron in the form of a cuboid of dimensions 49 cm $\times$ 33 cm $\times$ 24 cm is moulded to form a solid sphere. The radius of the sphere is:

- (a) 21 cm
- (b) 23 cm
- (c) 25 cm
- (d) 19 cm

16. A mason constructs a wall of dimensions 270 cm $\times$ 300 cm $\times$ 350 cm with bricks each of size 22.5 cm $\times$ 11.25 cm $\times$ 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

17. 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) 1 cm (b) 3 cm (c) 2 cm (d) 6 cm
18. The radii of the top and bottom of a bucket of slant height 45 cm are 28 cm and 7 cm, respectively. The curved surface area of the bucket is:
 (a) 4950 cm^2 (b) 4951 cm^2 (c) 4952 cm^2 (d) 4953 cm^2
19. A medicine-capsule is in the shape of a cylinder of diameter 0.5 cm with two hemispheres stuck to each of its ends. The length of entire capsule is 2 cm. The capacity of the capsule is:
 (a) 0.36 cm^3 (b) 0.35 cm^3 (c) 0.34 cm^3 (d) 0.33 cm^3
20. If two solid hemispheres of same base radius r are joined together along their bases, then curved surface area of this new solid is:
 (a) $4\pi r^2$ (b) $6\pi r^2$ (c) $3\pi r^2$ (d) $8\pi r^2$
21. A right circular cylinder of radius r cm and height h cm ($h > 2r$) just encloses a sphere of diameter
 (a) r cm (b) $2r$ cm (c) h cm (d) $2h$ cm
22. During conversion of a solid from one shape to another, the volume of the new shape will:
 (a) increase (b) decrease (c) remain unaltered (d) be doubled
23. The diameters of the two circular ends of the bucket are 44 cm and 24 cm. The height of the bucket is 35 cm. The capacity of the bucket is:
 (a) 32.7 litres (b) 33.7 litres (c) 34.7 litres (d) 31.7 litres
24. In a right circular cone, the cross-section made by a plane parallel to the base is a:
 (a) circle (b) frustum of a cone (c) sphere (d) hemisphere
25. Volume of two spheres 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
26. 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. The number of cones so formed is :
 (a) 121 (b) 123 (c) 125 (d) 126
27. 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. The number of bottles necessary to empty the bowl is :
 (a) 30 (b) 40 (c) 55 (d) 60
28. The base radius and height of a right circular solid cone are 2 cm and 8 cm respectively. It is melted and recast into spheres of diameter 2 cm each. The number of spheres so formed is :
 (a) 6 (b) 8 (c) 10 (d) 12
29. A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm, then the diameter of the cylindrical vessel is :
 (a) 16 cm (b) 17 cm (c) 18 cm (d) 20 cm
30. 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. The internal diameter of the sphere is :
 (a) 6 cm (b) 8 cm (c) 10 cm (d) 12 cm

31. A container, shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice-cream. This ice-cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. The number of such cones which can be filled with ice-cream is :
- (a) 16 (b) 14 (c) 10 (d) 8
32. A spherical copper shell of external diameter 18 cm, is melted and recast into solid cone of base radius 14 cm and height $4\frac{3}{7}$ cm. The inner diameter of the shell is :
- (a) 16 cm (b) 18 cm (c) 20 cm (d) 22 cm
33. The slant height of a frustum of a cone is 4 cm and the perimeters of its circular ends are 18 cm and 6 cm. The curved surface area of the frustum is :
- (a) 58 cm^2 (b) 48 cm^2 (c) 62 cm^2 (d) 63 cm^2
34. The surface area of a solid metallic sphere is 616 cm^2 . It is melted and recast into a cone of height 12 cm. The diameter of the base of the cone so formed is :
- (a) 18 cm (b) 16 cm (c) 14 cm (d) 12 cm
35. Two cubes, each of side 4 cm are joined end to end. The surface area of the resulting cuboid is :
- (a) 144 cm^2 (b) 152 cm^2 (c) 158 cm^2 (d) 160 cm^2
36. A cone of height 20 cm and radius of base 5 cm is made up of modeling clay. A child reshapes it in the form of a sphere. The diameter of the sphere is :
- (a) 6 cm (b) 7 cm (c) 9 cm (d) 10 cm
37. If the radius of the base of a right circular cylinder is halved, keeping the height the same, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is :
- (a) 1 : 2 (b) 1 : 3 (c) 3 : 2 (d) 1 : 4
38. A cylindrical bucket, 32 cm high and with radius of base 18 cm, 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 24 cm then, the radius and slant height of the heap (in cm) are respectively are :
- (a) 36, $12\sqrt{13}$ (b) $12\sqrt{13}$, 36 (c) 12, 36 (d) 36, 12
39. A rectangular sheet of paper $40\text{ cm} \times 22\text{ cm}$, is rolled to form a hollow cylinder of height 40 cm. The radius of the cylinder (in cm) is :
- (a) 3.5 cm (b) 5.5 cm (c) 6.5 cm (d) 7.5 cm
40. A hemispherical depression is cut out from one face of cubical block of side a cm, such that the diameter of the hemisphere is equal to the edge of the cube. The surface area of the remaining solid is :
- (a) $6a^2 + \pi\left(\frac{a}{2}\right)^2$ (b) $5a^2 + \pi r^2$ (c) $a^2 + 6\pi r^2$ (d) $a^2 - \pi r^2$
41. A well of diameter 4 m is dug 14 m deep. The earth taken out is spread evenly all around the well to form a 40 cm high embankment. The width of the embankment is :
- (a) 8 m (b) 9 m (c) 10 m (d) 12 m
42. Two spheres of same metal weights 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. The diameter of the new

sphere is :

- (a) 10 cm (b) 12 cm (c) 14 cm (d) 16 cm

43. A spherical ball of radius R is melted to make 8 new identical balls, each of radius r . Then $R : r$ is :
(a) 2 : 1 (b) 2 : 3 (c) 1 : 2 (d) 3 : 2
44. Volume and surface area of a solid hemisphere are numerically equal. The diameter of hemisphere is :
(a) 7 units (b) 9 units (c) 12 units (d) 16 units
45. The $\frac{3}{4}$ th part of a conical vessel of internal radius 5 cm and height 24 cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10 cm. The height water in cylindrical vessel is :
(a) 3.2 cm (b) 1.5 cm (c) 0.5 cm (d) 0.32 cm
46. Height of cone is 10 cm the cone is divided into two parts using a plane parallel to its base at the middle of its height. The ratio of the volumes of the two parts is :
(a) 1 : 3 (b) 1 : 5 (c) 1 : 7 (d) 1 : 9
47. The dimensions of a solid iron cuboid are $4.4 \text{ m} \times 2.6 \text{ m} \times 10 \text{ m}$. If it is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5 cm. The length of the pipe is :
(a) 109 m (b) 111 m (c) 112 m (d) 114 m
48. In a rain water harvesting system, the rainwater from a roof of $22 \text{ m} \times 20 \text{ m}$ drains into a cylindrical tank having diameter of base 2 m and height 3.5 m. If the tank is full, then the rainfall in cm is :
(a) 2 cm (b) 2.5 m (c) 3 m (d) 3.5 m
49. A solid metallic cuboid of dimensions $9 \text{ m} \times 8 \text{ m} \times 2 \text{ m}$ is melted and recast into solid cubes of edge 2 m. The number of cubes so formed is :
(a) 14 (b) 18 (c) 15 (d) 16
50. A well of diameter 3 cm dug is 14 cm deep. The soil taken out of it is spread evenly all round it to a width of 5 cm to form an embankment. The height of the embankment is:
(a) 0.79 cm (app) (b) 0.58 cm (app) (c) 0.73 cm (app) (d) 0.76 m (app)

II. FILL IN THE BLANKS

1. A test tube is a combination of a _____ and a _____.
2. Length of diagonal of a cuboid of dimensions l , b and h is given by _____.
3. For a hollow cylinder of radii R and r ($R > r$), curved surface area is _____.
4. Total surface area of a hemisphere of radius r = _____.
5. A *lattu* (top) is a combination of a _____ and a _____.
6. A funnel is the combination of a _____ and a _____.
7. When one solid X is melted and recast into another solid Y , then the _____ of solid X and solid Y is same.
8. If a solid ball is exactly fitted inside a cubical box of edge $2x$, then the volume of the ball is _____.
9. If two identical cubes of side x are joined end to end, then the total surface area of the resulting solid is _____.

10. If three spheres of radii 6 cm, 8 cm and 10 cm are melted and recast to form a cone of radius 12 cm. The height of the cone is _____.

III. VERY SHORT ANSWER QUESTIONS

1. If two cubes have their volumes in the ratio 1 : 27, then find the ratio of their surface areas.
2. Find the volume of the largest right circular cone that can be cut out from a cube of edge 4.2 cm.
3. If the surface area of a sphere is 154 cm^2 , then find its radius.
4. If a metallic cube of edge 1 cm is melted and drawn into a wire of diameter 4 mm, then find the length of the wire.
5. If each edge of a cube is increased by 50%, then find the percentage increase in its surface area.
6. Two cones with the same base radius 8 cm and height 15 cm are joined together along their bases. Find the nearest integer value of surface area of the shape so formed.
7. If the radius of the base of a cone is 5 cm and its height is 12 cm, find its curved surface area.
8. What is the radius of the sphere whose volume and surface area are numerically equal?
9. The radii of the base of a cylinder and a cone of same height are in the ratio 3 : 4. Find the ratio of their volumes.
10. The circumference of the circular end of a hemispherical bowl is 132 cm. Find the capacity of the bowl.
11. Three metallic solid cubes whose edges are 3 cm, 4 cm, and 5 cm are melted and recast into a single cube. Find the edge of the cube, thus formed.
12. A frustum of a right circular cone of height 16 cm has radii of its circular ends as 8 cm and 20 cm. Find its slant height.

ANSWERS

I. Multiple Choice Questions :

1. (b) 2. (a) 3. (c) 4. (a) 5. (d) 6. (a) 7. (a) 8. (b) 9. (b) 10. (c)
 11. (d) 12. (a) 13. (a) 14. (b) 15. (a) 16. (b) 17. (c) 18. (a) 19. (a) 20. (a)
 21. (b) 22. (c) 23. (a) 24. (b) 25. (d) 26. (d) 27. (d) 28. (b) 29. (c) 30. (a)
 31. (c) 32. (a) 33. (b) 34. (c) 35. (d) 36. (d) 37. (d) 38. (a) 39. (a) 40. (a)
 41. (c) 42. (b) 43. (a) 44. (b) 45. (b) 46. (c) 47. (c) 48. (b) 49. (b) 50. (a)

II. Fill in the Blanks :

1. cylinder, hemisphere 2. $\sqrt{l^2 + b^2 + h^2}$ units 3. $2\pi h(R + r)$ 4. $3\pi r^2$
 5. cone, hemisphere 6. frustum cylinder 7. volume 8. $\frac{4}{3}\pi x^3$
 9. $30x^2$ 10. 48 cm

III. Very Short Answer Questions :

1. 1 : 9 2. 19.4 m^3 3. 3.5 cm 4. $\frac{25}{\pi}$ 5. 125% 6. 855 cm^2 7. 65π
 8. 3 cm 9. 27 : 16 10. 19404 cm^3 11. 6 cm 12. 20 cm