SURFACE AREAS AND VOLUME

Section A (1 mark each)

1. The radius of a sphere is r cm. It is divided into two equal parts. Find the whole surface of the two parts.
   ($6\pi r^2$ cm^2 - Board 2012) **(HOTS)**

2. 12 solid spheres of the same size are made by melting a solid metallic cylinder of base radius 1cm and height $\frac{1}{3}$ of 48cm. Find the radius of each sphere.
   (1cm– Board 2012)

3. 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 original cylinder.
   (1 : 4 - Board 2012) **(HOTS)**

4. Three cubes of iron whose edges are 3cm, 4cm and 5cm, respectively are melted and formed into a single cube. Find the edge of the new cube so formed.
   (6cm - Board 2013)

5. Volumes of two spheres are in the ratio 64 : 27. Find the ratio of their surface areas.
   (16 : 9 - Board 2013)

Section B (2 marks each)

6. A hemispherical bowl of internal radius 9cm is full with a liquid. This liquid is to be filled into cylindrical shaped bottles of diameter 3cm and height 4cm. How many bottles are necessary to empty the bowl?
   (54 - Board 2012)

7. A cylindrical tank has a capacity of 6160cm. Find its depth if its radius is 14m. Also calculate the cost of painting its curved surface (outer) at a rate of ₹ 3 per m^2.
   (Depth=5m; Cost= ₹ 1320 - Board 2012)

8. A glass cylinder with diameter 20cm has water to a height of 9cm. A metal cube of 8cm edge is immersed in it completely. Calculate the height by which water will rise in the cylinder.
   (1.62cm – Board 2012)

9. If a wire is bent into the shape of a square, then the area enclosed by the square is 81cm^2. When the same wire is bent into a semi-circular shape, find the area enclosed by the semi-circle.
   (77cm^2 – Board 2014)

10. Find the volume (in cm^3) of the largest right circular cone that can be cut off from a cube of edge 4.2cm.
    (19.4cm^3– Board 2014)

Section C (3 marks each)

11. The circumference of the base of a conical tent is 44m. If the height of tent is 24m, find the length of the canvas used in making the tent, if the width of the canvas is 2m. (use π = 22/7)
    (275m - Board 2013)

12. A spherical shell of lead whose external and internal diameters are 24cm and 18cm respectively is melted and recast into a right circular cylinder 37cm high. Find the radius of the base of the cylinder.
    (6cm - Board 2013)

13. A rectangular sheet of paper of dimensions 44cm X 18cm is rolled along its length and a cylinder is formed. Find the volume of the cylinder so formed. (use π = 22/7)
    (2772cm^3 -Board 2012)

14. Find the volume of the largest solid right circular cone that can be cut out of a solid cube of side 14cm.

(719cm^3 - Board 2014)

15. A solid right circular cylinder has a total surface of 462 sq. cm. Its curved surface area is one-third of its total surface area. Find the volume of the cylinder. (539 cm^3 - Board 2014)**(HOTS)**

Section D (4 marks each)

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

(4.5 cm - Board 2013)

17. A bucket open at the top and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24cm and the diameters of its upper and lower circular ends are 30cm and 10 cm respectively. Find the cost of metal sheet used in it at the rate of ₹ 10 per 100cm^2.(use $\pi = 3.14$)

(₹ 171.13 - Board 2013)

18. A bucket is in the form of a frustum of a cone whose radii of the bottom and the top are 7cm and 28cm respectively. If the capacity of the bucket is 21560 cm^3, find the whole surface area of the bucket.

(3344cm^2 - Board 2014)

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

(2hrs. - Board 2012)

20. A right angled triangle, whose sides are 3cm, 4cm, and 5cm, is revolved about the longest side. Find the surface area of the figure (double cone) obtained. (52.8cm^2 - Board 2012)**(HOTS)**

21. 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 $\frac{8}{9}$ of the curved surface of the whole cone, find the ratio of the line segments in which the altitude of the cone is divided by the plane. (1 : 2 - Board 2004)**(EXEMPLAR)**

22. The height of a cone is 30cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}th$ of the volume of the given cone, at what height above the base is the section made?

(20 cm - Board 2005)**(EXEMPLAR)**

23. A cone is divided into two parts by drawing a plane through the midpoint of its axis, parallel to its base. Compare the volumes of the two parts. ($\frac{1}{7}$ - Board 2003))**(EXEMPLAR)**