# MATHEMATICS

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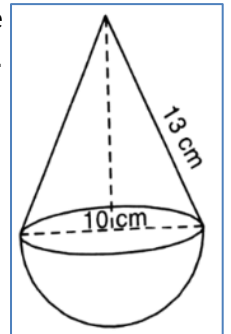
| Board – ICSE | Class – 10th | Topic – Sphere, Hemisphere and Shell |

1. The surface area of a solid metallic sphere is 616 cm². It is melted and recast into smaller sphere of 3.5 cm diameter. How many such spheres can be obtained?  [Ans: 64]
2. A hemispherical bowl of 14.4 cm diameter is filled completely with chocolate sauce. This sauce is poured into an inverted cone of 9.6 cm radius. Find height of cone.  [Ans: 8.1 cm]
3. A solid cone of 5 cm radius and 8 cm height is melted and made into small spheres of 0.5 cm radius. Find the number of spheres formed.  [Ans: 400]
4. The given figure represents a hemisphere surmounted by a conical block of wood. The diameter A of their bases is 10 cm each other and the slant height of the cone is 13 cm. Calculate:
   (i) The height of the cone, and  [Ans: 12 cm]
   (ii) The volume of the solid.  [Ans: 602.38 cm³]



5. A tent is in the form of a right circular cone. Its height is 4 m and base diameter is 10.5 m. If it can accommodate 15 persons, how many cubic metres of air is available for each person?
   [Ans: 7.7 m³]
6. A sphere has a radius of 10.5 cm. Find its
   a) Volume, and  [Ans: 4,851 cm³]
   b) Surface area.  [Ans: 1,386 cm²]
7. A spherical ball of a metal, 6 cm in diameter is melted and recast into three spherical balls. Diameters of two balls are 3 cm and 4 cm. What is diameter of the third ball?  [Ans: 5 cm]
8. What is the least number of solid metallic spheres each of 4 cm radius that should be melted and recast to form a hallow sphere of 24 cm outer diameter and of 2 cm uniform thickness?
   [Ans: 12]
9. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top which is open is 5 cm. It is filled with water up to the rim. When lead shots, each of which is a sphere of 0.5 cm radius, are dropped into the vessel, one fourth of the water flows out. Find the number of leads shots dropped into the vessel. (Take $\pi = 22/7$)  [Ans: 100]
10. Find the total surface area of a cone of 6 cm radius and 8 cm slant height.  [Ans: 264 cm²]
11. A conical tent, 6 m in diameter and 4 m high, is made of canvas. How many such tents can be made from 1,000 m long, 110 cm wide canvas, allowing 10% for wastage?  [Ans: 21]
12. A solid cylinder of radius 12 cm and height 20 cm is melted into solid spheres of radius 0.5 cm. Find the number of solid spheres made.  [Ans: 17280]
13. A hallow cylinder of outer radius 15 cm and inner radius 5 cm add height 20 cm is recast into solid cones of radius 4 cm and perpendicular height 10 cm. Find the number of cones formed.  [Ans: 75]
14. The area of the curved surface of a solid cylinder is 2200 cm² and the circumference of the base is 55 cm. Find:

a) Height of the cylinder, and                                               [Ans: 40cm]

b) Volume of the cylinder.                                       [Ans: 9625 cm$^3$]

15. How many revolutions will a roller of radius 0.7 m and length 2.5 m make to level a field 770 m × 350 m?             [Ans: 24500]

16. A cube is immersed completely in a cylinder containing water. If the level of water rises by 7 cm and the base radius of the cylinder is 22 cm, find the length of the cube.     [Ans: 22 cm]

17. Find the cost of painting a hallow cylinder of outer diameter 14 m, thickness 7 cm and height 7 m at Rs, 100 per m$^2$.            [Ans: Rs. 64,372]

18. A solid cylinder has its radius and height in the ratio 1:3. If its volume is 404.25 cm$^2$. Find its radius.                      [Ans: 3.5 cm]

19. Find the volume of a cylinder which has a base diameter 14 cm and height 24 cm.                                          [Ans: 3696 cm$^2$]

20. The total surface area of a cylinder is 264 cm$^2$. Find its volume of its height is 5 cm more than its radius.                   [Ans: 357.25 cm$^2$]

21. The volume of a cylinder of height 4 cm is 196 $\pi$ cm$^2$. Find its lateral surface area and its total surface area.                 [Ans: 176 cm$^2$; 484 cm$^2$]

22. The volume of a conical tent is 1,232 m$^3$ and the area of its base is 154 m$^2$. Calculate

a) The radius of the floor                                           [Ans: 7m]

b) The height of the tent, and                                   [Ans: 25 m]

c) The length of canvas required to cover this tent if its width is 2 m.     [Ans: 275 m]