

ASSIGNMENT –MENSURATION (II)**CLASS-10****PROBLEMS (1-Mark)**

1. The surface area of a sphere is 616cm^2 . Find its diameter. [14 cm]
2. A cylinder of height 45 cm and radius 2 cm is melted and solid spheres of diameter 6cm are re casted. Find the number of such spheres that can be produced. [5]
3. We have a cylindrical vessel of diameter 36 cm partly filled with water. Accidentally a sphere of diameter 18 cm is dropped inside this vessel. Find the rise in water level in vessel. [3 cm]
4. A solid cone of metal is melted and converted into a solid cylinder of same radius. Height of the cylinder is 5 cm. Find the height of the cone melted. [15 cm]
5. From a cube of side 4.2 cm, a largest cylinder is to be carved out. Find the radius of base of such cylinder. [2.1 cm]
6. If the diameter of two ends of a bucket 40 cm high are 35 and 14 cm respectively. Find the volume of the bucket. [80080 cm^3]
7. A solid sphere of radius 10.5 cm is melted and re-casted into small cones of radius 3.5 cm and height 3 cm. Find number of such cones. [126]

PROBLEMS (2-Marks)

1. Find diameter of a sphere of volume $1437\frac{1}{3}\text{cm}^3$. [14 cm]
2. A solid cylinder of radius 2 cm and height 45 cm is to be made by melting a number of metallic spherical balls each of diameter 6 cm. Find number of such spherical balls needed. [5]
3. A solid is hemispherical at bottom and conical above it. If the surface area of two parts are equal, find the ratio of its radius and height of the conical part. [1: $\sqrt{3}$]
4. A tank of dimension $30\text{m} \times 20\text{m} \times 12\text{m}$ is dug inside a field of dimension 500 m by 30 m. The earth taken out is spread evenly over the rest of the field. Find rise in level of field. [50 cm]
5. Three solid cubes of metal of sides 3cm, 4 cm, and 5 cm are melted a larger cube is made from the metal obtained. Find the side of new cube formed. [6 cm]
6. Two cubes each of 12cm edge are joined end to end. Find the surface area of generated figure. [1440 cm^2]
7. A right triangle whose perpendicular sides are 15 cm and 20 cm is revolved about its hypotenuse. Find the volume and surface area of double cone generated. [Take $\pi = 3.14$] [3768 ,1318.8]

8. The base of a solid is cube of side 5cm. A hemisphere is fixed on the top. The diameter of hemisphere is 4.2 cm. Find the total surface area of total solid. [163.06cm²]
9. A solid cylinder has height 14 cm and radius 3.5 cm. Two equal conical holes each of radius 2.1 cm and height 4 cm are carved out. Find volume of remaining solid. [502.04cm³]
10. How many coins each of diameter 1.75 cm and thickness 2 mm, must be melted to form a cuboid of dimensions 1cm × 10cm × 7cm . [1600]

PROBLEMS (4-Marks)

1. A solid is in the form of a cone mounted on a hemisphere of same diameter. The radius of the hemisphere is 3.5 cm and height of the cone is 5 cm. This solid is immersed in a cylindrical vessel of radius 5 cm and height 9.8 cm, which is full of water. Find volume of water left in the vessel. [616cm³]
2. The diameter of internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. It is melted and from the metal obtained, a solid cylinder of radius 7 cm is made. Find height of this cylinder. [$\frac{8}{3}$ cm]
3. A toy is in formed by joining three solids. A hemisphere and a cone are attached to two ends of a cylinder. The diameter and height of cylindrical part are 10 cm and 13 cm respectively. The radius of all three solids are same. Find surface area of toy if total height of the toy is 30 cm. [770cm²]
4. A cylinder has diameter 21 cm and height 30 cm. Four such cylinders are full with ice-cream. This ice-cream is to be distributed in cones of height 12 cm and radius 3.5 cm having a hemispherical shape on the top. Find how many cones can be filled with this available ice-cream. [216]
5. A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment. [4 m]
6. A tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of rupees 500/sq. metre. (use $\pi=22/7$) [16500]
7. A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe $3 \times \frac{4}{7}$ litre per second. How much time will it take to make the tank half empty? [16min30sec]
8. A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm³. The radii of the top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and the area of metal sheet used in making the bucket. ($\pi=3.14$) [15cm, 2160.32 cm²]

9. A right circular cone of height 30 cm. A small cone is cut off from the top by a plane parallel to the base. If the volume of the small cone is $\frac{1}{27}$ of the volume of given cone, find at what height above the base is the section made. [20 cm above base]
10. The rain water from a 22 m x 20 m roof drains into a cylindrical vessel of diameter 2 m and height 3.5 m. If the rain water collected from the roof fills $\frac{4}{5}$ th of the cylindrical vessel, then find the rainfall in cm. [2 cm.]

PROBLEMS (6-Marks)

1. A bucket is open at the top with a capacity of 12308.8 cm^3 . The radii of the top and bottom ends are 20 cm and 12 cm respectively. Find the height of the bucket. Also, find the area of metal sheet that has been used in making the bucket [Take $\pi = 3.14$] [15 cm , 2160.32 cm^2]
2. Hemispherical portions of radius 4.2 cm has been scooped out from both ends of a solid metal cylinder of radius 4.2 cm and height 10 cm. The left solid is then melted and converted into a cylindrical wire of 1.4 cm thickness. Find length of the wire. [158.4 cm]
3. A cylindrical tank of radius 40 cm is filled with water through a cylindrical pipe. Water flows out of the pipe at the rate 2.52 km/h . If the level of water raises by 3.15m in 30 minutes then find diameter of the pipe. [4 cm]
4. In an experiment of Physics, spherical solid metal balls of diameter 0.5 cm are put into a vessel, in the form of an inverted cone of height 11 cm and top radius 2.5 cm, full of water. In doing so, $\frac{2}{5}$ th of the water flows out. Find the number of balls that has been put into the vessel. [440]
5. Two solid cones of radius and height 2.1 cm, 4.1 cm and 2.1 cm, 4.3 cm respectively are melted and recast into a sphere. Find diameter of the sphere.
6. The difference between outer and inner curved surface areas of a hollow cylinder, 14cm long is 88 cm^2 . If the volume of the metal used in making the cylinder is 176 cm^3 , find outer and inner diameters of the cylinder. [5 cm and 3 cm]
7. A container to hold milk is in the form of a frustum of a cone whose volume is $10459\frac{3}{7} \text{ cm}^3$. The diameters of lower and upper ends of container are 16 cm and 40 cm respectively. Find the cost of metal sheet which will be required in making the container at the rate of ₹ 1.40 per square cm. [₹2745.60]
8. A tent is in the shape of a cylinder surmounted by a cone at top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively

and the height of the top is 2.8 m, find the area of the canvas used for making the tent. Find the cost of canvas of the tent at the rate of ₹ 500 per square meter. Also find the volume of air enclosed in the tent.

[44 cm^2 , ₹22000, 34.57 cm^3]

9. A cylindrical tank of radius 5 m and depth 2m is to be filled with water by a pipe of diameter 20 cm. If water flows out of the pipe at the rate of 3 km/h, in how much time the tank will be fully filled? [1 hr. 40 min]
10. Toys whose base is semi-circular and top is conical are produced from the metal obtained by melting a solid metal cylinder of height 15 cm and radius 6 cm. The radius of a toy is 3 cm and total height is 12 cm. Find the number of toys that can be produced. [12]
11. The rain water from a roof $22\text{m} \times 20\text{m}$ drains into a cylindrical vessel of diameter 2 m and height 3.5 m. If the vessel is just full, find the rainfall in cm. [2.5 cm]
12. A hollow cone is cut by a plane parallel to base and the upper portion is removed. If the curved surface area of the remainder is $\frac{8}{9}$ of the curved surface area of the whole cone, find the ratio of the line segments into which the altitude of the cone is divided by the plane. [1 : 2]
13. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If the volume is $\frac{1}{27}$ of the volume of the given cone, at what height above the base, the section has been made? [20 cm]
14. A metallic cone is 20 cm high. Its vertical angle is 60° . It is cut into two parts at the middle of its height by a plane parallel to base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire. [7964.4 m]
15. A cone is divided into two parts by a plane through the midpoint of its height and parallel to its base. Compare the volumes of two parts in which the cone is divided by the plane. [1 : 7]
16. A tank is hemispherical in shape and is full of water. A pipe is used to empty it at the rate $\frac{25}{7}$ liters per second. Find the time in which the tank will be emptied half if diameter of the tank is 3 meters. [16.5 minutes]
17. An iron pillar consists of a cylindrical portion 240 cm high and 16 cm in diameter and a cone 36 cm high surmounting it. Find the weight of the pillar if 1 cubic cm of iron weighs 7.8 gram. [395.36 Kg]
18. A sector of a circle of radius 12 cm has an angle 120° . By coinciding its straight edges a cone is formed. Find the volume of cone. [$\frac{362\sqrt{132}}{21}\text{ cm}^3$]

19. A wall 24 m long, 0.4 m thick and 6 m high is constructed with the bricks each of dimensions $25 \text{ cm} \times 16 \text{ cm} \times 10 \text{ cm}$. If the mortar occupies $\frac{1}{10}$ of the volume of the wall, then find the number of bricks used in constructing the wall. [12960]
20. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to $\frac{2}{3}$ of the total height of the building. Find the height of the building, if it contains $67\frac{1}{21} \text{ m}^3$ of air. [6 m]
21. A copper wire, 3 mm in diameter, is wound about a cylinder whose length is 12 cm, and diameter 10 cm, so as to cover the curved surface of the cylinder. Find the length and mass of the wire, assuming the density of copper to be 8.88 g/cm^3 . [12.57 m, 789.41 g]