Surface Areas and Volumes

1 Mark:

1. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere?
CBSE 2017, Delhi (30/1/1)

2. A solid metallic cuboid of dimensions $9\ m \times 8\ m \times 2\ m$ is melted and recast into solid cubes of edge $2\ m$. Find the number of cubes so formed.
CBSE 2017, Foreign (30/2/1)

3. The circumference of the base of a cone is 44 cm and the slant height is 25 cm. Find the curved surface area of the cone.
CBSE Sample Paper 2015

4. 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:
CBSE 2012, Delhi (30/1/1)

A) 1 : 2 B) 2 : 1 C) 1 : 4 D) 4 : 1

5. The radii of the circular ends of a bucket of height 40 cm are 24 cm and 15 cm. The slant height (in cm) of the bucket is :
CBSE 2012, Foreign (30/2/1)

A) 51 B) 49 C) 43 D) 41

6. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. The ratio of the volume of the smaller cone to the whole cone is
CBSE 2012, Outside Delhi (30/1)

A) 1 : 2 B) 1 : 4 C) 1 : 6 D) 1 : 8

7. A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged, then the water level rises (in cm) by
CBSE 2011, Delhi (30/1/1)

A) 3 B) 4 C) 5 D) 6

8. A solid is hemispherical at the bottom and conical (of same radius) above it. If the surface areas of the two parts are equal, then the ratio of its radius and the slant height of the conical part is
CBSE 2011, Foreign (30/2/1)

A) 2 : 1 B) 1 : 2 C) 1 : 4 D) 4 : 1

9. The radius (in cm) of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is
CBSE 2011, Outside Delhi (30/1)

A) 4.2 B) 2.1 C) 8.4 D) 1.05

10. The slant height of a frustum of a cone is 4 cm and the perimeters (circumferences) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum. $\left[\text{Use } \pi = \frac{22}{7}\right]$
CBSE 2010, Delhi (30/1/1)

11. The slant height of a frustum of a cone is 10 cm. If the height of the frustum is 8 cm then find the difference of the radii of its two circular ends.
CBSE 2010, Foreign (30/2/1)

12. A cylinder and a cone are of same base radius and of same height. Find the ratio of the volume of cylinder to that of the cone.
CBSE 2009, Delhi (30/1/1)

13. The surface area of a sphere is 616 cm^2. Find its radius.
CBSE 2008, Foreign (30/2/1), (30/2/2), (30/2/3)

14. A cylinder, a cone and hemisphere are of equal base and have the same height. What is the ratio in their volumes?
CBSE Sample Paper I 2008

2 Marks:

1. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?
CBSE Sample Paper 2016

2. Find the number of coins of 1.5 cm diameter and 0.2 cm thickness to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.
CBSE Sample Paper 2016

3. If the total surface area of a solid hemisphere is 462 cm^2, find its volume.
[Take $\pi = \frac{22}{7}$]
CBSE 2014, Outside Delhi (30/1), (30/2), (30/3)

4. A solid sphere of radius 10.5 cm is melted and recast into smaller solid cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed. (Use $\pi = \frac{22}{7}$). **CBSE 2012, Outside Delhi (30/1)**

5. The volume of a hemisphere is $2425\frac{1}{2}\ cm^3$. Find its curved surface area. [Use $\pi = \frac{22}{7}$]. **CBSE 2012, Delhi (30/1/1)**

6. A solid is in the shape of cone mounted on a hemisphere of same base radius. If the curved surface areas of the hemispherical part and the conical part equal, then find the ratio of the radius and the height of the conical part. **CBSE 2012, Foreign (30/2/1)**

7. Two cubes each of volume 27 cm^3 are joined end to end to form a solid. Find the surface area of the resulting cuboid. **CBSE 2011, Outside Delhi (30/1)**

8. A cone of height 20 cm and radius of base 5 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the diameter of the sphere. **CBSE 2011, Outside Delhi (30/1)**

9. Two cubes, each of side 4 cm are joined end to end. Find the surface area of the resulting cuboid. **CBSE 2011, Delhi (30/1/1)**

10. The dimensions of a metallic cuboid are 100 $cm \times 80\ cm \times 64\ cm$. It is melted and recast into a cube. Find the surface area of the cube. **CBSE 2011, Foreign (30/2/1)**

3 Marks:

1. Water in a canal, 5.4 m wide and 1.8 m deep, is flowing with a speed of 25 $km/hour$. How much area can it irrigate in 40 minutes, if 10 cm of standing water is required for irrigation? **CBSE 2017, Outside Delhi (30/1)**

2. 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. Find the curved surface area of the frustum. **CBSE 2017, Outside Delhi (30/1)**

3. The dimensions of a solid iron cuboid are $4.4\ m \times 2.6\ m \times 1.0\ m$. It is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5 cm. Find the length of the pipe. **CBSE 2017, Outside Delhi (30/1)**

4. 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. Find the height of water in cylindrical vessel. **CBSE 2017, Delhi (30/1/1)**

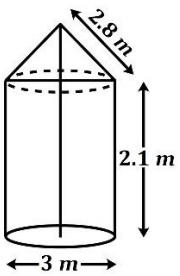
5. The radius and height of a solid right circular cone are in the ratio of $5 : 12$. If its volume is 314 cm^3, find its total surface area. [Take $\pi = 3.14$]. **CBSE 2017, Foreign (30/2/1)**

6. A cylindrical pipe has inner diameter of 4 cm and water flows through it at the rate of 20 meter per minute. How long would it take to fill a conical tank of radius 40 cm and depth 72 cm? **CBSE Sample Paper 2017**

7. Find the number of spherical lead shots, each of diameter 6 cm that can be made from a solid cuboid of lead having dimensions $24\ cm \times 22\ cm \times 12\ cm$. **CBSE Sample Paper 2017**

8. A wooden souvenir is made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm then find the total cost of polishing the souvenir at the rate of Rs. 10 per cm^2. **CBSE Sample Paper 2017**

9. In figure, 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 ₹ $500/sq$.metre. $\left(\text{Use } \pi = \frac{22}{7}\right)$.



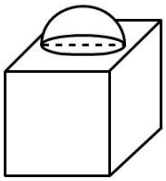
CBSE 2016, Outside Delhi (30/1)

10. A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied in to a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. $\left(\text{Use } \pi = \frac{22}{7}\right)$

CBSE 2016, Outside Delhi (30/1)

11. A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel. **CBSE 2016, Outside Delhi (30/1)**

12. In figure, is a decorative block, made up of two solids – a cube and a hemisphere. The base of the block is a cube of side 6 cm and the hemisphere fixed on the top has a diameter of 3.5 cm. Find the total surface area of the block. $\left(\text{use } \pi = \frac{22}{7}\right)$



CBSE 2016, Delhi (30/1/1)

13. 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. **CBSE 2016, Delhi (30/1/1)**

14. The sum of the radius of base and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 $sq.cm$, find the volume of the cylinder. $\left(\text{use } \pi = \frac{22}{7}\right)$ **CBSE 2016, Delhi (30/1/1)**

15. A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litre per second. How much time will it take to make the tank half empty? $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2016, Foreign (30/2/1)**

16. A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice–cream cones, with conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cone.

CBSE 2016, Foreign (30/2/1)

17. A metal container, open from the top, is in the shape of a frustum of a cone of height 21 cm with radii of its lower an upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of ₹ 35 per litre. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2016, Foreign (30/2/1)**

18. Water is flowing at the rate of 0.7 m/sec through a circular pipe whose internal diameter is 2 cm into a cylindrical tank, the radius of whose base is 40 cm. Determine the increase in the level of water in half hour. **CBSE Sample Paper 2016**

19. The perimeters of the ends of the frustum of a cone are 207.24 cm and 169.56 cm. If the height of the frustum be 8 cm, find the whole surface area of the frustum. $(\text{Use } \pi = 3.14)$ **CBSE Sample Paper 2016**

20. Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical uppepr part of same diameter but of height 2.8 m, and the canvas to be used costs ₹ 100 $per\ sq.m$, find the amount, the associations will have to pay. What values are shown by these associations? [Use $\pi = \frac{22}{7}$] **CBSE 2015, Outside Delhi (30/1)**

21. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer.

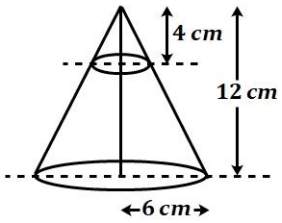
CBSE 2015, Outside Delhi (30/1)

22. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of ₹ 5 per 100 $sq.cm$. [Use $\pi = 3.14$] **CBSE 2015, Outside Delhi (30/1)**

23. 504 cones, each of diameter diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area. [Use $\pi = \frac{22}{7}$] **CBSE 2015, Outside Delhi (30/1)**

24. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire [Use $\pi = \frac{22}{7}$]. **CBSE 2015, Outside Delhi (30/1)**

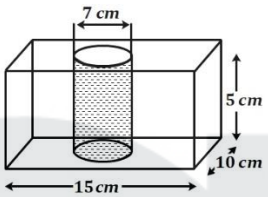
25. In figure, from the top of a solid cone of height 12 cm and base radius 6 cm, a cone of height 4 cm is removed by a plane parallel to the base. Find the total surface area of the remaining solid. (Use $\pi = \frac{22}{7}$ and $\sqrt{5} = 2.236$).



CBSE 2015, Delhi (30/1/1)

26. A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of hemisphere is 3.5 cm and the total wood used in the making of toy is $166\frac{5}{6}\,cm^3$. Find the height of the toy. Also, find the cost of painting the hemispherical part of the toy at the rate of ₹ 10 $per\ cm^2$. [Use $\pi = \frac{22}{7}$] **CBSE 2015, Delhi (30/1/1)**

27. In figure, from a cuboidal solid metallic block, of dimension 15 $cm \times 10\ cm \times 5\ cm$, a cylindrical hole of diameter 7 cm is drilled out. Find the surface area of the remaining block [Use $\pi = \frac{22}{7}$].



CBSE 2015, Delhi (30/1/1)

28. Two spheres of same metal weight 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. Find the diameter of the new sphere. **CBSE 2015, Foreign (30/2/1)**

29. A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weight, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}\,cm$ and its depth is $\frac{8}{9}\,cm$. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape. **CBSE 2015, Foreign (30/2/1)**

30. A solid right–circular cone of height 60 cm and radius 30 cm is dropped in a right–circular cylinder full of water of height 180 cm and radius 60 cm. Find the volume of water left in the cylinder, in cubic metres. [Use $\pi = \frac{22}{7}$] **CBSE 2015, Foreign (30/2/1)**

31. The largest possible sphere is carved out of a wooden solid cube of side 7 cm. Find the volume of the wood left. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2014, Outside Delhi (30/1), (30/2), (30/3)**

32. Water in a canal, 6 m wide and $1 \cdot 5\ m$ deep, is flowing at a speed of 4 km/h. How much area will it irrigate in 10 minutes, if 8 cm, of standing water is needed for irrigation? **CBSE 2014, Outside Delhi (30/1), (30/2), (30/3)**

33. A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14 cm and the total height of the vessel is 13 cm. Find the total surface area of the vessel. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2013, Delhi (30/1/1)**

34. A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the volume of wood in the toy. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2013, Delhi (30/1/1)**

35. A hemispherical bowl of internal radius 9 cm is full of water. Its contents are emptied in a cylindrical vessel of internal radius 6 cm. Find the height of water in the cylindrical vessel. **CBSE 2012, Outside (30/1)**

36. From a solid cylinder of height 7 cm and base diameter 12 cm, a conical cavity of same height and same base diameter is hollowed out. Find the total surface area of the remaining solid. [Use $\pi = \frac{22}{7}$]. **CBSE 2012, Delhi (30/1/1)**

37. A cylinder 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 find the radius and slant height of the heap. **CBSE 2012, Delhi (30/1/1)**

38. A sphere of diameter 6 cm is dropped into a cylindrical vessel, partly filled with water, whose diameter is 12 cm. If the sphere is completely submerged in water, by how much will the surface of water be raised in the cylindrical vessel? **CBSE 2012, Foreign (30/2/1)**

39. An open metal bucket is in the shape of a frustum of a cone of height 21 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. Find the cost of milk which can completely fill the bucket at Rs. 30 per litre. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2011, Outside Delhi (30/1)**

40. The radii of the circular ends of a bucket of height 15 cm are 14 cm and $r\ cm (r < 14\ cm)$. If the volume of bucket is 5390 cm^3, then find the value of r. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2011, Delhi (30/1/1)**

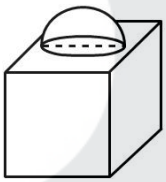
41. From a solid cylinder of height 14 cm and base diameter 7 cm, two equal conical holes each of radius 2.1 cm and height 4 cm are cut off. Find the volume of the remaining solid. **CBSE 2011, Foreign (30/2/1)**

42. The radii of the circular ends of a solid frustum of a cone are 18 cm and 12 cm and its height is 8 cm. Find its total surface area. [Use $\pi = 3.14$] **CBSE 2011, Foreign (30/2/1)**

43. The rain-water collected on the roof of a building, of dimensions 22 $m \times 20\ m$, is drained into a cylindrical vessel having base diameter 2 m and height 3.5 m. If the vessel is full up to the brim, find the height of rain-water on the roof. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2010, Foreign (30/2/1)**

44. The area of an equilateral triangle is $49\sqrt{3}\ cm^2$. Taking each angular point as centre, circle are drawn with radius equal to half the length of the side of the triangle. Find the area of triangle not included in the circles. $\left[\text{Take } \sqrt{3} = 1.73\right]$ **CBSE 2009, Outside Delhi (30/1)**

45. Figure shows a decorative block which is made of two solids – a cube and a hemisphere. The base of the block is a cube with edge 5 cm and the hemisphere, fixed on the top, has a diameter of 4.2 cm. Find the total surface area of the block. $\left[\text{Take } \pi = \frac{22}{7}\right]$



CBSE 2009, Outside Delhi (30/1)

46. A square field and an equilateral triangular park have equal perimeters. If the cost of ploughing the field at rate of Rs. $5/m^2$ is Rs. 720, find the cost of maintaining the part at the rate of Rs. $20/m^2$. **CBSE Sample Paper I 2008**

47. An iron solid sphere of radius 3 cm is melted and recast into small spherical balls of radius 1 cm each. Assuming that there is no wastage in the process, find the number of small spherical balls made from the given sphere. **CBSE Sample Paper I 2008**

4 Marks:

1. In a rain–water harvesting system, the rain–water from a roof of 22 $m \times 20\ m$ drains into a cylindrical tank having diameter of base 2 m and height 3.5 m. If the tank is full, find the rainfall in cm. Write your views on water conservation. **CBSE 2017, Outside Delhi (30/1)**

2. The height of a cone is 10 cm. The cone is divided into two parts using a plane parallel to its base at the middle of its height. Find the ratio of the volumes of the two parts. **CBSE 2017, Delhi (30/1/1)**

3. In a hospital used water is collected in a cylindrical tank of diameter 2 m and height 5 m. After recycling, this water is used to irrigate a park of hospital whose length is 25 m and breadth is 20 m. If the tank is filled completely then what will be the height of standing water used for irrigating the park. Write your views on recycling of water. **CBSE 2017, Delhi (30/1/1)**

4. A well of diameter 3 m is dug 14 m deep. The soil taken out of it is spread evenly all around it to a width of 5 m to form an embankment. Find the height of the embankment. **CBSE 2017, Foreign (30/2/1)**

5. In a rectangular park of dimensions 50 $m \times 40$ m, a rectangular pond is constructed so that the area of grass strip of uniform width surrounding the pond would be 1184 m^2. Find the length and breadth of the pond. **CBSE 2017, Foreign (30/2/1)**

6. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of uniform diameter $\frac{1}{16}cm$, find the length of the wire. **CBSE 2017, Foreign (30/2/1)**

7. A donor agency ensures milk is supplied in containers, which are in the form of a frustum of a cone to be distributed to flood victims in a camp. The height of each frustum is 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively. If this milk is available at the rate of Rs. 35 per litre and 880 litres of milk is needed daily for a camp. **CBSE Sample Paper 2017**

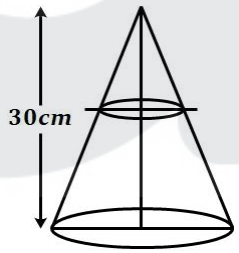
   a) Find how many milk containers are needed daily for the camp.
   b) What daily cost will it put on the donor agency?
   c) What value of the donor agency is depicted in this situation?

8. 50 circular discs, each of radius 7 cm and thickness 0.5 cm are placed one above the other. Find the total surface area of the solid so formed. Find how much space will be left in a cubical box of side 25 cm if the solid formed is placed inside it. **CBSE Sample Paper 2017**

9. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide place and the canvas for 1500 tents to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of height 2.1 m. If the canvas used to make the tents costs ₹ 120 per $sq.m$, find the amount shared by each school to set up the tents. What value is generated by the above problem? $\left(\text{Use } \pi = \frac{22}{7}\right)$ **CBSE 2016, Outside Delhi (30/1)**

10. A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3. 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. (Use $\pi = 3.14$) **CBSE 2016, Delhi (30/1/1)**

11. In figure is shown 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.



CBSE 2016, Foreign (30/2/1)

12. A right triangle having sides 15 cm and 20 cm is made to revolve about its hypotenuse. Find the Volume and Surface Area of the double cone so formed. (Use $\pi = 3.14$) **CBSE Sample Paper 2016**

13. 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. Find the width of the embankment. **CBSE 2015, Delhi (30/1/1)**

14. Water is flowing at the rate of 2.52 km/h through a cylindrical pipe into a cylindrical tank, the radius of whose base is 40 cm. If the increase in the level of water in the tank, in half an hour is 3.15 m, find the internal diameter of the pipe. **CBSE 2015, Delhi (30/1/1)**

15. A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into the vessel. One–fourth of the water flows out of the vessel. Find the radius of a spherical ball. **CBSE 2015, Foreign (30/2/1)**

16. Milk in a container, which is in the form of a frustum of a cone of height 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively, is to be distributed in a camp for flood victims. If this milk is available at the rate of ₹ 35 per litre and 880 litres of milk is needed daily for a camp, find how many such containers of milk are needed for a camp and what cost will it put on the donor agency for this. What value is indicated through this by the donor agency? **CBSE 2015, Foreign (30/2/1)**

17. 150 spherical marbles, each of diameter 1.4 cm, are dropped in a cylindrical vessel of diameter 7 cm containing some water, which are completely immersed in water. Find the rise in the level of water in the vessel. **CBSE 2014, Outside Delhi (30/1), (30/2), (30/3)**

18. A container open at the top, is in the form of a frustum of a cone of height 24 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the of ₹ 21 per litre. [Use $\pi = \frac{22}{7}$] **CBSE 2014, Outside Delhi (30/1), (30/2) (30/3)**

19. Water is flowing through a cylindrical pipe, of internal diameter 2 cm, into a cylindrical tank of base radius 40 cm, at the rate of 0.4 m/s. Determine the rise in level of water in the tank in half an hour. **CBSE 2013, Delhi (30/1/1)**

20. 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 24 cm and the diameters of its upper and lower circular ends are 30 cm and 10 cm respectively. Find the cost of metal sheet used in it at the rate of Rs. 10 per 100 cm^2. [Use $\pi = 3.14$] **CBSE 2013, Delhi (30/1/1)**

21. A solid is in the shape of a cone surmounted on a hemisphere, the radius of each of them being 3.5 cm and the total height of solid is 9.5 cm. Find the volume of the solid. [Use $\pi = \frac{22}{7}$]. **CBSE 2012, Delhi (30/1/1)**

22. A bucket is in the form of a frustum of a cone and it can hold 28.49 litres of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket. [Use $\pi = \frac{22}{7}$]. **CBSE 2012, Delhi (30/1/1)**

23. A toy is in the shape of a cone mounted on a hemisphere of same base radius. If the volume of the toy is 231 cm^3 and its diameter is 7 cm, then find the height of the toy. [Use $\pi = \frac{22}{7}$] **CBSE 2012, Foreign (30/2/1)**

24. The radii of internal and external surface of a hollow spherical shell are 3 cm and 5 cm respectively. It is melted and recast into a solid cylinder of diameter 14 cm. Find the height of the cylinder. **CBSE 2012, Foreign (30/2/1)**

25. A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 16 cm and 12 cm. Find the capacity of the glass. [Use $\pi = \frac{22}{7}$] **CBSE 2012, Foreign (30/2/1)**

26. A hemispherical tank, full of water, is emptied by a pipe at the rate of $\frac{25}{7}$ litres per sec. How much time will it take to empty half the tank if diameter of the base of the tank is 3 m? **CBSE 2012, Outside Delhi (30/1)**

27. A drinking glass is in the shape of the frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass. [Use $\pi = \frac{22}{7}$]. **CBSE 2012, Outside Delhi (30/1)**

28. A military tent of height 8.25 m is in the form of a right circular cylinder of base diameter 30 m and height 5.5 m surmounted by a right circular cone of same base radius. Find the length of the canvas used in making the tent, if the breadth of the canvas is 1.5 m. **CBSE 2012, Outside Delhi (30/1)**

29. From a solid cylinder whose height is 15 cm and diameter 16 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. [Take $\pi = 3.14$] **CBSE 2011, Delhi (30/1/1)**

30. Water is flowing at the rate of 6 km/h through a pipe of diameter 14 cm into a rectangular tank which is 60 m long and 22 m wide. Determine the time in which the level of the water in the tank will rise by 7 cm. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2011, Foreign (30/2/1)**

31. A hollow sphere of internal and external diameters 4 cm and 8 cm respectively is melted to form a cone of base diameter 8 cm. Find the height and the slant height of the cone. **CBSE 2011, Foreign (30/2/1)**

32. Water is flowing at the rate of 15 $km/hour$ through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in the pond rise by 21 cm? **CBSE 2011, Outside Delhi (30/1)**

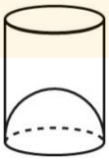
6 Marks:

1. A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $10459\frac{3}{7} cm^3$. The radii of its lower and upper circular ends are $8\ cm$ and $20\ cm$ respectively. Find the cost of metal sheet used in making the container at the rate of $Rs.\ 1.40$ per square centimeter. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2010, Delhi (30/1/1)**

2. A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is $21\ cm$ and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2010, Delhi (30/1/1)**

3. A container, open at the top, and made of a metal sheet, is in the form of a frustum of a cone of height $24\ cm$ with radii of its lower and upper ends as $7\ cm$ and $14\ cm$ respectively. Find the cost of milk which can completely fill the container at the rate of $Rs.\ 25$ per liter. Also find the area of the metal sheet used to make the container. $\left[\text{Use } \pi = \frac{22}{7}\right]$
CBSE 2010, Foreign (30/2/1)

4. A juice seller serves his customers using a glass as shown in Figure. The inner diameter of the cylinder 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. (Use $\pi = 3.14$)



CBSE 2009, Outside Delhi (30/1)

5. A cylindrical vessel with internal diameter $10\ cm$ and height $10.5\ cm$ is full of water. A solid cone of base diameter $7\ cm$ and height $6\ cm$ is completely immersed in water. Find the volume of
   I. water displaced out of the cylindrical vessel.
   II. Water left in the cylindrical vessel.

   $\left[\text{Take } \pi = \frac{22}{7}\right]$ **CBSE 2009, Outside Delhi (30/1)**

6. From a solid cylinder whose height is $8\ cm$ and 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 $\pi = 3.1416$) **CBSE 2009, Delhi (30/1/1)**

7. A spherical copper shell, of external diameter $18\ cm$, is melted and recast into a solid cone of base radius $14\ cm$ and height $4\frac{3}{7}\ cm$. Find the inner diameter of the shell. **CBSE 2009, Foreign (30/2/1)**

8. A bucket is in the form of a frustum of a cone with a capacity of $12308.8\ cm^3$. The radii of the top and bottom circular ends of the bucket are $20\ cm$ and $12\ cm$ respecitively. Find the height of the bucket and also the area of metal sheet used in making it.
   (Use $\pi = 3.14$) **CBSE 2009, Foreign (30/2/1)**

9. If the radii of the circular ends of a conical bucket, which is $16\ cm$ high, are $20\ cm$ and $8\ cm$, find the capacity and total surface area of the bucket. $\left[\text{Use } \pi = \frac{22}{7}\right]$ **CBSE 2008, Foreign (30/2/1), (30/2/2), (30/2/3)**

10. An iron pillar has lower part in the form of a right circular cylinder and the upperpart in the form of a right circular cone. The radius of the base of each of the cone and cylinder is $8\ cm$. The cylindrical part is $240\ cm$ high and the conical part is $36\ cm$ high. Find the weight of the pillar if $1\ cm^3$ of iron weighs $7.5\ grams$. (Take $\pi = \frac{22}{7}$)
CBSE Sample Paper II 2008

11. A container (open at the top) made up of metal sheet is 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
   I. the cost of milk when it is completely filled with milk at the rate of Rs. 15 per litre.
   II. the cost of metal sheet used, if it costs Rs. 5 per $100\ cm^2$
   (Take $\pi = 3.14$) **CBSE Sample Paper II 2008**

12. The interior of building is in the form of a right circular cylinder of radius 7 m and height 6 m, surmounted by a right circular cone of same radius and of vertical angle 60°. Find the cost of painting the building from inside at the rate of Rs. $30/m^2$ **CBSE Sample Paper I 2008**

13. A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 100 cm and the diameter of the hemispherical ends is 28 cm. Find the cost of polishing the surface of the solid at the rate of 5 paise per $sq.cm$. **CBSE Sample Paper I 2008**

14. An open container made up of metal sheet is in the form of a frustum of a cone of height 8 cm with radii of its lower and upper ends as 4 cm and 10 cm respectively. Find the cost of oil which can completely fill the container at the rate of Rs. 50 per litre. Also find the cost of metal used, if it costs Rs. 5 per 100 cm^2 (Use $\pi = 3.14$) **CBSE Sample Paper I 2008**