Question 1. 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 calculate the rise of water level (in cm). (2011D)

Question 2. Find the number of solid spheres, each of diameter 6 cm that can be made by melting a solid metal cylinder of height 45 cm and diameter 4 cm. (2014D)

Question 3. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. Find the ratio of the volume of the smaller cone to the whole cone. (2012OD)

Question 4. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? (2017D)

Short Answer Questions(2 Marks)

Question 5. If the total surface area of a solid hemisphere is 462 cm^2, find its volume. [Take $\pi = 227$] (2014OD)

Question 6. Two cubes, each of side 4 cm are joined end to end. Find the surface area of the resulting cuboid. (2011D)

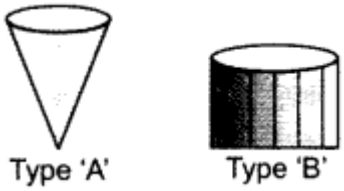
Question 7. The radii of the circular ends of a bucket of height 15 cm are 14 cm and r cm ($r <$ 14 cm). If the volume of bucket is 5390 cm^3, then find the value of r. [Use $\pi = 227$] (2011D)

Question 8. 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. (2011OD)

Question 9. 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. (Use $\pi = 227$) (2016D)

Question 10. A right circular cone of radius 3 cm, has a curved surface area of 47.1 cm^2. Find the volume of the cone. (Use $\pi = 3.14$) (2016D))

Question 11. An icecream seller sells his icecreams in two ways: (2012OD)
(A) In a cone of r = 5 cm, h = 8 cm
(B) In a cup in shape of cylinder with r = 5 cm, h = 8 cm



He charges the same price for both but prefers to sell his icecream in a cone.
(a) Find the volume of the cone and the cup.
(b) Which out of the two has more capacity?

Question 12. 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 (inner) suface area of the vessel. (Use $\pi = 227$)

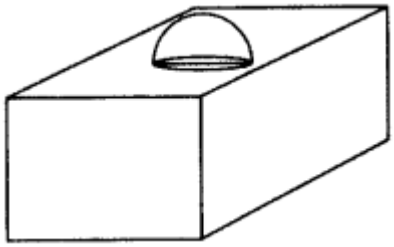
(2013D)

Question 13. 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 16656 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 $\pi = 227$] (2015D)

Question 14. 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 upper 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. (Use $\pi = 227$) (2015OD)

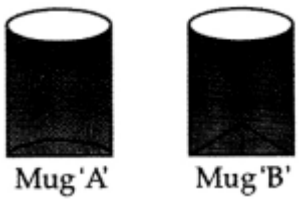
Question 15. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of ₹5 per 100 sq. cm. (Use $\pi = 3.14$) (2015OD)

Question 16. 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. (Use $\pi = 227$) (2016D)



Question 17. A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. (Use $\pi = 227$). (2016D)

Question 18. A milkman was serving his customers using two types of mugs A and B of inner diameter 5 cm to Mug'A Mug'B' serve the customers. The height of the mugs is 10 cm. (2012D)
He decided to serve the customers in 'B' type of mug.
(a) Find the volume of the mugs of both types.
(b) Which mathematical concept is used in the above problem?



Question 19. 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 $\pi = 227$] (2012D)

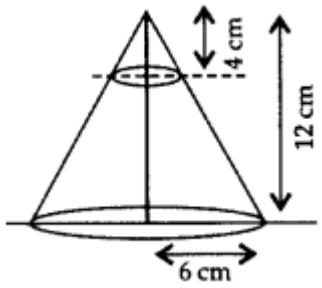
Question 20. A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the volume of wood in the toy. [Use $\pi = 227$] (2013D)

Question 21. A solid cone of base radius 10 cm is cut into two parts through the mid-point of its height, by a plane parallel to its base. Find the ratio in the volumes of the two parts of the cone. (2013OD)

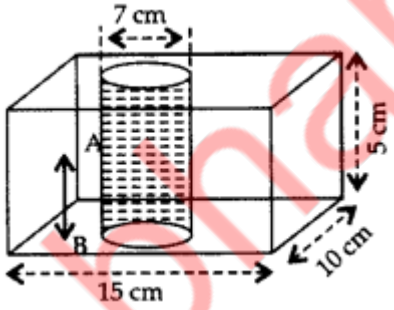
Question 22. A solid metallic right circular cone 20 cm high and whose vertical angle is 60°, is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter 112 cm, find the length of the wire. (2014D)

Question 23. The largest possible sphere is carved out of a wooden solid cube of side 7 cm. Find the volume of the wood left. (Use $\pi = 227$) (2014OD)

Question 24. 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 $\pi = 227$ and $3–\sqrt{} = 2.236$) (2015D)



Question 25. In Figure, from a cuboidal solid metallic block, of dimensions 15 cm × 10 cm × 5 cm, a cylindrical hole of diameter 7 cm is drilled out. Find the surface area of the remaining block. (Use $\pi = 227$) (2015D)



Question 26. A toy is in the shape of a solid cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 21 cm and 40 cm respectively, and the height of cone is 15 cm, then find the total surface area of the toy. [$\pi = 3.14$, be taken] (2011D)

Question 27. 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. (2011OD)

Question 28. 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 find the radius and slant height of the heap. (2012D)

Question 29. A solid metallic sphere of diameter 8 cm is melted and drawn into a cylindrical wire of uniform width. If the length of the wire is 12 m, find its width. (2013OD)

Question 30. 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. (2016D)

Question 31. 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 359 cm. Find the diameter of the cylindrical vessel. (2016D)

Question 32. 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 $\pi = 227$) (2012 OD)

Question 33. The 34th 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. (2017D)

Question 34. 504 cones, each of diameter 3.5 cm and height 3cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area. (Use $\pi = 227$) (2015OD)

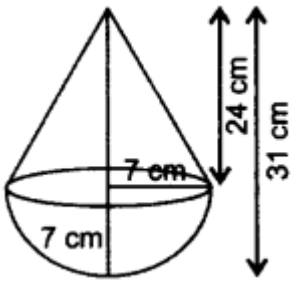
Question 35. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank which is 10 m in diameter and 2 m deep. If the water flows through the pipe at the rate of 4 km per hour, in how much time will the tank be filled completely? (2014D)

Question 36. Water in a canal, 6 m wide and 1.5 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 rrigation? (2014OD)

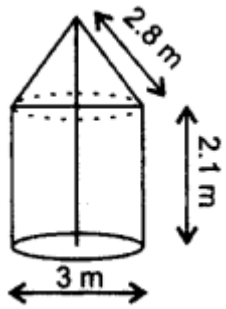
Question 37. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer. (2015OD)

Question 38. 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 ₹30 per litre. [Use $\pi = 227$] (2011OD)

Question 39. A toy is in the form of a cone mounted on a hemisphere of same radius 7 cm. If the total height of the toy is 31 cm, find its total surface area. (Use $\pi = 227$) (2013OD)



Question 40. 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. (Use $\pi = 227$) (2016OD)



Long Answer Questions (4 Marks)

Question 41. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. [Use $\pi = \frac{22}{7}$) (2012D)

Question 42. A hemispherical tank, full of water, is emptied by a pipe at the rate of 257 litres per sec. How much time will it take to empty half the tank if the diameter of the base of the tank is 3 m? (2012OD)

Question 43. 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. (2013D)

Question 44. 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. (2014OD)

Question 45. From a solid cylinder of height 2.8 cm and diameter 4.2 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. (Take $\pi = \frac{22}{7}$) (2014D)

Question 46. Water is flowing at the rate of 2.52 km/hr. 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. (2015D)

Question 47. 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 $\pi = \frac{22}{7}$] (2015OD)

Question 48. 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 $\pi = 3.14$) (2016D)

Question 49. A container shaped like a right circular cylinder having base radius 6 cm and height 15 cm is full of ice-cream. The ice-cream is to be filled into cones of height 12 cm and radius 3 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream. (2012D)

Question 50. 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. (2012OD)

Question 51. 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. (2015D)

Question 52. A tent consists of a frustum of a cone, surmounted by a cone. If the diameter of the upper and lower circular ends of the frustum be 14 m and 26 m respectively, the height of the frustum be 8 m and the slant height of the surmounted conical portion be 12 m, find the area of canvas required to make the tent. (Assume that the radii of the upper circular end of the frustum and the base of surmounted conical portion are equal). (2014OD)

Question 53. 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? (2011OD)

Question 54. Water is flowing at the rate of 10 km/hour through a pipe of diameter 16 cm into a cuboidal tank of dimensions 22 m × 20 m × 16 m. How long will it take to fill the empty tank? [Use $\pi = 227$] (2011OD)

Question 55. 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 $\pi = 227$] (2012OD)

Question 56. 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 10 per 100 cm^2. (Use $\pi = 3.14$) (2013D)

Question 57. 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. (2017OD)

Question 58. Sushant has a vessel, of the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which $\frac{1}{25}$ th of the water in the vessel flows out. Find how many balls were put in the vessel. Sushant made the arrangement so that the water that flows out irrigates the flower beds. (2014D)

Question 59. A 21 m deep well with diameter 6 m is dug and the earth from digging is evenly spread to form a platform 27 m × 11 m. Find the height of the platform. (Use $\pi = 227$] (2015D)

Question 60. The dimensions of a solid iron cuboid are 4.4 m × 2.6 m × 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. (2017OD)

Question 61. In a rain-water harvesting system, the rain water from a roof of 22 m × 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 rainfull in cm. (2017OD)

Question 62. 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 $\pi = 227$) (2012D)

Question 63. Water running in a cylindrical pipe of inner diameter 7 cm, is collected in a container at the rate of 192.5 litres per minute. Find the rate of flow of water in the pipe in km/h. (Use $\pi = 227$) (2013OD)

Question 64. 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 1,500 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. (2016OD)

Question 65.
A container, open at the top and made up of metal sheet is in the form of a frustum of a cone of height 16 cm with diameters of its lower and upper ends as 16 cm and 40 cm respectively. Find the cost of metal sheet used to make the container, if it costs 10 per 100 cm^2. [Take a = 3.14] (2013OD)