Date: 29/9/2021

**Q1.** 2 cubes each of volume 64 cm³ are joined end to end. Find the surface area of the resulting cubiod. (Use π = 22/7)

Q2. 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 4 cm and 2 cm. Find the capacity of the glass. (Use π = 22/7)

Q3. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy. (Use π = 22/7)

Q4. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel. (Use π = 22/7)

Q5. A cone of height 24 cm and radius of base 6 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

Q6. Rasheed got a playing top (*lattu*) as his birthday present, which suprisingly has no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere (see figure). The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area he has to colour. (Take π = $\dfrac{22}{7}$)
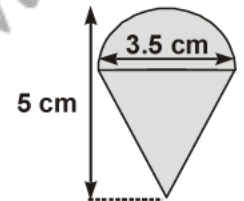
Q7. Selvi's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (an underground tank) which is in the shape of a cuboid. The sump has dimensions 1.57 m × 1.44 m × 95 cm. The overhead tank has its radius 60 cm and height 95 cm. Find the height of the water left in the sump after the overhead tank has been completely filled with water from the sump which had been full. Compare the capacity of the tank with that of the sump. (Use π = 3.14)

Q8. Maynak made a bird-bath for his garden in the shape of a cylinder with a hemispherical depression at one end (see figure). The height of the cylinder is 1.45 m and its radius is 30 cm. Find the total surface area of the bird-bath. (Take π = $\dfrac{22}{7}$)
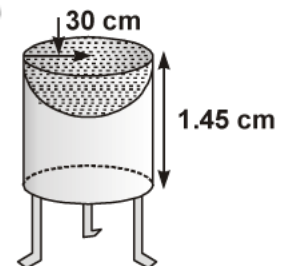
Q9. The decorative block shown in figure is made of two solids – a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block. (Take π = $\dfrac{22}{7}$)
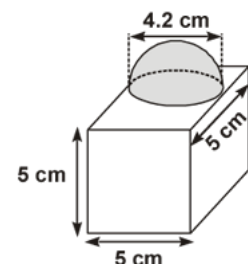
Q10. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet (see figure). The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not mtake into account the handle of the bucket. Also, find the volume of water the bucket can hold. (Take π = $\dfrac{22}{7}$)

Q11. Hanumappa and his wife Gangamma are busy making jaggery out of sugarcane juice. They have processed the sugarcane juice to make the molasses, which is poured into moulds in the shape of a frustum of a cone having the diameters of its two circular faces as 40 cm and 35 cm and the vertical height of the mould is 14 cm (see figure). If each cm³ of molasses has mass about 1.3 g, find the mass of the molasses that can be poured into each mould. (Take $\pi = \dfrac{22}{7}$)
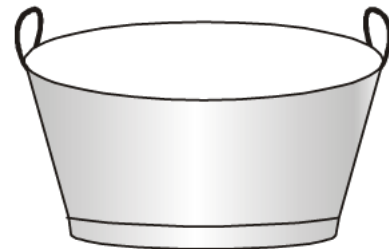

Q12. A hemispherical tank full of water is emptied by a pipe at the rate of $3\dfrac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3 m in diameter? (Take $\pi = \dfrac{22}{7}$)

Q13. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

Q14. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diamter the hemisphere can have? Find the surface area of the solid. (Use $\pi = 22/7$)

Q15. A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter l of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid. (Use $\pi = 22/7$)

Q16. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area. (Use $\pi = 22/7$)
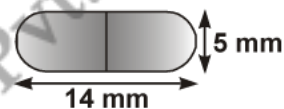
Q17. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π. (Use $\pi = 22/7$)

Q18. 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 per cm³.

Q19. The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum. (Use $\pi = 22/7$)

Q20. Water in a canal, 6 m wide and 1.5 deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed? (Use $\pi = 22/7$)

Q21. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. Thus, bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap. (Use $\pi = 22/7$)

Q22. How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm × 10 cm × 3.5 cm? (Use $\pi = 22/7$)

Q23. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform. (Use $\pi = 22/7$)

Q24. Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere. (Use $\pi = 22/7$)

Q25. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder. (Use $\pi = 22/7$)

Q26. A wooden toy rocket is in the shape of a cone mounted on a cylinder, as shown in figure. The height of the entire rocket is 26 cm, while the height of the conical part is 6 cm. The base of the conical portion diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours. (take π = 3.14)
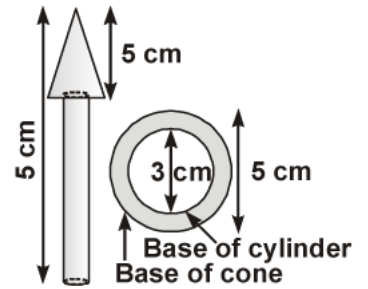

Q27. Shanta runs an industry in a shed which is in the shape of a cubiod surmounted by a half cylinder (see figure). If the base of the shed is of dimension 7 m × 15 m, and the height of the cuboidal portion is 8 m, find the volume of air that the shed can hold. Further, suppose the machinery in the shed occupies a total space of 300 m^3, and there are 20 workers, each of whom occupy about 0.08 m^3 space on an average. Then, how much air is in the shed? (Take π = $\dfrac{22}{7}$)
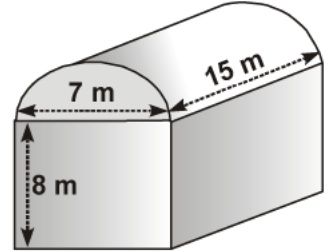

Q28. The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm (see figure). Find its volume, the curved surace area and the total surface area (Take π = $\dfrac{22}{7}$).
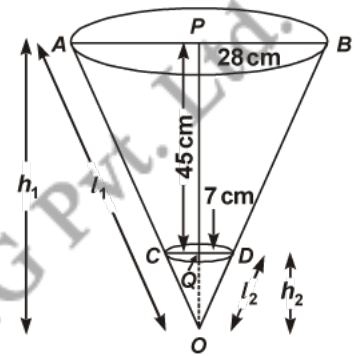

Q29. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volumes of the cylinder and the toy. (Use π = 3.14)
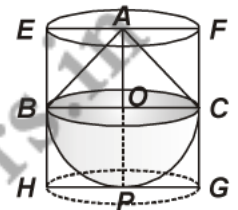
Q30. A juice seller was serving his customers using glasses as shown in figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Use π = 3.14)
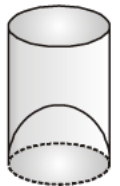
Q31. A *gulab jamun*, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm. (Use π = 22/7)
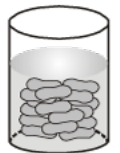

Q32. Rachel, an engineering student, was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model that Rachel made. (Assume the outer and inner dimensions of the model to be nearly the same. (Use π = 22/7)

Q33. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article. (Use π = 22/7)

Q34. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaing solid to the nearest cm^2. (Use π = 22/7)

Q35. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs. 500 per m². (Note that the base of the tent will not be covered with canvas.) (Use π = 22/7)

Q36. A container shaped like a right circular cylinder having diameter 12cm and height 15cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream. (Use π = 22/7)

Q37. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m form an embankment. Find the height of the embankment. (Use π = 22/7)

Q38. A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter, the diameter of the spherical part is 8.5 cm. By measuring the amount of water it holds, a child finds its volume to be 345 cm³. Check whether she is correct, taking the above as the inside measurements, and π = 3.14.

Q39. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm. (Use π = 22/7)

Q40. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm³ of iron has approximately 8 g mass. (Use π = 3.14)

Q41. 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 brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel. (Use π = 22/7)

Q42. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cubiod are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in entire stand. (Use π = 22/7)

Q43. An oil funnel made of tin sheet consists of a 10 cm long cylindrical portion attached to a frustum of a cone. If the total height is 22 cm, diameter of the cylindrical portion is 8 cm and the diameter of the top of the funnel is 18 cm, find the area of the tin sheet required to make the funnel (see figure).

Q44. In one fortnight of a given month, there was a rainfall of 10 cm in river valley. If the area of the valley is 7280 km², show that the total rainfall was approximately equivalent to the addition to the normal water of three rivers each 1072 km long, 75 m wide and 3 m deep.

Q45. A cistern, internally measuring 150 cm × 120 cm × 110 cm, has 129600 cm³ of water in it. Porous bricks are placed in the water until the cistern is full to the brim. Each brick absorbs one-seventeenth of its own volume of water. How many bricks can be put in without overflowing the water, each brick being 22.5 cm × 7.5 cm × 6.5 cm?

Q46. 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 diameter $\frac{1}{16}$ cm, find the length of the wire. (Use π = 22/7)
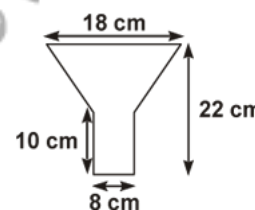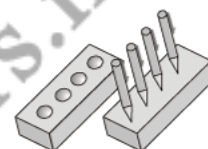
S1. $160\,\text{cm}^2$.

S2. $102\dfrac{2}{3}\,\text{cm}^3$.

S3. $214.5\,\text{cm}^2$.

S4. $572\,\text{cm}^2$.

S5. Radius = 6 cm.

S6. Area to be coloured = $39.6\,\text{cm}^2$.

S7. Height of the water left in the sump after the overhead tank has been completely filled with water = 47.5 cm. Capacity of tank is $\frac{1}{2}$ the capacity of sump.

S8. Total surface area of bird-bath = $3.3\,\text{m}^2$.

S9. Total surface area of block = $163.86\,\text{cm}^2$.

S10. Area of metallic sheet used = $4860.9\,\text{cm}^2$.
Volume of water that the bucket can hold = 33.62 litre (Approx.).

S11. The mass of the molasses that can be poured into each mouled = 13.97 kg = 14 kg (Approx.).

S12. Total time required to empty half of the tank is 16.5 minutes.

S13. Thickness of the wire = $\dfrac{1}{15}$ cm . i.e., 0.67 mm (Approx.)

S14. Greatest diameter = 7 cm, Surface area = $332.5\,\text{cm}^2$.

S15. $\dfrac{1}{4}l^2(\pi + 24)$.

S16. $220\,\text{m}^2$.

S17. $\pi\,\text{cm}^3$.

S18. 1256 cm; 788 g (approx.)

S19. $48\,\text{cm}^2$.

S20. $562500\,\text{m}^2$ or 56.25 hectares.

S21. 36 cm; $12\sqrt{3}$ cm.

S22. 400.

S23. 2.5 m.

S24. 12 cm.

S25. 2.74 cm.

S26. Area to be painted orange = 63.585 cm^2.
Area to be painted yellow = 195.465 cm^2.

S27. Total air in shed = 827.15 m^3.

S28. Volume 48510 cm^3, Curved surace area = 5461.5 cm^2, Total surface area = 8079.5 cm^2.

S29. Required difference = 25.12 cm^3.

S30. Apparent capacity = 196.25 cm^3, Actual capacity = 163.54 cm^3.

S31. 338 cm^3.

S32. 66 cm^3. Volume of the air inside the model = Volume of air inside (cone + cylinder + cone) = $\left(\dfrac{1}{3}\pi r^2 h_1 + \pi r^2 h_2 + \dfrac{1}{3}\pi r^2 h_1\right)$, where r is the radius of the cone and the cylinder, h_1 is the height (length) of the cone and h_2 is the height (length) of the cylinder.

$\therefore$ Required volume = $\dfrac{1}{3}\pi r^2\left(h_1 + 3h_2 + h_1\right)$

S33. 374 cm^2.

S34. 18 cm^2.

S35. 44 m^2, Rs. 22000.

S36. 10.

S37. 1.125 m.

S38. Not correct. Correct answer is 346.51 cm^3.

S39. 1.131 m^3 (approx.)

S40. 892.26 kg.

S41. 100.

S42. 523.53 cm^3.

S43. $782\dfrac{4}{7}$ cm^2.

S44. Try yourself.

S45. 1792.

S46. 7964.4 m.