SURFACE AREA AND VOLUME PYQ

1. A solid is hemispherical at the bottom and conical above (of same radius). If the curved surface areas of the two parts are equal, then the ratio of its radius and the height of the conical part is

(errors-eraser)

2. Assertion (A) : If surface areas of the two spheres are in the ratio 16 : 9, then their volumes are in the ratio 64 : 27.

Reason (R) : If S1 and S2 are the surface areas of two spheres and V1 and V2 are their volumes respectively, then $(V_1/V_2) = (S_1/S_2)^{3/2}$.

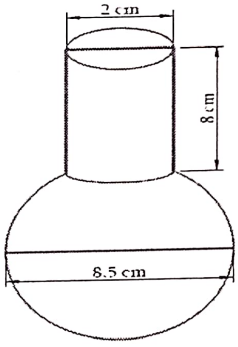
3. From a solid cone, whose height is 16 cm and radius 12 cm, and conical cavity of height 3 cm and base radius 4 cm is hollowed out such that the bases of the cones form concentric circles. Find the total surface area of the remaining solid.

(errors-eraser)

4. If the volume of a sphere of radius R is equal to 16 times the volume of a hemisphere of radius r, then R : r is :

5. Hemispherical depressions are scooped out from two opposite faces of a solid wooden cubical block of side 14 cm. If the diameter of each hemisphere is equal to the side of the cube, find the volume of the remaining solid wooden block.

6. A spherical glass vessel (shown below) has a cylindrical neck, which is 8 cm long and 2 cm wide. The diameter of the spherical part is 8.5 cm. Find the capacity of the glass vessel in mL.



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7. A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 21 cm. Find the cost of electroplating the vessel from inside as well as outside @ ₹ 2.50/cm^2.

8. If the volumes of two spheres are in the ratio 125 : 64, then the ratio of their surface areas is :

(errors-eraser)

9. Two cubes each of volume 64 cm3 are joined end to end to form a cuboid. The total surface area of the resulting cuboid is :

10. Assertion (A) : The volume of a cone of radius 7 cm and height 12 cm is 616 cm^3.
Reason (R) : The volume of a cone is $1/3\pi r^2h$, (where r is radius and h is the height).

11. The radius of sphere is 7/2cm , find it's volume.

(errors-eraser)

12. The height and radius of a right circular cone are 24 cm and 7 cm respectively. The slant height of the cone is

13. A solid is in the form of a cylinder with hemispherical ends of same radii. The total height of the solid is 20 cm and the diameter of the cylinder is 14 cm. Find the total volume and surface area of the solid.

14. A juice glass is cylindrical in shape with hemi-spherical raised up portion at the bottom. The inner diameter of glass is 10 cm and its height is 14 cm. Find the capacity of the glass.

15. Outer surface area of a cylindrical juice glass with radius 7 cm and height 10 cm , is :

16. The total surface area of a solid hemisphere of radius 7 cm is:

17. A textile industry runs in a shed. This shed is in the shape of a cuboid surmounted by a half cylinder. If the base of the industry is of dimensions 14m×20m and the height of the cuboidal portion is 7m, find the volume of air that the industry can hold. Further, suppose the machinery in the industry occupies a total space of 400 m^3. Then, how much space is left in the industry ?

(errors-eraser)

18. From a solid cylinder of height 8cm and radius 6cm, a conical cavity of the same height and same radius is carved out. Find the total surface area of the remaining solid.

19. The total surface area of a cube of side 20 cm is

20. If the volume of a sphere is 11/21 cm^3, then the radius of the sphere is :

21. From a solid cube of side 14 cm, a sphere of maximum diameter is carved out. The radius of sphere is :

22. 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.

(errors-eraser)

23. Two cubes each of volume 125 cm^3 are joined end to end. Find the volume and the surface area of the resulting cuboid.

24. A solid is in the shape of a cone surmounted on a hemisphere with both their diameters being equal to 7 cm and the height of the cone is equal to its radius. Find the volume of the solid.

25. A toy is in the form of a cone of radius 7 cm mounted on a hemisphere of same radius. The total height of the toy is 31 cm. Find the surface area of the toy.

26. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 15 cm and its base is of radius 4·2 cm, then find the total surface area of the article. (errors-eraser)

27. Total surface area (internal and external) of a hemispherical bowl having radii r1 and r2 (r2 > r1) is :

28. Two cubes each of 5 cm edge are joined end to end. The surface area of the resulting cuboid is :

29. A solid hemisphere of radius r is surmounted by a solid cone of same base radius as that of the hemisphere and height equal to its diameter. The volume of this combined solid is :

30. If the volumes of two spheres are in the ratio 125 : 64, then the ratio of their surface areas is : (errors-eraser)

31. 3 cubes each of volume 64 cm^3 are joined end-to-end to form a cuboid. Find the surface area of this cuboid.

32. The great Stupa at Sanchi is one of the oldest stone structures in India which was originally made by Emperor Ashoka. It is basically a big hemispherical dome with a cuboidal structure mounted on it.

Based on the above, answer the following questions :

(i) What is the volume of the hemispherical dome, if its height is 21 m ?

(ii) What is the area of plastic cloth required to cover the hemispherical dome, if radius of its base is 14 m ?

(iii) (a) If the dimensions of the cuboidal top are 8 m × 6 m × 4 m, then what is the surface area of this cuboidal top ? (errors-eraser)

(b) What is the volume of the cuboidal top of dimensions given in part (iii) ?

33. The volume of a cone of radius ' r ' and height ' 3r ' is :

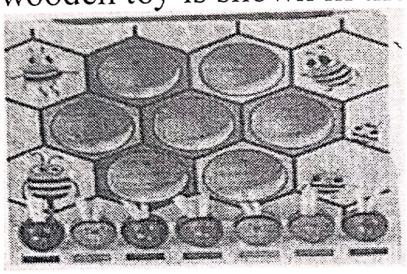
34. A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter. The diameter of the hemispherical bowl is 14 cm and the total height of the vessel is 13 cm . Find the inner surface area of the vessel. Also, find the volume of the vessel.

35. The sum of the radius of the base and the height of a solid cylinder is 37 m. If the total surface area of the cylinder is 1628 sq m, find its volume. (errors-eraser)

36. A heap of rice is in the form of a cone of base diameter 24 m and heght 3.5 m. find the volume of rice. How much canvas cloth is required to cover the heap?

37. A solid is of the form of a cone of radius 'r' surmounted on a hemisphere of the same radius. If the height of the cone is the same as the diameter of its base, then the volume of the solid is :

38. A wooden toy is shown in the picture.



This is a cuboidal wooden block of dimensions 14 cm * 17 cm * 4 cm. On its top there are seven cylindrical hollows for bees to fit in. Each cylindrical hollow is of height 3 cm and radius 2 cm.

Based on the above, answer the following questions :

(i) Find the volume of wood carved out to make one cylindrical hollow.

(ii) Find the lateral surface area of the cuboid to paint it with green colour.

(iii) (a) Find the volume of wood in the remaining cuboid after carving out seven cylindrical hollows. OR (b) Find the surface area of the top surface of the cuboid to be painted yellow.

39. The curved surface area of a cone of radius 7 cm is 550 cm^2. Its slant height is

40. The boilers are used in thermal power plants to store water and then used to produce steam. One such boiler consists of a cylindrical part in middle and two hemispherical parts at its both ends. Length of the cylindrical part is 7m and radius of cylindrical part is 7/2 m. Find the total surface area and the volume of the boiler. Also, find the ratio of the volume of cylindrical part to the volume of one hemispherical part.

41. One such bowl is shown here whose dimensions are : Hemispherical bowl has outer radius 6 cm and inner radius 5 cm. Mallet has height of 10 cm and radius 2 cm.

Based on the above, answer the following questions :

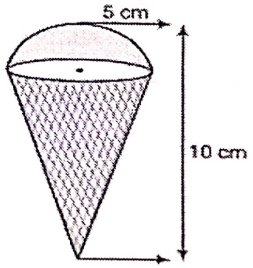
(i) What is the volume of the material used in making the mallet ?

(ii) The bowl is to be polished from inside. Find the inner surface area of the bowl.

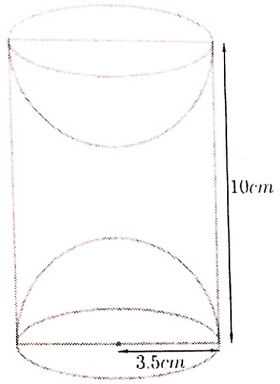
(iii) (a) Find the volume of metal used to make the bowl. 2 OR

(b) Find total surface area of the mallet. (Use = 3·14)

42. An ice-cream filled cone having radius 5 cm and height 10 cm is as shown in the figure. Find the volume of the ice-cream in 7 such cones.



43. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in the figure. If the height of the cylinder is 10 cm and its base of radius is 3.5 cm . Find the total surface area of the article.



44. A solid toy is in the form of a hemisphere surmounted by a right circular cone, the diameter of both is 14 cm and the height of cone is 24 cm. Find the total surface area and the volume of the toy. (errors-eraser)

45. A copper rod of diameter 2 cm length 10 cm is drawn into a wire of uniform thickness and length 10 m. Find the thickness of the wire.

46. Metallic spheres of radii 6cm ,8cm and 10cm respectively, are melted to form a single solid sphere. Find the radius of the resulting sphere.

47. A solid toy is in the form of a hemisphere, surmounted by a right circular cone of the same radius. The height of the cone is 10 cm and the radius is 7 cm. Determine the volume of the toy and also find the area of the colored sheet required to cover the toy. (errors-eraser)

48. A solid toy is in the form of a hemisphere, surmounted by a right circular cone of the same radius. The height of the cone is 2 cm and the radius is 2 cm. Determine the volume of the toy .

49. Ramesh, a farmer, wishes to fence off s rectangular field of given area 1500 m^2. the length of the field lies along a straight river. a wire of length 110 m is required for the fencing assuming that along the river, no fencing is needed for the field. (a) write the perimeter and the area of the rectangular field in terms of 'x' and 'y'. (b) what are the dimensions of the rectangular field? (errors-eraser)

50. A copper rod of diameter 1 cm and length 8 cm is converted into a wire of length 18 m with uniform thickness. Find the thickness of the wire:

51. Three cubes each of volume 216 cm^3 are joined end to end to form a cuboid. Find the total surface area of resulting cuboid.

52. If the total surface area of a solid hemisphere is 462 cm^2, find its volume.

53. A solid metallic sphere of radius 3 cm is melted and recast into the shape of a solid cylinder of radius 2 cm. Find the height of the cylinder. (errors-eraser)

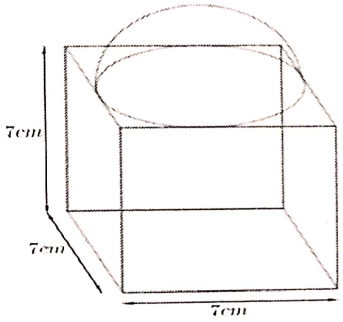
54. A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely. (errors-eraser)

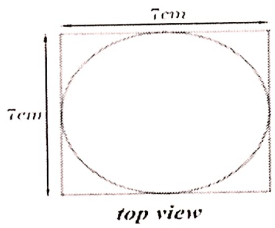
55. From a solid cylinder, whose height is 2·4 cm and diameter 1·4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid.

56. Three cubes, each of edge 8 cm, are joined as shown alongside. Find the total surface area and the volume of the cuboid.

57. A metallic hollow cylindrical pipe has outer and inner radii as 6cm and 4cm respectively. Find the volume of the metal used in the pipe of length of 14cm. (errors-eraser)

58. A cubical block of side 7 cm is surmounted by a hemisphere of largest possible diameter as shown in Figure 1. Find the total surface area of the solid.

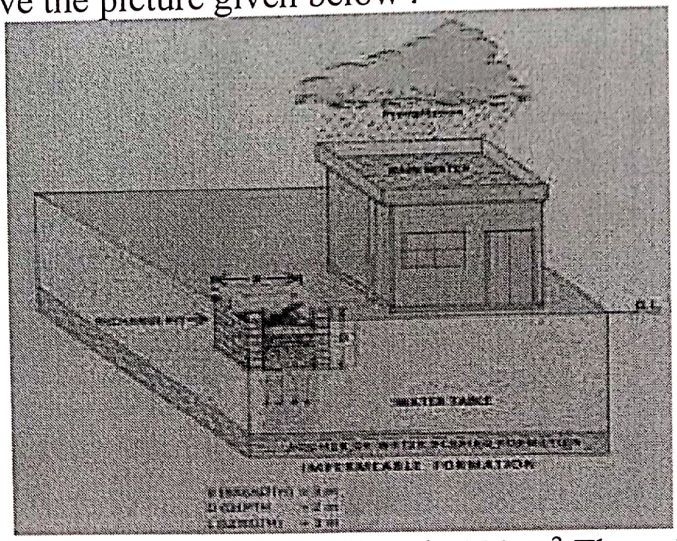




top view

59. How many solid cones of height 3 cm and radius 2 cm can be formed by melting a solid sphere of radius 3 cm ? (errors-eraser)

60. The technique of Rainwater harvesting through Recharge pit is very useful. Rainwater is collected on the roof and then flowing through the Recharge pit it goes to the ground. Observe the picture given below :



(errors-eraser)

The surface area of the roof floor is 100 m^2.The cuboidal pit measures 3 m * 3 m * 2 m.

(a) Water standing on the roof is released into the cuboidal pit. If the cuboidal pit is filled completely by the roof water, then find the height of standing water on the roof.

(b) Instead of a cuboidal pit, if a cylindrical pit with diameter 3 m and height 2 m had been built, then which tank would hold more water ?

61. Find the curved surface area of a right circular cone whose slant height is 10 cm and base radius is 7 cm.

62. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π. (errors-eraser)

63. To make the teaching learning process easier, creative and innovative, a teacher brings clay in the classroom to teach the topic of mensuration. She forms a cylinder of radius 6 cm and height 8 cm with the clay. Later on, she reshaped the same into a sphere.

Based on the above, answer the following :

(a) Find the radius of the sphere.

(b) Find the ratio of the total surface area of the cylinder to the surface area of the sphere. (errors-eraser)

64. A solid metallic sphere of radius 10·5 cm is melted and recast into a number of smaller cones, each of radius 3·5 cm and height 3 cm. Find the number of cones so formed.

65. From a solid cylinder of height 30 cm and radius 7 cm, a conical cavity of height 24 cm and same radius is hollowed out. Find the total surface area of the remaining solid.

66. Water in a canal, 8 m wide and 6 m deep, is flowing with a speed of 12 km/hour. How much area will it irrigate in one hour, if 0·05 m of standing water is required ? (errors-eraser)

67. A cone of height 28 cm and radius of base 7 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

68. from a solid cube of side 7 cm, a cylinder of radius 2·1 cm and height 7 cm is scooped out. Find the total surface area of the remaining solid.

69. A well of diameter 5 m is dug 24 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. (errors-eraser)

70. A circus is a company of performers who put on shows of acrobats, clowns eic, to entertain people tarted amound 250 years hack in open fields, now oeneraily performed in tents

One such 'eucus tent' is shown below

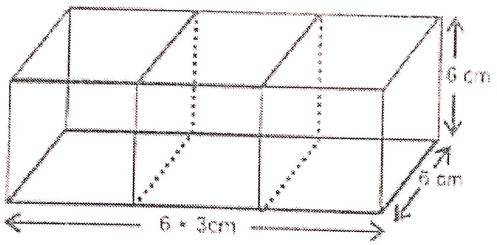
The tent is it the shape of a cylinder surmounted by a conical top. If the height and diameter of cylindrical part are 9 m and 30 m respectively and height of conical part is 8 m with same diameter as that of the cylindrieal part. then find (i) Slant height of conical part. (ii) The area of the canvas used in making the tent. (iii) The cost of the canvas bought for the ient at the rate Rs. 200 per 54.m. if 30 sy m canvas was wasted during stitching.

OR The volume of air in the tent. (errors-eraser)

71. A solid piece of metal in the form of a cuboid of dimensions 11 cm×7 cm×7 cm is melted to form ' n ' number of solid spheres of radii 7/2 cm each. Find the value of n.

72. 150 spherical marbles, each of diameter 1·4 cm, are dropped in a cylindrical vessel of diameter 7 cm containing some water, and are completely immersed in water. Find the rise in the level of water in the cylindrical vessel. (errors-eraser)

73. Three cubes of side 6 cm each, are joined as shown in Figure 1. Find the total surface area of the resulting cuboid.



74. The curved surface area of right circular cylinder is 176 sqm and its volume is 1232 cubic m then the radius of cylinder is : (a) 14 m (b) 7 m (c) 2 m (d) 1066 m
(errors-eraser)

75. The largest sphere is carved out of a cube of side 7 cm . The volume of the sphere is :

76. How many spherical shots each having diameter 3 cm can be made by melting a cuboidal solid of dimensions 18 cm * 22 cm * 6 cm ?

77. The radius of the base and the height of a solid right circular cylinder are in the ratio 2 : 3 and its volume is 1617 cm^3. Find the total surface area of the cylinder. (errors-eraser)

78. A room is in the form of cylinder surmounted by a hemi-spherical dome. The base radius of hemisphere is one-half the height of cylindrical part. Find total height of the room if it contains (1408/21)m^3 of air.

79. An empty cone of radius 3 cm and height 12 cm is filled with ice-cream such that the lower part of the cone, which is 1/6 of the volume of the cone, is unfilled (empty), but a hemisphere is formed on the top. Find the volume of the ice cream.

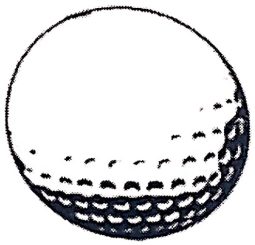
80. In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21 cm.
Based on the above, answer the following questions : (errors-eraser)
(i) Find the area of the base of the cylindrical cup.
(ii) (a) What is the capacity of the hemispherical cup ? OR (ii) (b) Find the capacity of the cylindrical cup.
(iii) What is the curved surface area of the cylindrical cup ?

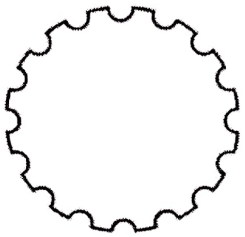
81. If the area of the base of a cone is 51 cm^2 and its volume is 85 cm^3, then the vertical height of the cone is given as :

82. A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model. (errors - eraser)

83. From a solid cylinder of height 20 cm and diameter 12 cm, a conical cavity of height 8 cm and radius 6 cm is hallowed out. Find the total surface area of the remaining solid.

84. A golf ball is spherical with about 300-500 dimples that help increase its velocity while in play. Golf balls are traditionally white but available in colours also. (errors - eraser)





In the given figure, a golf ball has diameter 4·2 cm and the surface has 315 dimples (hemispherical) of radius 2 mm.

Based on the above, answer the following questions :

(i) Find the surface area of one such dimple.

(ii) Find the volume of the material dug out to make one dimple.

(iii) (a) Find the total surface area exposed to the surroundings. OR

(b) Find the volume of the golf ball.

85. The volume of a right circular cone whose area of the base is 156 cm^2 and the vertical height is 8 cm , is (errors - eraser)

86. A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them being 3.5 cm and the height of the solid is 9.5 cm. Find the volume of the solid.

87. From a solid cone, whose height is 16 cm and radius of base is 12 cm, a right circular cylindrical cavity of height 3 cm and radius 4 cm is hollowed out such that bases of cone and cylinder form concentric circles. Find the volume of the remaining solid.

88. A hemispherical depression is cut off from one face of a cubical wooden block such that the diameter 14 cm of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid. (errors - eraser)

89. A tent is in the shape of a right circular cylinder up to a height of 3 m and then a right circular cone, with a maximum height of 13·5 m above the ground. Calculate the cost of painting the inner side of the tent at the rate of 2 per square meter , if the radius of the base is 14 m. (errors - eraser)

90. A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere of same radius. If the radius of the hemisphere is 4·2 cm and the total height of the toy is 10·2 cm, find the volume of the wooden toy. Also, find the total surface area of the toy.

91. A hemispherical bowl is made of steel of thickness 1 cm. The inner radius of the bowl is 5 cm. The volume of steel used (in cm^3) is :

92. The interior of a building is in the form of a cylinder of base radius 12 m and height 3×5 m surmounted by a cone of equal base and slant height 14 m. Find the internal curved surface area of the building.

(errors - eraser)

93. Determine the ratio of the volume of a cube to that of the sphere which will exactly fit inside the cube.