

SATISH CHANDRA MEMORIAL SCHOOL

SURFACE AREA AND VOLUME

EXTRA QUESTIONS

ASSERTION AND REASON

1. **Assertion:** If diameter of a sphere is decreased by 25%, then its curved surface area is decreased by 43.75%.

Reason : Curved surface area is increased when diameter decreases

- a) both Assertion and reason are correct and reason is correct explanation for Assertion
- b) both Assertion and reason are correct but reason is not correct explanation for Assertion
- c) Assertion is correct but reason is false
- d) both Assertions and reason are false

2. Assertion: The volume and surface Area of a sphere are related to each other by radius.

Reason : Relation between Surface Area S and Volume V is ' $S^3 = 36 \pi V^2$ '.

3. Assertion: The external dimensions of a wooden box are 18 cm, 10 cm and 6 cm respectively and thickness of the wood is 15 mm, then the internal volume is 765 cm³.

Reason : If external dimensions of a rectangular box be l, b and h and the thickness of its sides be x , then its internal volume is (l – 2x) (b – 2x) (h – 2x)

4. Assertion: The radius of a cylinder is doubled and its height remaining same. Then its volume will be increased four times.

Reason (R): Volume of the cylinder is $\pi r^2 h$ where, r = radius of base and h = height of the cylinder.

5. Assertion: The surface area of a sphere is 2464 . Then its volume is 11498(2/3)cm³

Reason (R): The volume of a sphere of radius (4/3) πr^3 is , and total surface area is $4\pi r^2$

6. Assertion: Volume of sphere= $\frac{4}{3}\pi r^3$ and surface area of sphere= $4\pi r^2$

Reason: if the volume of two sphere are in the ratio 27:8 then the surface area are in the ratio 3:2

7. Assertion: total surface area of cylinder having radius of the base 14 cm and height 30 cm is 3872 cm²

Reason: If r be the radius and h be the height of the cylinder then the total surface area= ($2\pi rh + 2\pi r^2$)

8. Assertion: if r be the radius and h be the slant height of cone then the slant height = $\sqrt{h^2 + r^2}$

Reason: if the height of cone is 24 cm and diameter of base is 14cm then the slant height of cone is 15 cm

9. Assertion: total surface area of cuboid is 2(lb+bh+lh)

Reason: two identical solid cube of side 5 cm are joined end to end then the total surface area of the resulting cuboid is 300 cm²

10. Assertion: volumes of cone = $\frac{1}{3}\pi r^2 h$

Reason: The radii of two cone are in the ratio 2:3 and their volumes in the ratio 1:3 then the ratio of their height is 3:2

11. Assertion: If a ball is in the shape of a sphere has a surface area of 221.76cm^2 then it's diameter is 8.4 cm

Reason: If the radius of the sphere be r then the surface area, $S = 4\pi r^2$

12. Assertion: The number of coins 1.75 cm in diameter and 2mm thick is formed from a melted cuboid $10\text{cm} \times 5.5\text{cm} \times 3.5\text{cm}$ is 400

Reason: Volume of cylinder = $\pi r^2 h$ cubic units and area of cuboid = $(l \times b \times h)$ cubic units

13. Assertion: Number of spherical balls that can be made out of a solid cube lead whose edge 44 cm each ball being 4 cm in diameter is 2541

Reason: Number of balls = volume of one ball/ volume of lead

14. Assertion: volume of sphere = $(4/3)\pi r^3$ and it's surface area $4\pi r^2$

Reason: if the volumes of two spheres are in the ratio 27:8 then their surface area are in ratio 9:4

15. Assertion: Total surface area of hemisphere is $3\pi r^2$

Reason: The outer surface of solid hemisphere of radius 7cm is to be painted the total cost of painting at the rate of Rs 5 per cm^2 is Rs 2300

16. Assertion: Two circular cylinder of equal volumes have their height in the ratio 1:2 then ratio of their radii is $\sqrt{2}:1$

Reason: Relation between the height and radius of volume is inversely proportional.

17. Assertion: the volume of a solid is defined as the space occupied by the solid shape in 3-dimensional region

Reason: the amount of water the glass can hold is called volume of glass

18. Assertion: in a cylinder radius is doubled and height is halved curved surface area will be same

Reason: curved surface area of cylinder = $2\pi RH$

19. Assertion: If a ball shape of a sphere has surface area 221.76cm^2 then it's diameter is 8.4cm

Reason: if the radius of sphere be r then the surface area , $S = 4\pi r^2$

20. Assertion: 220cm^2 the curved surface area of a right circular cone whose slant height is 10 cm and base radius is 7 cm.

Reason: Curved surface area = πrl

CASE STUDY

1. Singing bowls (hemispherical in shape) are commonly used in sound healing practices. Mallet (cylindrical in shape) is used to strike the bowl in a sequence to produce sound and vibration.



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.

(OR)

- b) Find total surface area of the mallet. (Use $\pi = 3.14$)

2. A wooden toy is shown in the picture. This is a cuboidal wooden block of dimensions 14 cm $\times$ 17 cm $\times$ 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.



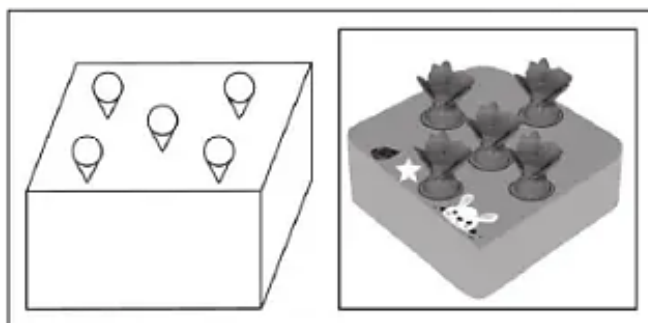
Based on the above, answer the following questions :

- i) Find the volume of wood carved out to make one cylindrical hollow. [1M]
- ii) Find the lateral surface area of the cuboid to paint it with green colour. [1M]
- iii) a) Find the volume of wood in the remaining cuboid after carving out seven cylindrical hollows. [2M]

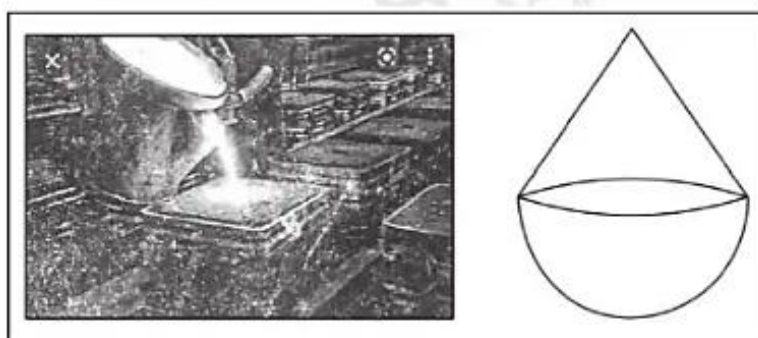
(OR)

- b) Find the surface area of the top surface of the cuboid to be painted yellow. [2M]

3. A solid cuboidal toy is made of wood. It has five cone shaped cavities to hold toy carrots. The dimensions of the toy are cuboid – $10\text{ cm} \times 10\text{ cm} \times 8\text{ cm}$. Each cone carved out – Radius = 2.1 cm and Height = 6



- i) Find the volume of wood carved out to make five conical cavities. [2]
 - ii) Find the volume of the wood in the final product. [2]
4. A company deals in casting and moulding of metal on orders received from its clients.



In one such order, company is supposed to make 50 toys in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of hemisphere. If the radius of the base of the cone is 21 cm and height is 28 cm ,

- a) Find the volume of 50 toys
 - b) Find the ratio of the volume of hemisphere to the volume of cone.
5. John planned a birthday party for his younger sister with his friends. They decided to make some birthday caps by themselves and to buy a cake from a bakery shop. For these two items, they decided the following dimensions :
- Cake :** Cylindrical shape with diameter 24 cm and height 14 cm .
- Cap :** Conical shape with base circumference 44 cm and height 24 cm .

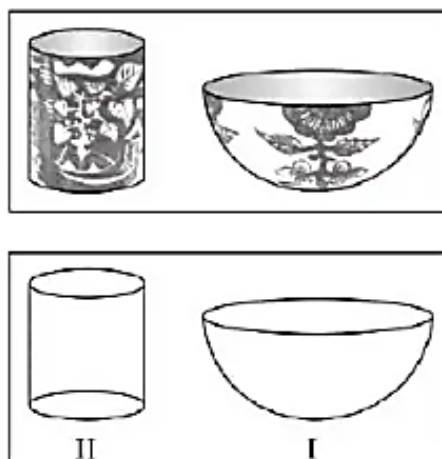


Based on the above information, answer the following questions :

- a) How many square cm paper would be used to make 4 such caps ?
- b) The bakery shop sells cakes by weight (0.5 kg , 1 kg , 1.5 kg , etc.). To have the required dimensions, how much cake should they order, if 650 cm^3 equals 100 g of cake ?

6. Khurja is a city in the Indian state of Uttar Pradesh famous for the pottery. Khurja pottery is traditional Indian pottery work which has attracted Indians as well as foreigners with a variety of tea - sets, crockery and ceramic tile works. A huge portion of the ceramics used in the country is supplied by Khurja and is also referred as "The Ceramic Town".

One of the private schools of Bulandshahr organised an Educational Tour for class 10 students to Khurja. Students were very excited about the trip. Following are the few pottery objects of Khurja.



Students found the shapes of the objects very interesting and they could easily relate them with mathematical shapes viz sphere, hemisphere, cylinder etc. Maths teacher who was accompanying the students asked following questions :

- The internal radius of hemispherical bowl (filled completely with water in I is 9 cm and radius and height of cylindrical jar in II is 1.5 cm and 4 cm respectively. If the hemispherical bowl is to be emptied in cylindrical jars, then how many cylindrical jars are required?
- If in the cylindrical jar full of water, a conical funnel of same height and same diameter is immersed, then how much water will flow out of the jar?