

CBSE CLASS X

Mathematics Standard (041)

QUESTION PAPER

From previous CBSE Board Exam questions

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Questions: 59

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SELECTIONS USED

Source	Previous-year board
Subject	Mathematics
Lessons	Surface Areas and Volumes
Year	2022-2026
Questions selected	59

Composition — Types: 19 MCQ · 12 Long · 11 Case-based · 10 Short · 4 Very short · 3 Assertion–reason

Q1. § 12.3 Volume of a Combination of Solids

[3]

The difference between the outer and inner radii of a hollow right circular cylinder of length 14 cm is 1 cm. If the volume of the metal used in making the cylinder is 176 cm^3 , find the outer and inner radii of the cylinder.

Previously asked in: 2024 30/1/1 Q31

◆ Surface Areas and Volumes

Volume of a Hollow Cylinder

Q2. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids

[4]

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 :

- (a) 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 ? [2]
- (b) 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 ? [2]

Previously asked in: 2022 30/4/1 Q14

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q3. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary [2]

A solid piece of metal in the form of a cuboid of dimensions $11 \text{ cm} \times 7 \text{ cm} \times 7 \text{ cm}$ is melted to form 'n' number of solid spheres of radii $\frac{7}{2} \text{ cm}$ each. Find the value of n .

Previously asked in: 2022 30/2/1 Q3

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q4. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary [5]

A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them being 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid.

Previously asked in: 2023 30/6/1 Q33

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q5. § 12.2 Surface Area of a Combination of Solids [3]

An empty cone is of radius 3 cm and height 12 cm. Ice-cream is filled in it so that lower part of the cone which is $\left(\frac{1}{6}\right)^{th}$ of the volume of the cone is unfilled but hemisphere is formed on the top. Find volume of the ice-cream. (Take $\pi = 3.14$)

Previously asked in: 2023 30/1/1 Q31(b) (OR-2)

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q6. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary [1]

If a cone of greatest possible volume is hollowed out from a solid wooden cylinder, then the ratio of the volume of remaining wood to the volume of cone hollowed out is

- A 1 : 1
- B 1 : 3
- C 2 : 1
- D 3 : 1

Previously asked in: 2025 30/6/1 Q14

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q7. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary [1]

A cone of height 12 cm and slant height 13 cm is surmounted on a hemisphere having radius equal to that of cone. The entire height of the solid is

- A 17 cm
- B 18 cm
- C 22 cm
- D 23 cm

Previously asked in: 2025 30/5/1 Q15

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q8. § 12.4 Summary [1]

A cone of maximum size is carved out from a solid cube of edge length l . The volume of the cone is :

- A $\frac{\pi l^3}{12}$
- B $\frac{\pi l^3}{3}$
- C $l^3 \left(1 - \frac{\pi}{3}\right)$
- D $\frac{\pi l^3}{8}$

Previously asked in: 2026 30/3/1 Q7

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q9. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary [1]

A hemispherical bowl is made of steel of thickness 1 cm. The outer radius of the bowl is 6 cm. The volume of steel used (in cm^3) is :

- A 182π
- B $\frac{182}{3}\pi$
- C $\frac{682}{3}\pi$
- D $\frac{364}{3}\pi$

Previously asked in: 2026 30/2/1 Q16

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q10. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary [3]

A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid. (Use $\pi = \frac{22}{7}$)

Previously asked in: 2026 30/1/1 Q30

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q11. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary [2]

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.

Previously asked in: 2022 30/3/1 Q4(a) (OR-1)

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q12. § 12.3 Volume of a Combination of Solids [4]

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?

Previously asked in: 2022 30/1/1 Q11(b) (OR-2)

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q13. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary [2]

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.

Previously asked in: 2022 30/1/1 Q2

◆ Surface Areas and Volumes 12.3 Volume of a Combination of Solids

Q14. § 12.3 Volume of a Combination of Solids [1]

Water in a river which is 3 m deep and 40 m wide is flowing at the rate of 2 km/h. How much water will fall into the sea in 2 minutes ?

- (a) 800 m^3
- (b) 4000 m^3
- (c) 8000 m^3
- (d) 2000 m^3

Previously asked in: 2023 30/5/1 Q9

◆ Surface Areas and Volumes Volume of water flow (rate problems using cuboid/prism volume)

Q15. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[5]**

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.

Previously asked in: 2023 30/4/1 Q34

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q16. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[5]**

A solid iron pole consists of a solid cylinder of height 200 cm and base diameter 28 cm, which is surmounted by another cylinder of height 50 cm and radius 7 cm. Find the mass of the pole, given that 1 cm³ of iron has approximately 8 g mass.

Previously asked in: 2024 30/3/1 Q35(a) (OR-1)

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q17. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[5]**

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.

Previously asked in: 2025 30/3/1 Q35

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q18. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[3]**

A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains $\frac{1408}{21}$ m³ of air, find the height of the cylindrical part. (Use $\pi = \frac{22}{7}$).

Previously asked in: 2025 30/1/1 Q30

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q19. § 12.2 Surface Area of a Combination of Solids**[1]**

An ice-cream cone of radius r and height h is completely filled by two spherical scoops of ice-cream. If radius of each spherical scoop is $\frac{r}{2}$, then $h : 2r$ equals

- A 1 : 8
- B 1 : 2
- C 1 : 1
- D 2 : 1

Previously asked in: 2026 30/4/1 Q16

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q20. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[1]**

Three tennis balls are just packed in a cylindrical jar. If radius of each ball is r , volume of air inside the jar is

- A $2\pi r^3$
- B $3\pi r^3$
- C $5\pi r^3$
- D $4\pi r^3$

Previously asked in: 2026 30/4/1 Q13

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Q21. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

The volume of the largest right circular cone that can be carved out from a solid cube of edge 2 cm is :

- (a) $\frac{4\pi}{3}$ cu cm
- (b) $\frac{5\pi}{3}$ cu cm
- (c) $\frac{8\pi}{3}$ cu cm
- (d) $\frac{2\pi}{3}$ cu cm

Previously asked in: 2024 30/1/1 Q15

◆ Surface Areas and Volumes

Largest cone carved from a cube

Q22. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

A solid sphere is cut into two hemispheres. The ratio of the surface areas of sphere to that of two hemispheres taken together, is :

- (a) 1 : 1
- (b) 1 : 4
- (c) 2 : 3
- (d) 3 : 2

Previously asked in: 2024 30/1/1 Q13

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q23. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

A wall mounted lamp, made of fabric, is shown below. Lamp has cuboidal shape, open from top and bottom. A spherical bulb of diameter 7 cm is latched with a very thin rod. (Ignore the rod while making calculations.) Dimensions of the cuboid are 24 cm × 12 cm × 17 cm.

Based on the above information, answer the following questions:

- (i) Find the surface area of the bulb. [1]
- (ii) What could be the maximum diameter of the bulb if at least 1 cm space is left from each side? [1]
- (iii) Find the area of the fabric used if there is a fold of 2 cm on top and bottom edges. OR Find the space available inside the lamp. [2]

Previously asked in: 2026 30/5/1 Q37

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q24. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[1]**

A camping tent in hemispherical shape of radius 1.4 m, has a door opening of area 0.50 m². Outer surface area of the tent is

- (A) 11.78 m²
- (B) 12.32 m²
- (C) 11.82 m²
- (D) 12.86 m²

Previously asked in: 2026 30/5/1 Q12

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q25. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

A conical cavity of maximum volume is carved out from a wooden solid hemisphere of radius 10 cm. Curved surface area of the cavity carved out is (use $\pi = 3.14$)

- (A) $314\sqrt{2} \text{ cm}^2$
 (B) 314 cm^2
 (C) $\frac{3140}{3} \text{ cm}^2$
 (D) $3140\sqrt{2} \text{ cm}^2$

Previously asked in: 2026 30/5/1 Q7

◆ Surface Areas and Volumes

Curved surface area of cone carved from hemisphere

Q26. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[2]**

The largest sphere is carved out of a solid cube of side 21 cm. Find the volume of the sphere.

Previously asked in: 2022 30/4/1 Q6(b)

◆ Surface Areas and Volumes

Volume of a Sphere Carved from a Cube

Q27. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[2]**

The curved surface area of a right circular cylinder is 176 sq cm and its volume is 1232 cu cm. What is the height of the cylinder ?

Previously asked in: 2022 30/4/1 Q6(a)

◆ Surface Areas and Volumes

Curved Surface Area and Volume of a Right Circular Cylinder

Q28. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

A 'circus' is a company of performers who put on shows of acrobats, clowns etc. to entertain people started around 250 years back, in open fields, now generally performed in tents. One such 'Circus Tent' is shown below. The tent is in 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 cylindrical part.

Case Study - 2 : The tent is in 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 cylindrical part, then find:

- (1) the area of the canvas used in making the tent; [3]
- (2) the cost of the canvas bought for the tent at the rate ₹ 200 per sq m, if 30 sq m canvas was wasted during stitching. [1]

Previously asked in: 2022 30/2/1 Q14

◆ Surface Areas and Volumes

Cost Estimation using Surface Area

Surface Area of Combined Solids (Cylinder + Cone)

Q29. § 12.4 Summary**[1]**

The volume of a right circular cone whose area of the base is 156 cm^2 and the vertical height is 8 cm, is

- A 2496 cm^3
 B 1248 cm^3
 C 1664 cm^3
 D 416 cm^3

Previously asked in: 2023 30/6/1 Q12

◆ Surface Areas and Volumes

Volume of a Cone

Q30. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[3]**

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 $\left(\frac{1408}{21}\right) \text{ m}^3$ of air. (Take $\pi = \frac{22}{7}$)

Previously asked in: 2023 30/1/1 Q31(a) (OR-1)

♦ Surface Areas and Volumes

Volume of combined solids (cylinder surmounted by hemisphere)

Q31. § 12.4 Summary**[1]**

The curved surface area of a cone having height 24 cm and radius 7 cm, is

- A 528 cm²
- B 1056 cm²
- C 550 cm²
- D 500 cm²

Previously asked in: 2023 30/1/1 Q12

♦ Surface Areas and Volumes

Curved Surface Area of a Cone

Q32. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

Curved surface area of a cylinder of height 5 cm is 94.2 cm². Radius of the cylinder is (Take $\pi = 3.14$)

- A 2 cm
- B 3 cm
- C 2.9 cm
- D 6 cm

Previously asked in: 2023 30/1/1 Q10

♦ Surface Areas and Volumes

Curved Surface Area of a Cylinder

Q33. § 12.4 Summary**[5]**

From one face of a solid cube of side 14 cm, the largest possible cone is carved out. Find the volume and surface area of the remaining solid. (Use $\pi = \frac{22}{7}$, $\sqrt{5} = 2.2$)

Previously asked in: 2025 30/6/1 Q34

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q34. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[5]**

From a solid cylinder of height 24 cm and radius 5 cm, two cones of height 12 cm and radius 5 cm are hollowed out. Find the volume and surface area of the remaining solid.

Previously asked in: 2025 30/5/1 Q34(b)

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q35. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[5]**

From one of the faces of a solid wooden cube of side 14 cm, maximum number of hemispheres of diameter 1.4 cm are scooped out. Find the total number of hemispheres that can be scooped out. Also, find the total surface area of the remaining solid.

Previously asked in: 2025 30/5/1 Q34(a)

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q36. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[5]**

A wooden cubical die is formed by forming hemispherical depressions on each face of the cube such that face 1 has one depression, face 2 has two depressions and so on. The sum of number of hemispherical depressions on opposite faces is always 7. If the edge of the cubical die measures 5 cm and each hemispherical depression is of diameter 1.4 cm, find the total surface area of the die so formed.

Previously asked in: 2025 30/4/1 Q34

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q37. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

On the top face of the wooden cube of side 7 cm, hemispherical depressions of radius 0.35 cm are to be formed by taking out the wood. The maximum number of depressions that can be formed is :

- (a) 400
- (b) 100
- (c) 20
- (d) 10

Previously asked in: 2025 30/4/1 Q11

♦ Surface Areas and Volumes

Maximum number of hemispherical depressions on a cube face

Q38. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

A model of Leafy Ball Fountain is made to be kept on the tabletop. Water gently cascades down the ball into a decorative cylindrical pool where it is recycled. The diameter of spherical ball is 21 cm. Cylindrical pool – Outer diameter is 50 cm and inner diameter is 40 cm. Height of solid base is 14 cm. Height of water filled is 7 cm.

Observe the figure and answer the following questions:

- (i) Determine the total height of the fountain. [1]
- (ii) Find the volume of the ball. [1]
- (iii) If one-third of the ball is submerged in the water, find the volume of the water filled in the pool. [2]

Previously asked in: 2026 30/3/1 Q38

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q39. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[2]**

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

Previously asked in: 2026 30/3/1 Q25

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q40. § 12.4 Summary**[4]**

On a Sunday your parents took you to a fair. You could see lot of toys displayed and you wanted them to buy a Rubik's cube and a strawberry ice-cream for you.

Based on the information given above, answer the following questions :

- (i) Find the length of the diagonal of Rubik's cube if each edge measures 6 cm. [1]
- (ii) Find the volume of Rubik's cube if the length of the edge is 7 cm. [1]
- (iii) What is the curved surface area of hemisphere (ice-cream) if the base radius is 7 cm ? [2]

Previously asked in: 2026 30/2/1 Q38

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Diagonal of a Cube

Volume of a Cube

Q41. § 12.4 Summary**[1]**

Assertion (A) : The surface area of the cuboid formed by joining two cubes of sides 4 cm each, end-to-end, is 160 cm^2 .

Reason (R): The surface area of a cuboid of dimensions $l \times b \times h$ is $(lb + bh + hl)$.

Select the correct answer from the options (A), (B), (C) and (D).

- A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- C Assertion (A) is true, but Reason (R) is false.
- D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 30/2/1 Q19

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q42. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

The total surface area of a solid hemisphere of diameter ' $2d$ ' is :

- (a) $3\pi d^2$
- (b) $2\pi d^2$
- (c) $\frac{1}{2}\pi d^2$
- (d) $\frac{3}{4}\pi d^2$

Previously asked in: 2026 30/1/1 Q16

◆ Surface Areas and Volumes

Total Surface Area of a Hemisphere

Q43. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

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? [2]
- (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? [2]

Previously asked in: 2022 30/3/1 Q14

◆ Surface Areas and Volumes

12.3 Volume of a Combination of Solids

Curved Surface Area of a Cone (making conical caps)

Q44. § 12.4 Summary**[2]**

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

Previously asked in: 2022 30/3/1 Q4(b) (OR-2)

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q45. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

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.

Previously asked in: 2022 30/1/1 Q11(a) (OR-1)

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q46. § 12.4 Summary**[4]**

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. In the given figure, a golf ball has diameter 4.2 cm and the surface has 315 dimples (hemi-spherical) of radius 2 mm.

Based on the above, answer the following questions :

- (i) Find the surface area of one such dimple. [1]
- (ii) Find the volume of the material dug out to make one dimple. [1]
- (iii) Find the total surface area exposed to the surroundings. OR Find the volume of the golf ball. [2]

Previously asked in: 2023 30/5/1 Q36

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q47. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[4]**

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:

- (i) Find the area of the base of the cylindrical cup. [1]
- (ii) What is the capacity of the hemispherical cup? [2]
- (iii) What is the curved surface area of the cylindrical cup? [1]

Previously asked in: 2023 30/2/1 Q37

♦ Surface Areas and Volumes

Area of base of a cylinder (πr^2)Curved Surface Area of a cylinder ($2\pi rh$)Volume (capacity) of a hemisphere ($\frac{2}{3}\pi r^3$)**Q48.** § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

The total surface area of a solid hemisphere whose diameter is d is:

- (a) $3\pi d^2$
- (b) $2\pi d^2$
- (c) $\frac{1}{2}\pi d^2$
- (d) $\frac{3}{4}\pi d^2$

Previously asked in: 2023 30/2/1 Q10

♦ Surface Areas and Volumes

Total Surface Area of a Hemisphere

Q49. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[5]**

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 5.8 cm and its base is of radius 2.1 cm, find the total surface area of the article.

Previously asked in: 2024 30/5/1 Q35

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q50. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids**[4]**

Tamper-proof tetra-packed milk guarantees both freshness and security. This milk ensures uncompromised quality, preserving the nutritional values within and making it a reliable choice for health-conscious individuals.

500 mL milk is packed in a cuboidal container of dimensions 15 cm × 8 cm × 5 cm. These milk packets are then packed in cuboidal cartons of dimensions 30 cm × 32 cm × 15 cm.

Based on the above given information, answer the following questions :

- (i) Find the volume of the cuboidal carton. [1]
- (ii) Find the total surface area of a milk packet. OR How many milk packets can be filled in a carton ? [2]
- (iii) How much milk can the cup (as shown in the figure) hold ? [1]

Previously asked in: 2024 30/4/1 Q38

◆ Surface Areas and Volumes

Packing / Number of Containers Problem

Total Surface Area of a Cuboid

Volume of a Combination of Solids (Cup)

Volume of a Cuboid

Q51. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[1]**

The ratio of total surface area of a solid hemisphere to the square of its radius is :

- A $2\pi : 1$
- B $4\pi : 1$
- C $3\pi : 1$
- D $1 : 4\pi$

Previously asked in: 2024 30/4/1 Q9

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q52. § 12.2 Surface Area of a Combination of Solids § 12.4 Summary**[5]**

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 4 mm, find its surface area. Also, find its volume.

Previously asked in: 2024 30/3/1 Q35(b) (OR-2)

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q53. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[4]**

The word 'circus' has the same root as 'circle'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd.

A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.

The word 'circus' has the same root as 'circle'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd. A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m. Based on the above, answer the following questions:

- (i) Find slant height of the conical part. [1]
- (ii) Determine the floor area of the tent. [1]
- (iii) Find area of the cloth used for making tent. OR Find total volume of air inside an empty tent. [2]

Previously asked in: 2024 30/2/1 Q37

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Volume of a Combination of Solids

Q54. § 12.4 Summary**[1]**

****Assertion (A):**** Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2 .

****Reason (R):**** Area of each surface of a cube of side 10 cm is 100 cm^2 .

- (A) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
- (C) Assertion (A) is true but Reason (R) is not true.
- (D) Assertion (A) is not true but Reason (R) is true.

Previously asked in: 2024 30/2/1 Q20

♦ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q55. § 12.3 Volume of a Combination of Solids § 12.4 Summary**[1]**

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

- A 8 : 125
- B 4 : 25
- C 2 : 5
- D 16 : 25

Previously asked in: 2025 30/3/1 Q12

♦ Surface Areas and Volumes

Ratio of Surface Areas and Volumes of Cubes

Q56. § 12.2 Surface Area of a Combination of Solids § 12.3 Volume of a Combination of Solids § 12.4 Summary

[4]

A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood — two small ones on the ends and one larger in the centre — to create a perfect tool. The baker loved the rolling pin, as it rolled out the smoothest dough for breads and pastries.

The length of the bigger cylindrical part is 12 cm and diameter is 7 cm and the length of each smaller cylindrical part is 5 cm and diameter is 2.1 cm.

Based on the above information, answer the following questions :

- (i) Find the volume of the bigger cylindrical part. [1]
- (ii) Find the curved surface area of the bigger cylindrical part. [1]
- (iii) Find the ratio of the volume of the bigger cylindrical part to the total volume of the two smaller (identical) cylindrical parts. [2]

Previously asked in: 2025 30/2/1 Q38

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

12.3 Volume of a Combination of Solids

Q57. § 12.4 Summary

[1]

Assertion (A): If we join two hemispheres of same radius along their bases, then we get a sphere.

Reason (R): Total Surface Area of a sphere of radius r is $3\pi r^2$.

Select the correct answer from the codes (A), (B), (C) and (D) given below.

- A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- C Assertion (A) is true, but Reason (R) is false.
- D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 30/1/1 Q20

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q58. § 12.4 Summary

[3]

The internal and external radii of a hollow hemisphere are $5\sqrt{2}$ cm and 10 cm respectively. A cone of height $5\sqrt{7}$ cm and radius $5\sqrt{2}$ cm is surmounted on the hemisphere as shown in the figure. Find the total surface area of the object in terms of π . (Use $\sqrt{2} = 1.4$)

Previously asked in: 2026 30/4/1 Q29 (OR-2)

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

Q59. § 12.3 Volume of a Combination of Solids

[3]

To protect plants from heat, a shed of iron rods covered with green cloth is made. The lower part of the shed is a cuboid mounted by semi-cylinder as shown in the figure. Find the area of the cloth required to make this shed, if dimensions of the cuboid are 14 m × 25 m × 16 m.

Previously asked in: 2026 30/4/1 Q29 (OR-1)

◆ Surface Areas and Volumes

12.2 Surface Area of a Combination of Solids

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