SmartKalike

CBSE Class 10 · Maths

Surface Areas and Volumes

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

An object made by joining a cylinder and two hemispheres is an example of: (A) a single basic solid (B) a combination of basic solids (C) a plane figure (D) a frequency distribution.

Answer

(B) a combination of basic solids — it is made by joining a cylinder and two hemispheres.

Q2. 2 marks · Short answer

When finding the surface area of a solid formed by joining two solids, what should be done with the surfaces that become hidden at the join?

Answer

Exclude the surfaces hidden where the solids join; include only exposed surfaces in the total surface area. For a cylinder with hemispheres at both ends, count the cylinder's curved surface and both hemispheres' curved surfaces.

Q3. 3 marks · Medium answer

A solid consists of a cylinder of radius 3 cm and height 8 cm surmounted by a hemisphere of radius 3 cm. Find its volume. Use $\pi = 3.14$.

Answer

Given: Cylinder radius r = 3 cm; cylinder height h = 8 cm; hemisphere radius = 3 cm; $\pi = 3.14$.
Formula: Total volume = volume of cylinder + volume of hemisphere.
Substitution: Total volume = $\pi r^2 h + \frac{2}{3}\pi r^3$.
Cylinder volume = $3.14 \times 3^2 \times 8 = 226.08$ cm^3.
Hemisphere volume = $\frac{2}{3} \times 3.14 \times 3^3 = 56.52$ cm^3.
Total volume = $226.08 + 56.52 = 282.6$ cm^3.
Answer: The solid's volume is 282.6 cm^3.

Q4. 4 marks · Long answer

A solid consists of a cylinder of radius 3 cm and length 10 cm, with a hemisphere attached to each circular end. Find the total surface area of the solid. Use $\pi = 3.14$.

Answer

Given: The radius of the cylinder and each hemisphere is r = 3 cm.
The length of the cylinder is h = 10 cm.
Formula: Total surface area = curved surface area of cylinder + curved surface areas of both hemispheres.
Only the curved surfaces are exposed because the circular faces are joined together.
The two hemispheres together have the curved surface area of one sphere, $4\pi r^2$.

Therefore, total surface area = $2\pi rh + 4\pi r^2$.
Substitution: Total surface area = $2 \times 3.14 \times 3 \times 10 + 4 \times 3.14 \times 3^2$.
The curved surface area of the cylinder is $2 \times 3.14 \times 3 \times 10 = 188.4$ cm^2.
The curved surface area of both hemispheres is $4 \times 3.14 \times 3^2 = 113.04$ cm^2.
Adding the exposed areas gives $188.4 + 113.04 = 301.44$ cm^2.
Answer: The total surface area of the solid is 301.44 cm^2.

Q5. 5 marks · Long answer

A cylindrical glass has an inner radius of 3 cm and height 10 cm. A hemispherical raised portion of radius 3 cm occupies part of its base. Find the glass's actual capacity. Use π = 3.14.

Answer

Given: Inner radius of the glass, r = 3 cm; height, h = 10 cm; π = 3.14.
Formula: Apparent capacity = volume of cylinder = $\pi r^2 h$.
Substitution: Apparent capacity = $3.14 \times 3^2 \times 10$ cm^3.
Calculation: Apparent capacity = $3.14 \times 9 \times 10$ cm^3 = 282.6 cm^3.
The raised hemispherical portion occupies space inside the glass and reduces its actual capacity.
Formula: Volume of hemisphere = $\frac{2}{3}\pi r^3$.
Substitution: Volume of hemisphere = $\frac{2}{3} \times 3.14 \times 3^3$ cm^3.
Calculation: Volume of hemisphere = $\frac{2}{3} \times 3.14 \times 27$ cm^3 = 56.52 cm^3.
Formula: Actual capacity = apparent capacity − volume of hemisphere.
Substitution: Actual capacity = 282.6 cm^3 − 56.52 cm^3.
Answer: The actual capacity of the glass is 226.08 cm^3.

Q6. 1 mark · Multiple choice

A long container with rounded ends can be modelled as: (A) a cone with two hemispheres (B) a cylinder with a hemisphere at each end (C) a cube with two cones (D) a sphere joined to a cuboid.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/surface-areas-and-volumes

Q7. 2 marks · Short answer

A cone and a hemisphere are joined along equal-radius flat faces. Which surfaces contribute to the total surface area of the resulting solid?

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/surface-areas-and-volumes

Q8. 4 marks · Long answer

A toy consists of a cone surmounted by a hemisphere of radius 5 cm. Its total height is 17 cm. Find the cone's height, its slant height, and the total surface area of the toy. Use π = 3.14.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/surface-areas-and-volumes

Q9. 5 marks · Long answer

A solid toy is made from a cylinder of radius 3 cm and height 10 cm with a cone of the same radius and height 4 cm attached at one end. Find the volume of the toy. Use π = 3.14.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/surface-areas-and-volumes

Q10. 1 mark · Very short answer

How is the volume of air in an enclosed space found when objects and people occupy part of it?

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/maths/surface-areas-and-volumes

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