Mathematics

Practice Test Paper 3

(Chapter 12: Surface Areas and Volumes)

Class X | 2026–27

Time Allowed: 45 Minutes | Maximum Marks: 25

General Instructions

1. All 13 questions are compulsory. The paper has four sections: A, B, C and D.
2. Section A - 5 marks; Section B - 8 marks; Section C - 9 marks; Section D - 3 marks.
3. Choose one correct option in Section A. Show the necessary steps and reasoning in Sections B, C and D.
4. Use π = 22/7 unless stated otherwise. Use of calculators is not allowed.

SECTION A

(5 questions × 1 mark = 5 marks)

1. A hemisphere of radius r is fixed to a cube on a circular patch of the same radius. The increase in external area of the cube is:

(A) πr^2 (B) $2\pi r^2$

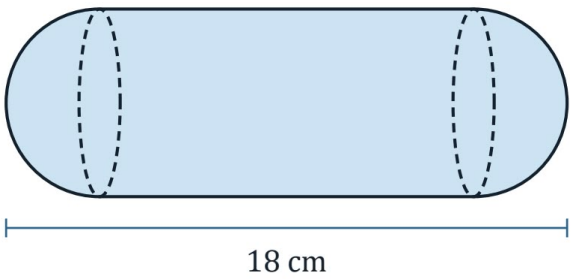
(C) $3\pi r^2$ (D) $4\pi r^2$

2. A cone of height 6 cm and radius 2 cm is attached to a cylinder. The volume added is:

(A) 24π cm^3 (B) 12π cm^3

(C) 8π cm^3 (D) 4π cm^3

3. The capsule shown has total length 18 cm and radius 3 cm. The length of its cylindrical part is:



(A) 15 cm (B) 12 cm

(C) 9 cm (D) 6 cm

4. A hemispherical cavity of radius r is made in one flat face of a block. The new curved cavity area is:

(A) πr^2 (B) $4\pi r^2$

(C) $3\pi r^2$ (D) $2\pi r^2$

5. Two hemispheres of radius 2 cm are joined along their flat faces. Their combined volume is:

(A) $\frac{16\pi}{3}$ cm^3 (B) $\frac{32\pi}{3}$ cm^3

(C) 16π cm^3 (D) 8π cm^3

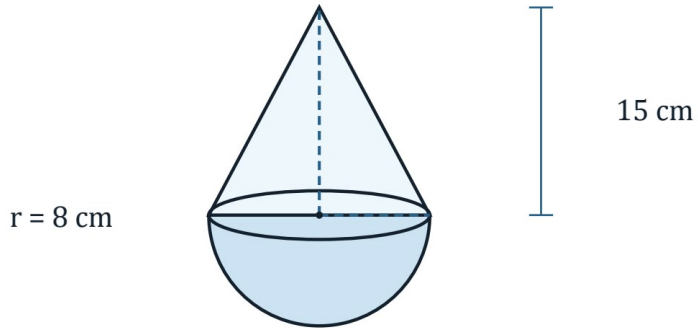
SECTION B

(4 questions × 2 marks = 8 marks)

6. A cylinder of radius 2 cm and height 9 cm has a hemisphere of radius 2 cm attached at each end. Find its volume in terms of π.

7. A cone of radius 1 cm and height 1 cm is joined to a hemisphere of radius 1 cm. Find the solid volume in terms of π.

8. The cone on the hemisphere shown has radius 8 cm and height 15 cm. Find the total external area in terms of π.



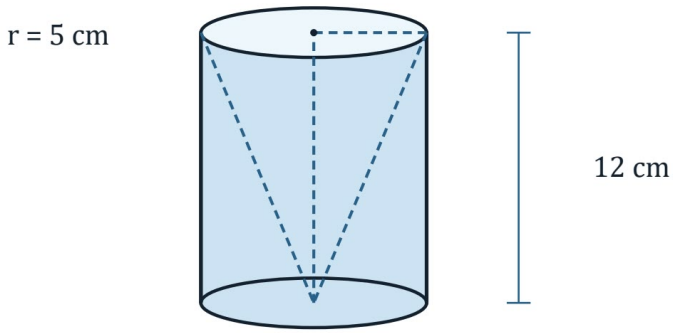
9. A cylinder of radius 7 cm and height 15 cm has a hemispherical cavity of radius 7 cm at the top. Find the area of its curved outer wall and curved cavity together.

SECTION C

(3 questions × 3 marks = 9 marks)

10. A solid cuboid 12 cm × 10 cm × 6 cm has two separate conical depressions, each of radius 1.5 cm and depth 4 cm. Find the volume of material left, using π = 3.14.

11. A conical cavity of radius 5 cm and depth 12 cm is hollowed from the top of the cylinder shown, with the same radius and height. Find the total area of all remaining surfaces.



12. A cone of height 6 cm is joined to a hemisphere of radius 3 cm. A cylinder of radius 3 cm and height 9 cm just encloses the toy. Find the empty space in the cylinder in terms of π.

SECTION D

(Application Based Question - 3 marks)

13. A decorative block is a cube of edge 10 cm with a hemisphere of radius 3 cm fixed centrally on its top. All external surfaces, including the bottom, are to be painted. Give areas in terms of π where needed.

(i) Find the area of the cube covered by the hemisphere.

(ii) Find the curved surface area of the hemisphere.

(iii) Find the total area to be painted.