Mathematics

Practice Test Paper 10

(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 cylindrical vessel has a solid hemispherical bulge of radius r at its base. Compared with an unobstructed cylinder, its capacity is smaller by:

(A) $\frac{2}{3}\pi r^3$ (B) $\frac{4}{3}\pi r^3$

(C) πr^2 (D) $2\pi r^2$

2. An open hemisphere is extended upwards by a cylinder of the same radius 2 cm and height 3 cm. The extra capacity provided by the cylinder is:

(A) 6π cm^3

(B) 12π cm^3

(C) 8π cm^3

(D) 4π cm^3

3. The curved areas of a cone and a hemisphere with common radius 6 cm are equal. The cone slant height is:

(A) 3 cm (B) 6 cm

(C) 9 cm (D) 12 cm

4. A closed combined solid has exterior area 120 cm^2. Painting costs Rs 2.50 per cm^2. The cost is:

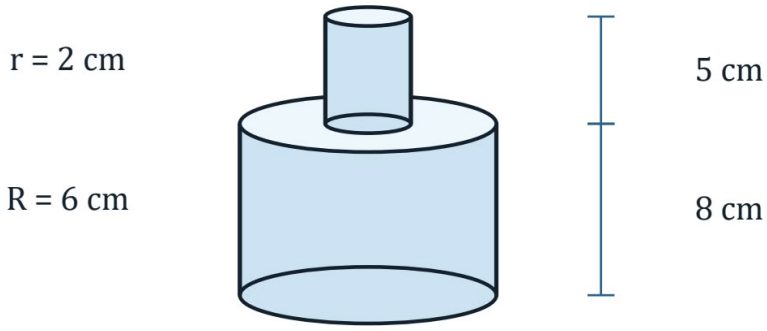
(A) Rs 48

(B) Rs 240

(C) Rs 300

(D) Rs 480

5. The stepped solid shown has lower radius 6 cm and upper radius 2 cm. The exposed horizontal shoulder area is:



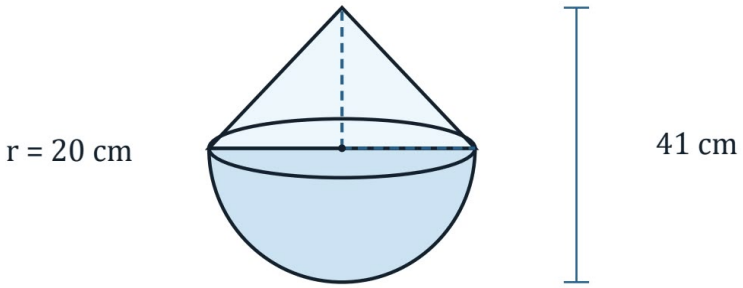
(A) 36π cm^2 (B) 40π cm^2
(C) 32π cm^2 (D) 16π cm^2

SECTION B

(4 questions × 2 marks = 8 marks)

6. A hemispherical cavity of radius 2 cm is scooped from a cube of edge 5 cm. Find both the volume of material and its total surface area in terms of π.

7. A cone on the hemisphere shown has common radius 20 cm and total height 41 cm. Find the cone slant height.



8. A capsule has external surface area 264 cm^2 and radius 3.5 cm. Find its total length.

9. A cylindrical solid of radius 4 cm and height 5 cm is joined to a cone of the same radius and height 6 cm. Find the ratio of cylinder volume to total volume.

SECTION C

(3 questions × 3 marks = 9 marks)

10. A solid iron pole is made of a cylinder 220 cm high and radius 12 cm, with another cylinder 60 cm high and radius 8 cm on top. Use $\pi = 3.14$ and mass 8 g per cm^3. Find the mass in kilograms.

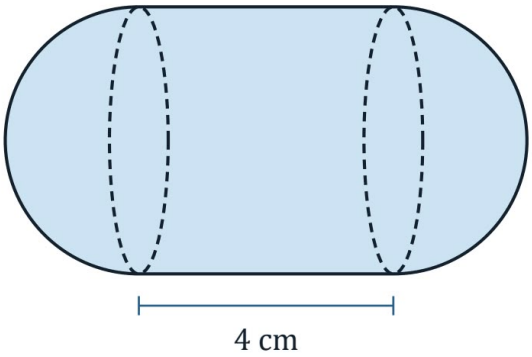
11. A cone of radius 6 cm and height 9 cm stands on a hemisphere of radius 6 cm inside a cylindrical container of radius 6 cm and height 15 cm. The container was full before the solid was immersed. Find the water remaining, using $\pi = 3.14$.

12. A shed has a cuboidal part 15 m long, 7 m wide and 8 m high, topped by a half-cylinder of radius 3.5 m and length 15 m. Machinery occupies 300 m^3 and 20 workers occupy 0.08 m^3 each. Find the volume of air in the occupied shed.

SECTION D

(Application Based Question - 3 marks)

13. The capsule-shaped sweet shown has radius 2.1 cm and cylindrical length 4 cm. Sugar syrup occupies 30% of its volume. Use $\pi = 22/7$.



(i) Find the total sweet length.

(ii) Find the volume of one sweet.

(iii) Find the syrup volume in one sweet.