Mathematics — Ganita Manjari

Chapter 14 Test 10

Math of Space: Surface Area and Volume

Class IX | 2026–27

Time Allowed: 45 Minutes | Maximum Marks: 25

General Instructions

1. All 13 questions are compulsory. Choose one option in A; show working in B–D.
2. No calculators. Leave π exact unless stated. Ignore thickness unless specified.
3. Figures are not to scale; cones and cylinders are right circular.

SECTION A

(5 questions × 1 mark = 5 marks)

1. A cone and sphere of radius r have equal curved areas. Find the cone's slant height.

(A) r (B) $2r$
(C) $3r$ (D) $4r$

2. A cuboid's edges are multiplied by 2, 3 and $\frac{1}{6}$. Its volume:

(A) Unchanged
(B) Doubles
(C) Triples
(D) Becomes one-sixth

3. A cone is cut by a plane parallel to its base, between the vertex and base. What is the cross-section?

(A) Triangle (B) Circle
(C) Rectangle (D) Trapezium

4. Using diameter in place of radius multiplies a sphere's calculated volume by:

(A) 2 (B) 4
(C) 8 (D) 16

5. For volume V and surface area S, which expression has units of length?

(A) $\frac{V}{S}$ (B) $\frac{S}{V}$
(C) VS (D) $\frac{V^2}{S}$

SECTION B

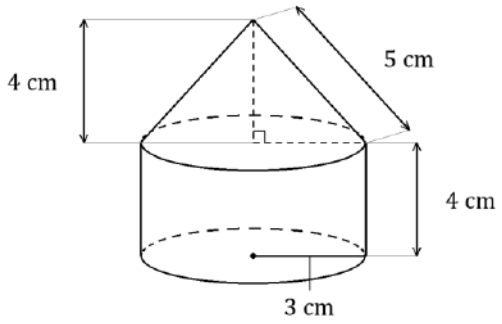
(4 questions × 2 marks = 8 marks)

6. A cylinder has radius 5 cm and height 4 cm. A cone has radius 5 cm and height 12 cm. Compare capacities and curved areas.

7. A square pyramid has base edge 6 cm and height 10 cm. An equal-volume triangular pyramid has height 9 cm. Find its base area.

8. A cylinder's radius increases by 20% while its height decreases by 25%. Find the percentage change in volume.

9. A cone is joined to a cylinder along their common circular face, as in figure. Find the solid's volume and exposed surface area, including its bottom.



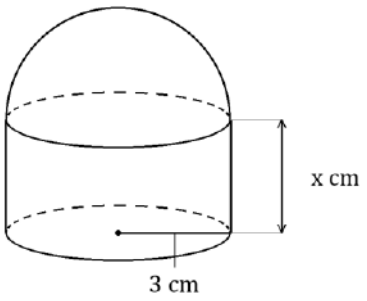
SECTION C

(3 questions × 3 marks = 9 marks)

10. A sphere's volume is multiplied by 27; coating price per cm^2 falls 10%. Find the cost multiplier and percentage increase.

11. From a 6 cm cube, remove a hemisphere of radius 3 cm, centred on one face. Find remaining volume and exposed area.

12. The dome-topped tank in figure has volume 54π cm^3. The dome is hemispherical.



(i) Find the cylindrical height x.
(ii) Find the tank's total height.
(iii) Find its outer curved area, excluding the bottom.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A closed cube (edge 4 cm) and closed cylinder (radius 2 cm, height $\frac{16}{\pi}$ cm) have equal capacity. Verify this and find each surface area. At ₹2 per cm^2, which costs less and by how much? Use $\pi = 3.14$ for costs.