Mathematics — Ganita Manjari

Chapter 14 Test 4

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. Which radius–slant height pair (in cm) cannot form a right cone with positive height?

(A) (3,5) (B) (5,13)
(C) (8,10) (D) (7,6)

2. A cone's curved area is three times its base area. Find its slant-height-to-radius ratio.

(A) 1: 3 (B) 3: 1
(C) 1: 2 (D) 2: 1

3. A cone and hemisphere share radius r; the cone's height is $2r$. Compare their volumes.

(A) Cone has twice the volume (B) Hemisphere has twice the volume
(C) Volumes are equal (D) Cone has three times the volume

4. Find the axial-section area of a cylinder with radius 4 cm and height 5 cm.

(A) 20 cm^2 (B) 20π cm^2
(C) 40 cm^2 (D) 40π cm^2

5. A cone's curved surface unrolls into a sector. What equals the sector's radius?

(A) Slant height (B) Base radius
(C) Perpendicular height (D) Base circumference

SECTION B

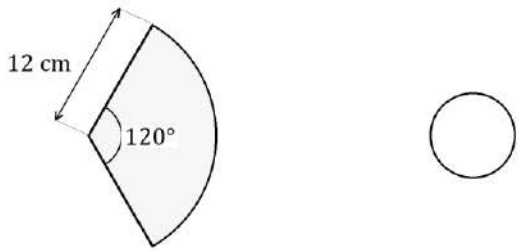
(4 questions × 2 marks = 8 marks)

6. A conical lid has base circumference 18π cm and curved surface area 135π cm^2. Find its slant height.

7. Two right cones have equal base radii and equal volumes. Show that their slant heights are equal.

8. A cone has radius 6 cm and height 8 cm. A pupil uses 8 cm as its slant height. Find the correct curved area and the shortfall.

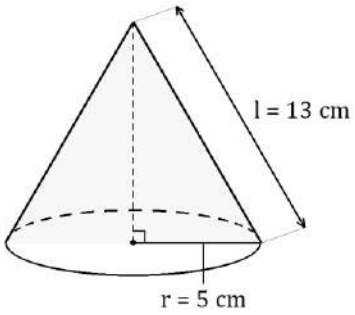
9. The sector in figure forms a cone without overlap. Find the cone's base radius and curved surface area.



SECTION C

(3 questions × 3 marks = 9 marks)

10. For the cone in figure, find its perpendicular height, volume and total surface area.



11. A cone's base radius equals its height. Its volume is 72π cm^3. Find its radius and curved surface area.

12. A right triangle has perpendicular sides 3 cm and 4 cm. Rotate it separately about each perpendicular side. Compare the resulting cone volumes and curved areas.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A square-based display pyramid has base side 6 cm and height 9 cm. Its apex moves sideways while its perpendicular height remains 9 cm.

(i) Find the original volume.

(ii) Find the volume after the move.

(iii) Must the total surface area stay unchanged? Explain.