Mathematics — Ganita Manjari

Chapter 14 Test 6

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. For a solid hemisphere, what is the ratio of total surface area to curved surface area?

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

2. A sphere has surface area 64π cm^2. What is its diameter?

(A) 4 cm
(B) 8 cm
(C) 16 cm
(D) 32 cm

3. A solid hemisphere has volume 144π cm^3. What is its radius?

(A) 6 cm
(B) 3 cm
(C) 9 cm
(D) 12 cm

4. A sphere of radius r fits tightly inside a cube. What is the cube's edge length?

(A) r
(B) $\sqrt{2}r$
(C) $2r$
(D) $3r$

5. A plane through a sphere's centre cuts out a circle. How does this circle's radius compare with the sphere's radius r?

(A) $\frac{r}{2}$
(B) r
(C) $2r$
(D) $\sqrt{2}r$

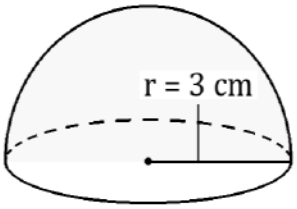
SECTION B

(4 questions × 2 marks = 8 marks)

6. The circumference of a sphere's great circle is 18π cm. Find the sphere's surface area.

7. Two solid hemispheres of radius 5 cm are joined along their circular bases. Find the decrease in total exposed surface area.

8. Find the volume of the hemisphere in figure and the area of its flat base.



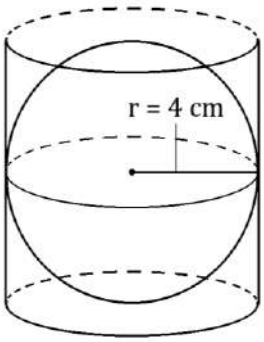
9. Sphere A has twice the surface area of sphere B. Find the ratio of their volumes.

SECTION C

(3 questions × 3 marks = 9 marks)

10. A sphere of radius 3 cm is inscribed in a cube. Find the cube's volume, the sphere's volume and the fraction of cube space occupied.

11. The sphere fits tightly inside the cylinder in figure.



(i) Find the cylinder's height.
(ii) Find the sphere-to-cylinder volume ratio.
(iii) Compare the sphere's area with the cylinder's curved area.

12. A sphere's volume in cm^3 is numerically twice its surface area in cm^2. Find its radius and volume.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A string fits tightly around a sphere's great circle. The radius is 10 cm. The string is lengthened by 4π cm and held concentrically around it.

(i) Find the original string length.
(ii) Find the uniform gap after lengthening.
(iii) Would the gap change for a sphere of radius 100 cm? Explain.