Mathematics — Ganita Manjari

Chapter 14 Test 3

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. Two cubes have edges in the ratio 2 : 5. What is the ratio of their total surface areas?

(A) 4 : 25 (B) 2 : 5
(C) 8 : 125 (D) 1 : 5

2. Every edge of a cube is doubled. By what factor does its volume increase?

(A) 2 (B) 4
(C) 6 (D) 8

3. Which distance is the height used in the volume formula for a pyramid?

(A) A sloping edge
(B) Perpendicular apex–base distance
(C) Base perimeter
(D) Altitude of a side face

4. A cube has volume 729 cm^3. Find the sum of the lengths of all its edges.

(A) 54 cm (B) 81 cm
(C) 108 cm (D) 486 cm

5. Equal circular discs are stacked with their centres on one vertical line. Which ideal solid do they form?

(A) Cylinder
(B) Cone
(C) Sphere
(D) Pyramid

SECTION B

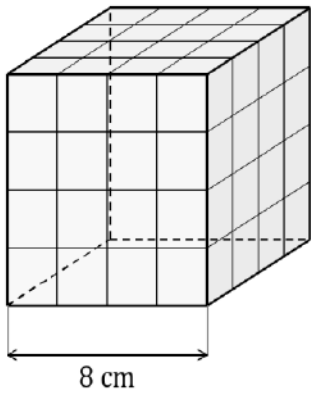
(4 questions × 2 marks = 8 marks)

6. A cube of side 6 cm is cut into cubes of side 2 cm. Find the increase in the sum of their surface areas.

7. A cube has total surface area 294 cm^2. Find its volume.

8. A 10 cm × 5 cm × 4 cm cuboid is changed by increasing its length by 2 cm and decreasing its width by 1 cm. Find the volume change.

9. The cube in figure is painted on all six faces, then cut along the grid. How many small cubes have exactly two painted faces? How many have none?

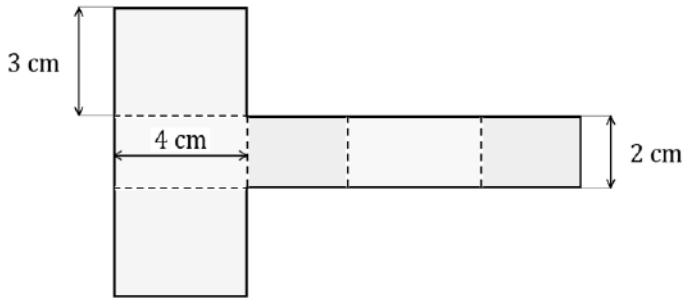


SECTION C

(3 questions × 3 marks = 9 marks)

10. A cube of integer edge a consists of unit cubes. Derive the number of additional unit cubes needed for edge $a + 1$, and evaluate it for $a = 4$.

11. The net in figure folds into a cuboid. Find its total surface area, volume and the area of each largest face.



12. Give two different positive-integer edge sets for cuboids with total surface area 100 cm^2. Verify them and compare their volumes.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A 12 cm × 8 cm × 6 cm box is filled without gaps by identical cubes aligned with its edges. Find the largest possible cube edge and the number required.