Mathematics — Ganita Manjari

Chapter 14 Test 7

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 quantity is conserved when metal is recast without loss?

(A) Surface area
(B) Volume
(C) Height
(D) Number of faces

2. A 200 cm^3 metal piece loses 5% of its volume during melting. What remains?

(A) 10 cm^3
(B) 195 cm^3
(C) 190 cm^3
(D) 210 cm^3

3. A fully submerged solid moves deeper in a tank. The water level:

(A) Remains unchanged
(B) Always rises
(C) Always falls
(D) Doubles

4. An object is fully submerged in two cylindrical tanks. It causes a 2 cm rise in one. With triple radius, the rise is:

(A) 6 cm
(B) $\frac{2}{3}$ cm
(C) 18 cm
(D) $\frac{2}{9}$ cm

5. A fully submerged stone displaces 35 mL of water. Find its volume.

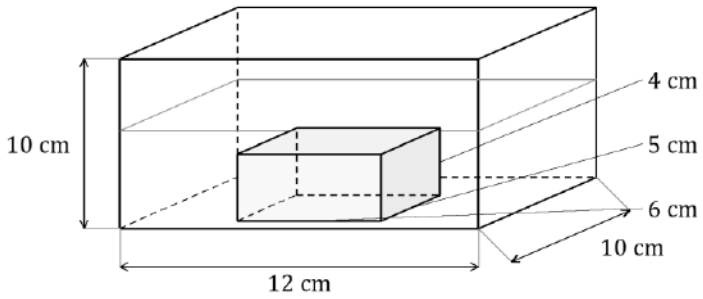
(A) 0.035 cm^3
(B) 35 cm^3
(C) 350 cm^3
(D) 35000 cm^3

SECTION B

(4 questions × 2 marks = 8 marks)

6. Two metal cubes have edges 3 cm and 4 cm. Can they be melted to make a cube of edge 5 cm? Justify.

7. The block in figure is fully submerged. Initially the tank's water depth is 6 cm. Find the rise and final water depth.



8. A sealed hollow metal sphere has outer radius 3 cm and inner radius 2 cm. Find its displaced water volume and metal volume when submerged.

9. A solid cylinder of radius 3 cm and height 8 cm is recast into two identical cones of radius 6 cm. Find their height.

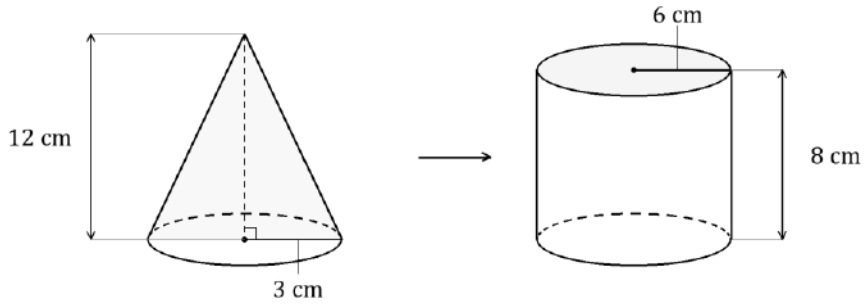
SECTION C

(3 questions × 3 marks = 9 marks)

10. Recast a metal cube of edge 6 cm into spheres of radius 1 cm. Find the number of complete spheres and the leftover volume. Use $\pi = \frac{22}{7}$.

11. A solid sphere of radius 3 cm is melted into cylindrical wire of radius 0.1 cm. Find the wire's length in metres.

12. The cone in figure is full of water, which is poured into the empty cylinder.



(i) Find the volume transferred.
(ii) Find the cylinder's water depth.
(iii) What fraction of its capacity is filled?

SECTION D

(1 application question × 3 marks = 3 marks)

13. A 12 × 10 × 8 cm metal block loses 10% during melting. Find usable volume, the number of complete square pyramids (base edge 6 cm, height 8 cm), and unused volume.