



The SSC CGL Mensuration 3D topic is one of the most practical and high-yield areas of the Quantitative Aptitude section in the **Staff Selection Commission Combined Graduate Level (SSC CGL)** examination. It focuses on three-dimensional (3D) geometric shapes and their measurement, including volume, surface area, and curved surface area. Shapes like cubes, cuboids, cylinders, cones, spheres, and hemispheres are frequently tested in this section. Despite appearing simple, questions from Mensuration 3D often require quick and accurate calculations, along with a clear understanding of spatial visualization and formula application.

This chapter carries significant weightage in both Tier 1 and Tier 2 of **SSC CGL**, with at least one or two direct questions in Tier 1 and more integrated, data-driven problems in Tier 2. What makes SSC CGL Mensuration 3D particularly important is its connection to real-world applications, ranging from packaging and construction to tank capacity and material cost problems. With the right conceptual foundation and consistent practice, aspirants can score full marks in this section in minimal time. This makes SSC CGL Mensuration 3D not just a topic to study, but a strategic asset in your preparation journey.

## SSC CGL Mensuration 3D - What is Mensuration 3D?

Mensuration 3D is a branch of mathematics that deals with the measurement of three-dimensional geometric figures. While 2D mensuration focuses on flat surfaces and calculates parameters like area and perimeter, mensuration 3D takes it a step further by involving solids that occupy space. In the context of SSC CGL Mensuration 3D, this includes computing the **volume, total surface area, and curved (or lateral) surface area** of various 3D shapes such as **cubes, cuboids, cylinders, cones, spheres, hemispheres, and frustums**.

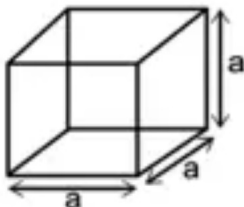
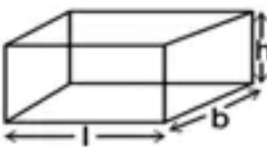
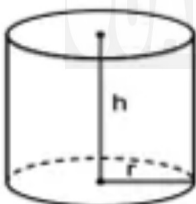

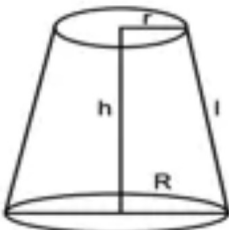

These concepts are used to solve problems involving the space covered by containers, the capacity of tanks, the cost of painting or wrapping a solid object, and the weight of solid materials, making this topic extremely practical and application-based. For SSC CGL aspirants, mastering SSC CGL Mensuration 3D means not only memorizing formulas but also being able to visualize objects, understand the difference between curved and total surface area, and apply unit conversions where necessary.

In the exam, questions from Mensuration 3D in SSC CGL may be direct and formula-driven or appear as part of more complex word problems, often mixed with arithmetic concepts. Its relevance is particularly high in Tier 2, where Data Interpretation sets sometimes include 3D shapes, and candidates must use these concepts in a time-bound environment. This makes a solid grasp of Mensuration 3D a valuable tool for scoring well in both basic and advanced levels of the Quantitative Aptitude section.

## SSC CGL Mensuration 3D - Key 3D Shapes and Formulae



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Name	Nomenclature	Figure
Cube	A solid body having 6 equal faces with equal length, breadth and height.	
Cuboid	A rectangular solid body having 6 rectangular faces.	
Cylinder	A solid or hollow body that is formed by keeping circles of equal radii one on another.	
Cone	A solid or hollow body with a round base and pointed top.	
Cone Frustrum	A cone is cut into two parts by a plane parallel to the base; the portion that contains the base is called the frustrum of a cone.	
Sphere	A three-dimensional solid figure, which is made up of all points in the space, which	



[Source: Quant Sir]

## Cube

- Volume =  $a^3$
- Lateral Surface Area =  $4a^2$
- Total Surface Area =  $6a^2$

## Cuboid

- Volume =  $l \times b \times h$
- Lateral Surface Area =  $2h(l + b)$
- Total Surface Area =  $2(lb + bh + hl)$

## Cylinder

- Volume =  $\pi r^2 h$
- Curved Surface Area =  $2\pi r h$
- Total Surface Area =  $2\pi r(h + r)$



## Cone

- Volume =  $(1/3) \pi r^2 h$
- Curved Surface Area =  $\pi r l$
- Total Surface Area =  $\pi r(l + r)$

## Sphere

- Volume =  $(4/3) \pi r^3$
- Surface Area =  $4\pi r^2$

## Hemisphere

- Volume =  $(2/3) \pi r^3$
- Curved Surface Area =  $2\pi r^2$
- Total Surface Area =  $3\pi r^2$

## Frustum of a Cone





- Volume =  $(1/3) \pi h (R^2 + Rr + r^2)$
- Curved Surface Area =  $\pi l(R + r)$

## SSC CGL Mensuration 3D - Importance

The SSC CGL Mensuration 3D topic holds immense importance in the Quantitative Aptitude section of both Tier 1 and Tier 2 examinations. While it may seem like a purely theoretical math topic at first glance, its practical application and consistent appearance in SSC CGL papers make it a scoring opportunity that every aspirant should focus on. From determining the volume of storage containers to calculating surface areas for painting or packaging, Mensuration 3D has direct real-life relevance, which SSC uses to frame logical, application-based questions in the exam.

In Tier 1, questions from Mensuration 3D are typically direct and formula-based, involving shapes like cubes, cuboids, cylinders, or spheres. These questions are generally straightforward and can be solved within seconds if the formulas are memorized and the approach is correct. In Tier 2, however, the complexity increases. Questions may appear as part of mixed concept sets, be integrated into Data Interpretation (DI), or require multi-step logical deductions involving compound solids or unit conversions. This not only tests your calculation ability but also your conceptual understanding and decision-making speed.

Moreover, SSC often includes Mensuration 3D problems in disguised formats, such as real-world word problems involving cost, weight, volume, or efficiency, where students must apply their knowledge beyond memorized formulas. A well-prepared candidate can use this topic to their advantage, quickly securing 4–6 marks that others may spend too much time on. Given its high scoring potential, frequent presence, and blend of conceptual and visual learning, SSC CGL Mensuration 3D is an indispensable topic that can significantly boost your overall exam score if approached strategically.



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[Source: Quant Sir]

## SSC CGL Mensuration 3D - Practice Based Questions

Given below are some questions of SSC CGL Mensuration 3D similar to those that appear in the actual exam.

**Q.** A tent is constructed such it looks like a cone over a cylinder. The radius of the structure is 3.5 m, the total height is 16 m, whereas the height of the conical part is alone 12 m. If it is estimated that 12% of the material is wasted in making the tent and the cost of the material is Rs 80/m<sup>2</sup>, what is the cost of the material purchased? (in rupees)

**Sol:** Total surface area = CSA of cylinder + CSA of cone

=  $2\pi rh + \pi rl$  (where signs have their usual meaning)

Now,  $l = \sqrt{r^2 + h^2} = \sqrt{3.5^2 + 12^2} = 12.5$  cm

So, Total surface area =  $2 \times 227 \times 3.5 \times (16 - 12) + 227 \times 3.5 \times 12.5 = 225.5$  m<sup>2</sup>

12% wasted, so 88% of x = 225.5

$\Rightarrow 0.88x = 225.5$

$\Rightarrow x = 256.25$



Cost of material =  $256.25 \times 80 = \text{Rs } 20500$  (Ans.)

**Q.** Let  $x \text{ cm}^2$  be the surface area and  $y \text{ cm}^3$  be the volume of a sphere such that  $y = 14x$ . What is the radius (in cm) of the sphere?

**Sol:** 1. Surface area of the sphere =  $x$

2. Volume of sphere =  $y$

3.  $y = 14x$

According to the question,

Surface area of sphere =  $x$

$$\Rightarrow 4\pi r^2 = x \dots\dots(i)$$

Also, Volume of the sphere =  $y$

$$\Rightarrow \frac{4}{3}\pi r^3 = y$$

given that  $y = 14x$

$$\Rightarrow \frac{4}{3}\pi r^3 = 14x$$

$$\Rightarrow \frac{22}{7}\pi r^3 = x \dots\dots(ii)$$

From equation (i) and equation (ii)

$$\Rightarrow 4\pi r^2 = \left(\frac{22}{7}\right)\pi r^3 \Rightarrow r = 2 \times 21 = 42$$

Hence, the radius of the sphere is 42 cm. (Ans.)

## SSC CGL Mensuration 3D - Previous Year Weightage

Every year, SSC includes 1–2 direct Mensuration 3D questions in Tier 1, while Tier 2 integrates this topic into Data Interpretation sets and applied arithmetic, increasing both its complexity and significance.





Year	Tier Level	Number of Questions	Types of Questions	Difficulty Level of Questions
2023	Tier 1	2	Volume & Surface Area of Cylinder, Sphere	Moderate
2023	Tier 2	3 + (in DI set)	Application-based: Mixed Solids, Frustum in DI	Moderate to Difficult
2022	Tier 1	1	Surface Area of Cone	Easy
2022	Tier 2	2	Word Problem on Volume + Cost of Painting	to Difficult
2021	Tier 1	2	Volume of Hemisphere, Lateral Surface of Cone	Moderate
2021	Tier 2	3	Frustum-based Tank Problem, Cost Calculation	Moderate
2020	Tier 1	1	Simple Cube/Cuboid Formula	Easy
2020	Tier 2	2-3 (in DI)	3D Shapes in Graph + Ratio-based Volume Problems	Moderate to Difficult

## SSC CGL Mensuration 3D - Tips to Score High

To excel in the SSC CGL Mensuration 3D segment, candidates must go beyond rote memorization of formulas. Success in this topic requires a smart and strategic approach, combining conceptual understanding, efficient time management, and regular practice. With the right techniques, even complex geometry problems can be solved with confidence and accuracy during the exam.



**Master Essential Formulas:** Focus on key area and perimeter formulas for frequently tested 2D shapes.

**Sketch the Figures:** Drawing diagrams can help you understand the problem more clearly.

**Solve Mock Tests Regularly:** Practice scenarios involving overlapping figures like a circle inside a square or shaded regions within sectors.

**Manage Time Wisely:** Aim to complete Mensuration 3D questions within 4–5 minutes.

**Refer to Previous Year Papers:** Analyze question trends and difficulty levels for better exam preparedness.

**Apply Logical Shortcuts:** Use smart tricks and visual reasoning to avoid lengthy calculations.

By integrating these methods into your daily preparation, you'll be well-equipped to tackle SSC CGL Mensuration 3D questions quickly and effectively.

In conclusion, SSC CGL Mensuration 3D is a high-impact topic that blends mathematical accuracy with real-world application. Whether you're solving for the volume of a cylinder, the surface area of a cone, or navigating complex problems involving combined solids or frustums, this topic offers a great opportunity to secure easy marks, provided you're equipped with the right formulas, concepts, and time-saving strategies.

With questions consistently appearing in both Tier 1 and Tier 2, a solid command over Mensuration 3D can give you a definitive edge over other aspirants. At **Quant Sir**, we're committed to guiding your SSC CGL preparation journey with expert-led video lectures, structured quizzes, detailed formula sheets, and targeted mock tests specifically designed to help you master Mensuration 3D and all other quantitative topics. Start early, practice smart, and make SSC CGL Mensuration 3D your scoring stronghold on the path to government job success.