Hi Everyone! Mensuration 3D is a crucial topic in the Quantitative Aptitude section of the SSC CGL Tier 1 exam. This blog focuses entirely on Mensuration 3D questions from previous SSC CGL papers. It includes problems based on cubes, cuboids, cylinders, cones, and spheres. A solid understanding of Mensuration 3D formulas and concepts is essential to solve questions quickly and accurately. By practicing these Mensuration 3D previous year questions, you can boost your confidence and enhance your score in the exam.

In this blog, we've focused on Mensuration 3D questions. For detailed Practice on Mensuration 2D, don't miss our previous blog! Let's go through important patterns and previous year questions to build confidence and boost your score!

SSC CGL Mensuration 3D Previous Year Questions Practice

Let's dive into exam-level questions and strengthen your grip on 3D Mensuration concepts!

A cylindrical road roller made of metal is one meter long. Its inner radius is 27 cm and the thickness of the metal sheet rolled into it is 9 cm. What is the weight of the roller, if 1 cm of the metal weighs 8g? (in kg) **[SSC CGL 2019]**

Sol: Height of the cylinder(h) = 1 m or 100 cm

The inner radius of the cylinder(r_1) = 27 cm

Thickness = 9 cm

The outer radius of the cylinder(r_2) = 27 + 9 = 36 cm

Volume of a hollow cylinder = $\pi(r_2^2 - r_1^2)h = \pi(36^2 - 27^2)100 = \pi(1296 - 729)100 = 56700\pi$

$\Rightarrow$ Weight = $56700\pi \times 8 = 453600$ g or 453.6 kg (**Ans.**)

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The external diameter of an iron pipe is 20 cm and its length is 12 cm. If the thickness of the pipe is 1 cm, find the surface area of the pipe (take π = correct to two places of decimal. **[SSC CGL 2022]**

Sol: The external diameter of an iron pipe = 20 cm

R = 20/2 = 10

length = 12 cm

Thickness = 1 cm

So, the inner radius r = 10 - 1 = 9 cm

TSA of hollow pipe = $2\pi h(R + r) + 2\pi (R^2 - r^2) = 2\pi \times 12(10 + 9) + 2\pi(10 + 9)(10 - 9) = 456\pi + 38\pi = 494 \times 3.14 = 1,552.57$ cm^2 (**Ans.**)

Did you spot the cone and cylinder trick here? SSC CGL loves testing your 3D formula grip like this.

Let x cm^2 be the surface area and y cm^3 be the volume of a sphere such that y = 14x. What is the radius (in cm) of the sphere? **[SSC CGL 2021]**

Sol:1. Surface area of the square = x

2. Volume of sphere = y

3. y = 14x

According to the question,

Surface area of sphere = x

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

Also, Volume of the sphere = y

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

given that y = 14x

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

$\Rightarrow \frac{2}{21}\pi r^3 = x$ .....(ii)

From equation (i) and equation (ii)

$\Rightarrow 4\pi r^2 = \frac{2}{21}\pi r^3 \Rightarrow r = 2 \times 21 = 42$

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

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If the volume of a sphere is 24,416.64 cm^3, find its surface area, correct to two places of decimal. (take π=3.14) **[SSC CGL 2022]**

Sol: Volume of sphere = $4/3 \times \pi \times r^3$ ---- (1)

Surface area of sphere = $4 \times \pi \times r^2$ ---- (2)

Using equation (1),

$\Rightarrow 24,416.64 = 4/3 \times 3.14 \times r^3 \Rightarrow r^3 = 5832 \Rightarrow r = 18$ cm

Using equation (2),Total surface area of sphere = $4 \times 3.14 \times 18 \times 18 = 4069.44\ cm^3$ (**Ans.**)

Notice how SSC CGL brings cubes and cuboids into play? These 3D shapes are regular favorites!

How much iron sheet (in m^2) will be needed to construct a rectangular tank measuring 10 m × 8 m × 6 m, if a circular opening of radius one metre is to be left at the top of the tank? (correct to one decimal place) **[SSC CGL 2019]**

Sol: Surface area of rectangular tank = 2(lb + bh + hl)

The required area of iron sheets= Total surface area of the tank − Area of the circular hole

Radius of circular hole = 1 m

^{2} 2(80 + 48 + 60) − 3.14 × 1= 2 x 188 − 3.14= 376 − 3.14= 372.9 cm^2 (**Ans.**)

A copper wire of radius 6cm and height 8cm is melted to form spheres of radius 2cm. How many such spheres can be formed? **[SSC CGL 2020]**

Sol:A copper wire is in the shape of cylinder and when we melt any shape into any other, their volume remain same.

Let x be the number of spheres which were formed.

$\Rightarrow \pi r^2 h = x \times (4/3)\pi r^3 \Rightarrow 6^2 \times 8 \times 34 = x \times 2^3$

$\Rightarrow 36 \times 3/4 = x \Rightarrow x = 27.$

Volume of cylinder = $\pi r^2 h$

Volume of spheres = $(4/3)\pi r^3$ (**Ans.**)

E.g. The volume of a cone with a height equal to the radius, and a slant height of 5 cm is:**[SSC CGL 2023]**

Sol: Let's assume the height of the cone h = radius of the cone r = x

Slant height = 5 cm

Slant height = $\sqrt{(h^2 + r^2)}$

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$\Rightarrow 5 = \sqrt{(x^2 + x^2)} \Rightarrow 5 = x\sqrt{2} \Rightarrow x = 5/\sqrt{2}$

Volume of the cone = $(1/3)\pi r^2 h = 1/3\pi \times (5/\sqrt{2})^2 \times 5/\sqrt{2} = 125\pi/(6\sqrt{2})$ cm^3 **(Ans.)**

This one's interesting—volume and surface area together! Mensuration 3D at its finest.

A heap of wheat is in the form of a cone whose base diameter is 8.4 m and height is 1.75 m. The heap is to be covered by canvass. What is the area (in m^2) of the canvas required? (Use π =) **[SSC CGL 2020]**

Sol: Radius = 4.2 m and Height = 1.75 m

$(\text{Slant height})^2 = (\text{radius})^2 + (\text{Height})^2$ ----- (1)

Curved surface area of cone = πrl ----- (2)

Using equation (1), we get,

$\Rightarrow l^2 = (4.2)^2 + (1.75)^2 = 17.64 + 3.0625 = 20.7025$

$\Rightarrow l = 4.55$ m

Using equation (2), we get,

$\Rightarrow$ Area of the canvas = $\pi rl = (22/7) \times 4.2 \times 4.55 = 22 \times 0.6 \times 4.55 = 60.06$ m^2 **(Ans.)**

Tricky, right? SSC CGL often tests Mensuration 3D with such layered figures. Stay sharp

Ranu carries water to school in a cylindrical flask with diameter 12 cm and height 21 cm. Determine the amount of water that she can carry in the flask. (Use: π =*227*) **[SSC CGL 2023]**

Sol:A cylindrical flask with diameter (d) 12 cm and height (h) 21 cm.

Radius (r) = d/2 = 12/2 = 6 cm

The amount of water that she can carry in the flask = Volume of the cylindrical flask

Volume of a cylinder = $\pi r^2 h$

The amount of water in flask = $22/7 \times 6^2 \times 21 = 2376$ cm^3 **(Ans.)**

A 22.5 m high tent is in the shape of a frustum of a cone surmounted by a hemisphere. If the diameters of the upper and lower circular ends of the frustum are 21m and 39m, respectively, then find the area of the cloth (in m^2) used to make the tent(ignoring the wastage).(U) **[SSC CGL 2021]**

Sol: Height of the tent = 22.5m

Upper and lower radius of the frustum

R = 39/2 = 19.5, r = 21/2 = 10.5

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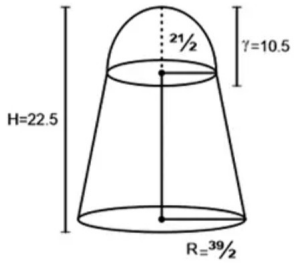
Radius of hemisphere = 21/2 = 10.5

Height of the frustum = 22.5 - 21/2 = 12m



[Source: Quant Sir]

Slant height of the frustum = $\sqrt{(h^2 + (R - r)^2)} = \sqrt{(12^2 + (19.5 - 10.5)^2)} = 15$

TSA of tent = CSA of frustum + CSA of hemisphere

= $\pi l(R + r) + 2\pi r^2 = \pi \times 15\ (38/2) + (212/) + 2\pi(21/2)^2 = 22/7 \times \{450 + (441/2)\} = (22/7) \times 1341/2 = 2107\frac{2}{7}\ m^2$

The area of the cloth = $2107\frac{2}{7}\ m^2$ (**Ans.**)

SSC CGL Mensuration 3D Previous Year Questions - Weightage Analysis

To understand the importance of Mensuration 3D in SSC CGL, it's helpful to look at its **previous year trends**. The table below highlights the number of questions asked from this topic in recent years across Tier 1 and Tier 2, along with their difficulty level:

Year	Tier	No. of Questions	Difficulty Level
2023	Tier 1	2-3	Easy to Moderate
2022	Tier 1	2	Easy
2021	Tier 1	2-3	Moderate
2020	Tier 1	3-4	Moderate
2019	Tier 1	4	Moderate

SSC CGL Mensuration 3D Previous Year Questions - Important Topics to Focus

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To score well in Mensuration 3D, it's essential to concentrate on the subtopics that are frequently asked in the SSC CGL exam. Below is a list of areas you should prioritize during your preparation:

- **Surface Area and Volume Calculations**
  - Cube and Cuboid
  - Cylinder
  - Cone (including problems involving slant height)
  - Sphere and Hemisphere
- **Melting and Recasting of Solids**
  Questions involving the transformation of one solid shape into another using volume conservation.
- **Water and Capacity-Based Problems**
  Often framed around cylindrical containers or pipes, requiring precise volume calculations and unit conversions.
- **Combination of Solids**
  Includes compound shapes such as a cone placed over a hemisphere or a cylinder with a hemispherical top.
- **Ratio-Based Questions**
  Involving relationships between radius, height, or volume—commonly tested through scaled dimensions or percentage changes.
- **Unit Conversions**
  Especially between cm^3, m^3, and litres. Accuracy in unit handling is crucial for correct answers.

SSC CGL Mensuration 3D Previous Year Questions - common Mistakes to Avoid

Even with strong preparation, many candidates lose marks in Mensuration 3D due to small but avoidable errors. Here are some of the most frequent mistakes:

- **Incorrect Formula Application:** Using surface area instead of volume (or vice versa) is a common slip, especially under time pressure. Always read the question carefully.
- **Overlooking Units:** Confusing cm^3 with m^3 or litres can completely change the answer. Always standardize units before applying formulas.
- **Ignoring Hidden Conditions:** Some questions include details like "hollow" figures or shapes "open from one end." These affect which formula to apply.
- **Skipping Diagrams:** Visualizing the shape helps avoid misinterpretation. Draw rough sketches, especially for combination solids.
- **Using Wrong Value of π:** Stick to the value suggested by the question or use 22/7 or 3.14 based on the level of approximation needed.

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Avoiding these common mistakes can significantly boost your accuracy and help you maximize your score in this high-weightage topic.

SSC CGL Mensuration 3D Previous Year Questions - Tips To Solve

Here are top tips to tackle Mensuration 3D questions effectively in SSC CGL:

- **Know the Core Formulas:** Be thorough with surface area and volume formulas of cube, cuboid, cone, cylinder, sphere, and hemisphere. Quick recall is key to saving time.
- **Understand Recasting & Volume Logic:** Practice questions where one solid is melted and recast into another. Volume remains constant—use that to your advantage.
- **Watch the Units:** Ensure unit consistency, especially in volume and capacity-based problems. Convert cm^3 to m^3 or litres where needed.
- **Use Approximations Wisely:** Apply π as 22/7 or 3.14 based on question demand, but avoid rounding off when options are close.
- **Break Down Complex Shapes:** For combination solids, split into individual parts, apply separate formulas, and then combine results.

The questions from Mensuration 3D are not only frequent in the SSC CGL Tier 1 exam but also appear in many other competitive exams. Practicing previous year questions from Mensuration 3D strengthens your grasp on key formulas and improves accuracy. To understand the topic-wise distribution and weightage of Mensuration 3D in SSC CGL, do check out our dedicated blog on Mensuration 3D.

We hope this blog on SSC CGL Mensuration 3D Previous Year Questions has helped you understand the exam pattern and difficulty level. For more in-depth practice, tips, and topic-wise quizzes, make sure to refer to Quant Sir—your trusted source for Quant preparation.

Keep revising, keep solving, and stay consistent—Mensuration 3D is yours to conquer!

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