THE O.P. GUPTA
ADVANCED MATH CLASSES
Mathematics (Standard & Basic)
Topic - Surface Areas & Volumes

RTS-12

CLICK HERE FOR ANSWERS

RANKERS
TEST SERIES FOR X

Max. Marks - 40
Time - 90 Minutes

SECTION A

*Followings multiple choice questions are of **1 Mark** each (Q01-10).*
Select the correct option in each one of them.

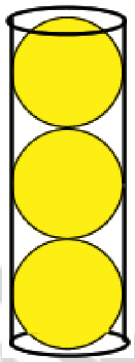
Q01. The radius of a cylinder is doubled and height is halved. The curved surface area (CSA) will
(A) remain the same (B) be doubled (C) be halved (D) become four times

Q02. If the radius of a sphere is doubled, then its surface area becomes
(A) double (B) four times (C) eight times (D) sixteen times

Q03. Which solid has two circular faces and one curved surface?
(A) Sphere (B) Cylinder (C) Cone (D) Hemisphere

Q04. A metallic sphere of radius 4.2 cm is melted and recast into smaller spheres each of radius 2.1 cm. The number of smaller spheres formed is
(A) 2 (B) 4 (C) 6 (D) 8

Q05. A cylindrical tennis ball container contains three balls stacked on one another, such that they touch the wall of the container (see the figure). The top and bottom balls also touch the lid and the base of the container respectively.



If the volume of a tennis ball is 160 cm^3, then what is the volume of the container?

(A) 720 cm^3 (B) 840 cm^3
(C) 1440 cm^3 (D) 480 cm^3

Q06. The curved surface area of a cone is 12320 cm^2 and slant height is 56 cm. The diameter of its base will be
(A) 140 cm (B) 130 cm (C) 120 cm (D) 110 cm

Q07. When a cone is cut parallel to the base, the top portion is a
(A) smaller cone (B) hemisphere (C) cylinder (D) frustum

Q08. The volume and the surface area of a sphere are numerically equal, then its radius is
(A) 0 unit (B) 1 unit (C) 2 units (D) 3 units

*Followings are **Assertion-Reason based questions** (Q09 & 10).*
In the following questions, a statement of Assertion (**A**) is followed by a statement of Reason (**R**).
Choose the correct answer out of the following choices.
(A) Both **A** and **R** are true and **R** is the correct explanation of **A**.
(B) Both **A** and **R** are true and **R** is not the correct explanation of **A**.
(C) **A** is true but **R** is false.
(D) **A** is false but **R** is true.

Q09. **Assertion (A) :** If the radius of the base of a right circular cone is 3r and its height is equal to the radius of the base, then its volume is $9\pi r^3$.
Reason (R) : A cone and a cylinder stand on equal base and have the same height. Then ratio of their volumes is $1:3$.

Q10. **Assertion (A) :** Total surface area of the top is the sum of curved surface area of the hemisphere and the curved surface area of the cone.

Reason (R) : Top is obtained by fixing the plane surface of the hemisphere and cone together.

$[1\times10=10$

SECTION B

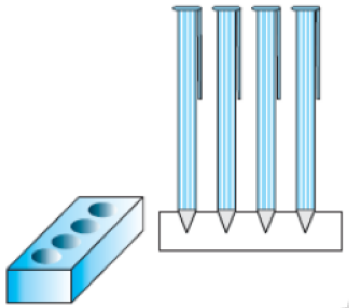
*Followings are of **2 Marks** each (Q11-12).*

Q11. A solid is in the shape of a right-circular cone surmounted on a hemi-sphere, the radius of each of them being 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid.

Q12. (a) A right circular cylinder and a cone have equal bases and equal heights. If their curved surface areas are in the ratio $8:5$, then find the ratio between the radius of their bases to their heights.

OR

(b) A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depression is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand.



$[2\times2=4$

SECTION C

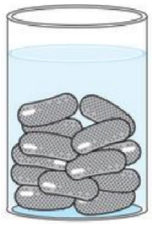
*Followings are of **3 Marks** each (Q13-16).*

Q13. (a) An empty cone is of radius 3 cm and height 12 cm. Ice-cream is filled in it so that lower part of the cone which is $\left(\frac{1}{6}\right)^{th}$ of the volume of the cone is unfilled but hemisphere is formed on the top. Find volume of the ice-cream. Take $\pi=3.14$.

OR

(b) A room is in the form of cylinder surmounted by a hemi-spherical dome. The base radius of hemi sphere is one-half the height of cylindrical part. Find total height of the room if it contains $\left(\frac{1408}{21}\right)$ m^3 of air. Take $\pi=\frac{22}{7}$.

Q14. A gulab jamun, contains sugar syrup up to abut 30% of its volume. Find approximately how much syrup would be found in 45 gulab jamuns, each shaped like cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm.



Q15. Total height of a plumb-line is 14 cm and its radius is 7 cm. Find its (i) volume and (ii) total surface area; (both in terms of π).

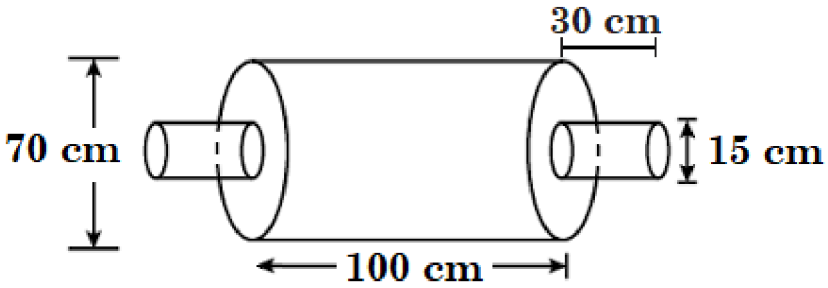
Q16. 500 persons are taking a dip into a cuboidal pond which is 80 m long and 50 m broad. What is the rise of water level in the pond, if the average displacement of the water by a person is 0.04 m^3?

$[3\times4=12$

SECTION D

*Followings are of **5 Marks** each (Q17-18).*

Q17. (a) A roller pin is made by joining 3 cylindrical pieces of wood as shown in the Fig.1. Find the cost of painting it at the rate of 10 paise per sq. cm. Use $\pi=\frac{22}{7}$.

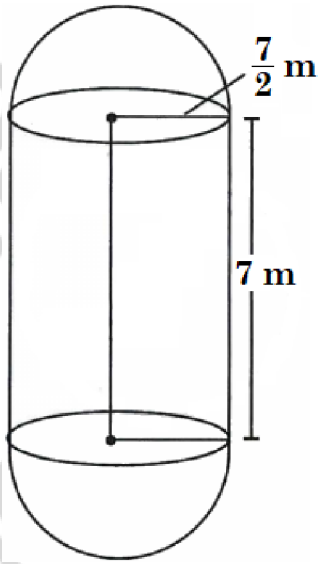


OR

(b) The height of a cone is 40 cm. A small cone is cut off at the top by a plane parallel to the base and its volume $\frac{1}{64}$ times the volume of original cone. Find the height from the base at which the section is made.

Q18. The boilers are used in thermal power plants to store water and then used to produce steam. One such boiler consists of a cylindrical part in middle and two hemispherical parts at its both ends.

If the length of the cylindrical part is 7 m and radius of cylindrical part is $\frac{7}{2}$ m, then find the total surface area and the volume of the boiler. Also, find the ratio of the volume of cylindrical part to the volume of one hemispherical part.



[5 × 2 = 10

SECTION E

*Following is a case-study based question of **4 Marks** (Q19); having three sub-parts (i), (ii) and (iii).*

Q19. **CASE STUDY BASED QUESTION :** A Chennai based company manufactures cylindrical water tanks with a hemispherical dome on top. The cylindrical part has a radius of 3.5 m and a height of 7 m. The hemispherical dome has the same radius as the cylinder. The company wants to paint the outside surface (excluding the base) and also calculate the water it can store.

Based on the above information, answer the following questions using $\pi = \frac{22}{7}$.

(i) Find the curved surface area of the cylindrical part.

(ii) Find the curved surface area of the hemispherical dome.

(iii) Find the total cost of painting the outside surface of the tank (excluding the base) if the cost of painting is ₹50 per m^2.

OR

(iii) If the tank is filled with water and water is supplied to a residential colony of 100 families, each consuming 200 liters per day, find for how many days the water will last.

$[1+1+2=4$

theopgupta.com

MATHEMATICIA BY O.P. GUPTA

...a name you can bank upon!

Feel Safe to **Share this Document** with other math scholars

CLICK NOW

TO Download

or, just type - theopgupta.com

FREE PDF TESTS AND ASSIGNMENTS OF THE CLASSES XII, XI & X

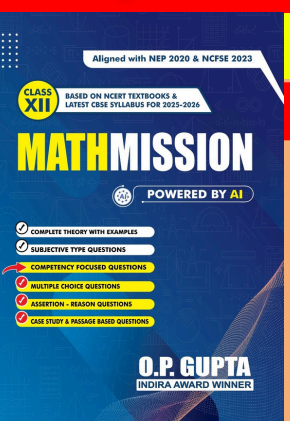
To get FREE PDF Materials, join WhatsApp Teachers Group by Clicking on the Logo

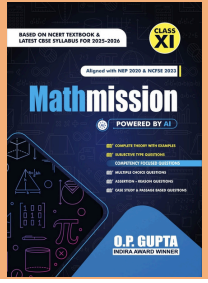
Click on the Book cover to buy!

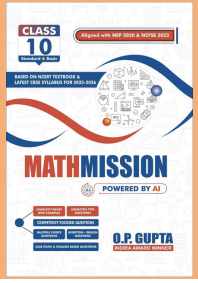
If you are a **Student**, then you may join our **Students Group**

CLICK HERE FOR CLASSES IX & X

CLICK HERE FOR CLASSES XI & XII







You can add our WhatsApp no. +919650350480 to your Groups also

Many **Direct Questions from our Books** have been asked in the recent CBSE Exams

MATHMISSION FOR XII, XI & X

2025-26 Edition

/theopgupta /theopgupta /theopgupta /@theopgupta

Buy our books on amazon Flipkart

For Bulk Orders of our Books at Discounted Price, contact on +91-9650350480

KEY HIGHLIGHTS

2 **FULLY SOLVED OFFICIAL CBSE SAMPLE PAPERS** issued on 30 July, 2025

14 **FULLY SOLVED SAMPLE PAPERS BASED ON LATEST PATTERN**

5 **UNSOLVED SAMPLE PAPERS WITH VIDEO / PDF SOLUTIONS**

5+ **PDF SAMPLE PAPERS AVAILABLE BY QR CODE**

RANKERS TEST SERIES FOR X

AS PER LATEST PATTERN ACCESSIBLE VIA QR CODE

theopgupta.com