Assignment 1
AI1110

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Abstract—**This document contains the solution to problem 3 (c) in 10th ICSE 2019 Paper**

Question 3(c) A solid metallic sphere of radius 6cm is melted and made into a solid cylinder of height 32cm. Find the

  (i) radius of the cylinder
 (ii) curved surface area of the cylinder

Solution: The various parameters involved in this question are listed in Table (I):

Symbol	Value	Description
R	6	Radius of Sphere
h	32	Height of Cylinder
r	?	Radius of Cylinder
CSA	?	Curved Surface Area

TABLE I
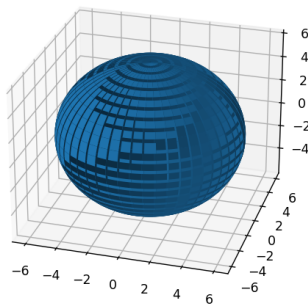

Fig. 1. sphere of radius 6cm

The Volume of a sphere of radius R is:

$$4/3 \times \pi \times R^3 \tag{1}$$

Let V be the volume of the metallic sphere, of radius 6cm. Hence,

$$V = 4/3 \times \pi \times 6^3 cm^3 \tag{2}$$

 (i) When the sphere is melted, it's volume doesn't change Since the cylinder is obtained by melting the sphere, Hence the volume of the cylinder is same as that of the sphere. Let radius of the cylinder be r cm. The volume of this cylinder is given as:

$$Volume = \pi \times r^2 \times h cm^3 \tag{3}$$

where h=32cm Using Equations (2) and (3) ,equating them,we get

$$4/3 \times \pi \times 6^3 cm^3 = \pi \times r^2 \times 32 cm^3 \tag{4}$$
$$\implies 4/3 \times 216 = r^2 \times 32 \tag{5}$$
$$\implies 288 = r^2 \times 32 \tag{6}$$
$$\implies r^2 = 288/32 \tag{7}$$
$$\implies r^2 = 9 \tag{8}$$
$$\implies r = 3cm \tag{9}$$
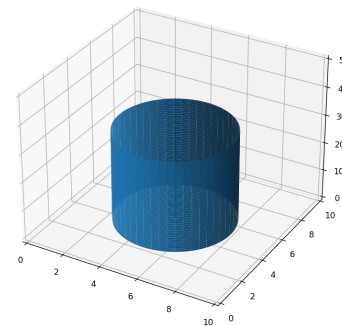
$\therefore$ radius of the cylinder is 3 cm

Fig. 2. cylinder of radius 3cm and height 32cm

(ii) The curved surface area (CSA) of a cylinder in centimeter square units with radius r cm and height h cm is given as $2 \times \pi \times r \times h$
Let C be the CSA(curved surface area) of the cylinder.

$$\implies C = 2 \times \pi \times r \times h \tag{10}$$

Here for the cylinder r=3cm and h=32cm

$$\implies C = 2 \times \pi \times 3 \times 32 \tag{11}$$
$$\implies C = 192 \times \pi \tag{12}$$
$$\implies C = 603.185789 cm^2 \tag{13}$$

$\therefore$ The Curved Surface Area of cylinder is nearly 603 square centimeters.