Surface Area of a Cylinder

Objective

To find the curved surface area and total surface area of a cylinder experimentally.

Prerequisite Knowledge

1. Area of a rectangle.
2. Area of a circle.
3. Concept of surface area of a cylinder.

Materials Required

A white chart paper, a cylinder made of paper, a pair of scissors, a ruler, fevicol.

Procedure

1. Remove the top and bottom circles of the cylinder.
2. Make a vertical cut in the curved surface and lay the cylinder flat to get a rectangle as shown.
3. Measure the length and breadth of the rectangle so formed.

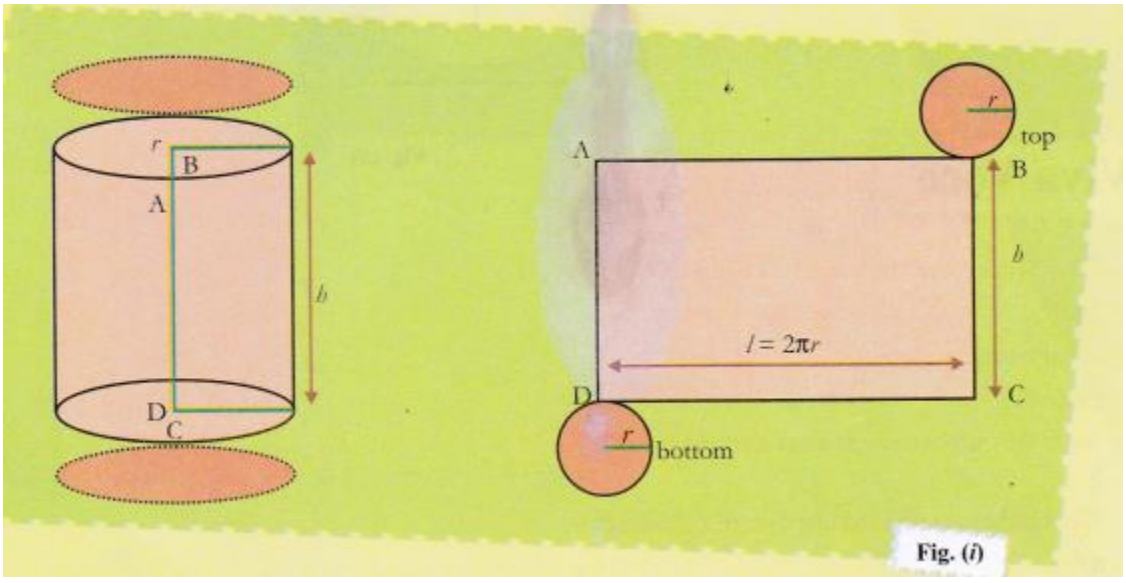

Fig. (i)

Observation

1. Top and bottom of cylinders are circles.
   Therefore Area of 2 circles = πr^2, where r is the radius of base circle of cylinder
2. Length of rectangle = circumference of base of cylinder = 2πr
3. Breadth of rectangle = height = h

4. Area of rectangle = πrx h = curved surface area of cylinder
5. Total surface area of cylinder =$2\Pi rh$ + πr^2
   = $2\Pi r(h+r)$

Result

Curved surface area of a cylinder = $2\Pi rh$
Total surface area of a cylinder = $2\Pi r$ (h+r)

Learning Outcome

This activity' clears the concept of curved surface area (lateral surface area) and total surface area of a cylinder.

Activity Time

Calculate the total surface area in terms of radius, where 'tf represents the diameter of the cylinder.

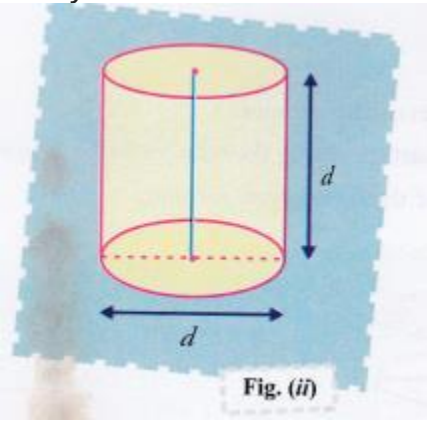

Fig. (ii)

Viva voice

Question 1:
What is curved surface area of a cylinder ?
Answer:
$2\Pi rh$

Question 2:
What is total surface area of a cylinder ?
Answer:
$2\Pi r(r+h)$

Question 3:
Write the number of circular faces of a cylinder ?
Answer:
2

Question 4:
What is the area of a circular face of cylinder ?
Answer:
πr^2

Question 5:
If h = 7 cm and r=2 cm, find the lateral surface area of a cylinder.
Answer:
$2\Pi rh$=2× $\frac{22}{7}$ ×2×7= 88 cm^3

Question 6:
What is the total area of circular faces of a cylinder ?
Answer:
$2\pi r^2$

Question 7:
What will be the curved surface area of a cylinder if its height is 3 times of its radius ?
Answer:
$6\pi r^2$

Question 8:
What will be the curved surface area of a cylinder if its height is equal to the diameter of the base ? **Answer:**
$4\pi r^2$

Multiple Choice Questions

Question 1:
The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. The diameter of the base of
the cylinder is
(a) 2 cm
(b) 1 cm
(c) 1.5 cm
(d) none of these

Question 2:
The curved surface area of a right circular cylinder is 4.4 m^2 . If the radius of the base of the cylinder is
0.7 m, find its height.
(a) 2 m
(b) 1.5 m

(c) 1 m
(d) none of these

Question 3:
A cylindrical pillar is 5 m in diameter and 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of Rs.12.50 per m^2
(d) Rs. 69.75
(b) Rs. 687.5
(c) Rs.67.75
(d) none of these

Question 4:
A rectangular sheet of paper 44 cm x 18 cm is rolled along its length and a cylinder is formed. The radius of the cylinder is
(a) 7 cm
(b) 9 cm
(c) 22 cm
(d) none of these

Question 5:
The radius and height of a cylinder are in the ratio 5 : 7 and its curved surface area is 220 cm^2. The radius and height are respectively
(a) 5 cm and 7 cm
(b) 7 cm and 5 cm
(c) 5 cm and 5 cm
(d) 1 cm and 7 cm

Question 6:
The curved surface area of a cylinder is 1000 cm^2 and its diameter is 20 cm. The height of the cylinder is
(a) 15.9 cm
(b) 15.8 cm
(c) 19.5 cm
(d) none of these

Question 7:
Find the curved surface area of a right circular cylinder of height 14 cm and base radius 1 cm.
(a) 88 cm^2
(b) 80 cm^2
(c) 82 cm^2
(d) 84 cm^2

Question 8:
What is the height of a cylinder of base radius as 1 cm and curved surface area as 88 cm^2 ?
(a) 11 cm
(b) 14 cm
(c) 44 cm
(d) none of these

Question 9:
A metal pipe is 77 cm long. The inner diameter of a cross-section is 4 cm, the outer diameter being 4.4 cm. Its outer curved surface area is
(a) 1064.8 cm^2
(b) 1406.8 cm^2
(c) 1460.8 cm^2
(d) none of these

Question 10:
What is the curved surface area of a right circular cylinder of base radius 0.7 m and height 1 m ?
(a) 4.4 m^2
(b) 4.1 m^2
(c) 1.1 m^2
(d) none of these

Answers
1. (a)
2. (c)
3. (b)
4. (a)
5. (a)
6. (a)
7. (a)
8. (b)
9. (a)
10. (a)