CHAPTER-12
CIRCUMFERENCE, AREA AND VOLUME

Students Learning Outcomes

After studying this chapter, students will be able to:

- ➤ Express it as the ratio between the: circumference and the diameter of a circle.
- ➤ Find the circumference of a circle using formula.
- ➤ Find the area of a circular region using formula.
- ➤ Find the surface area of a cylinder using formula.
- ➤ Find the volume of the cylindrical region using formula.
- ➤ Solve real life problems involving.
- • circumference and area of a circular region.
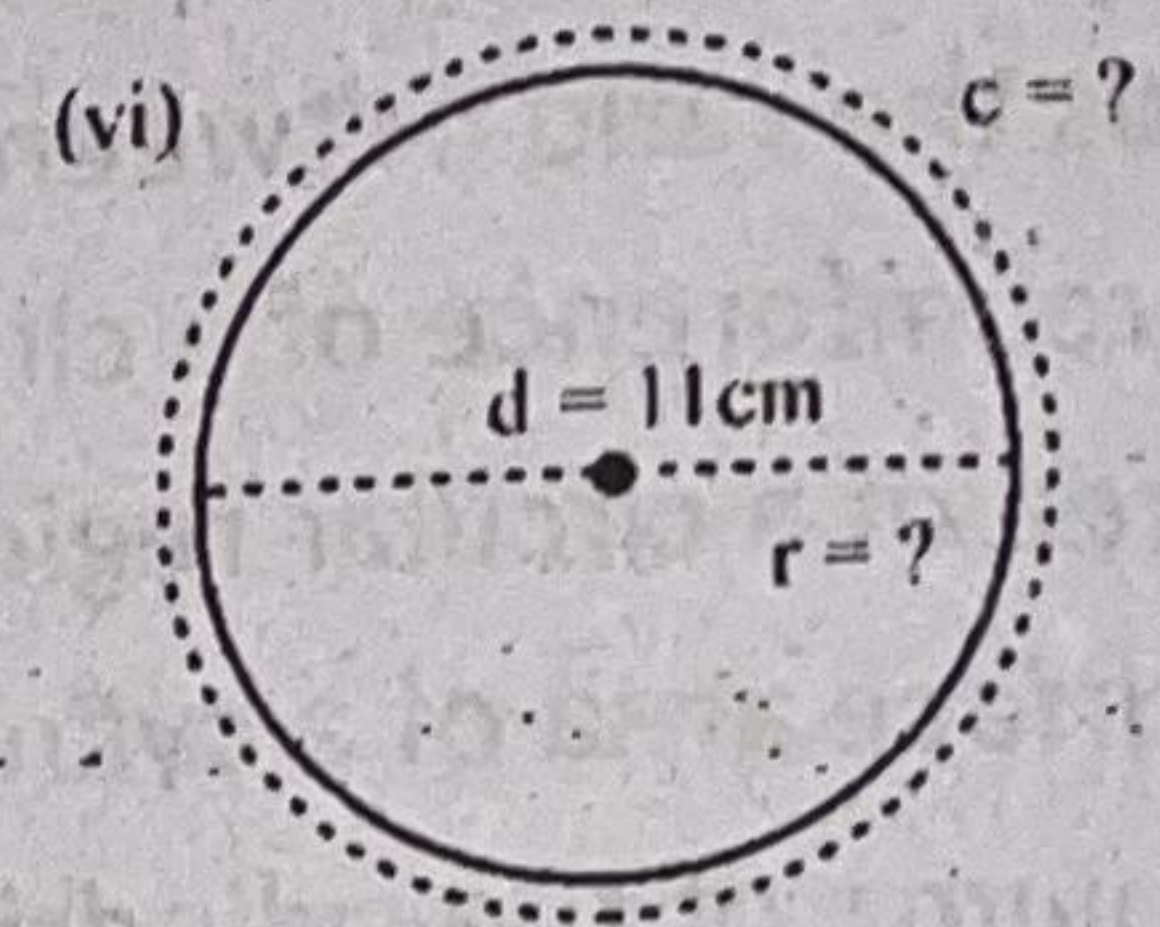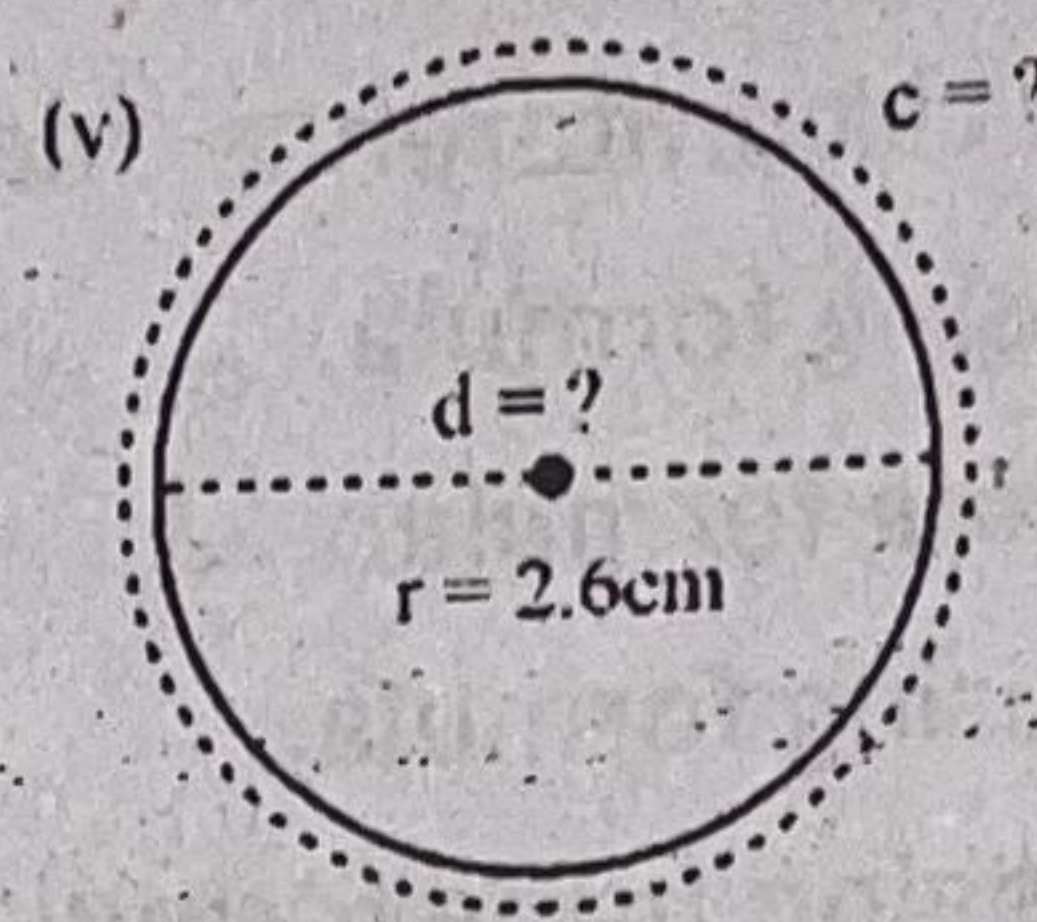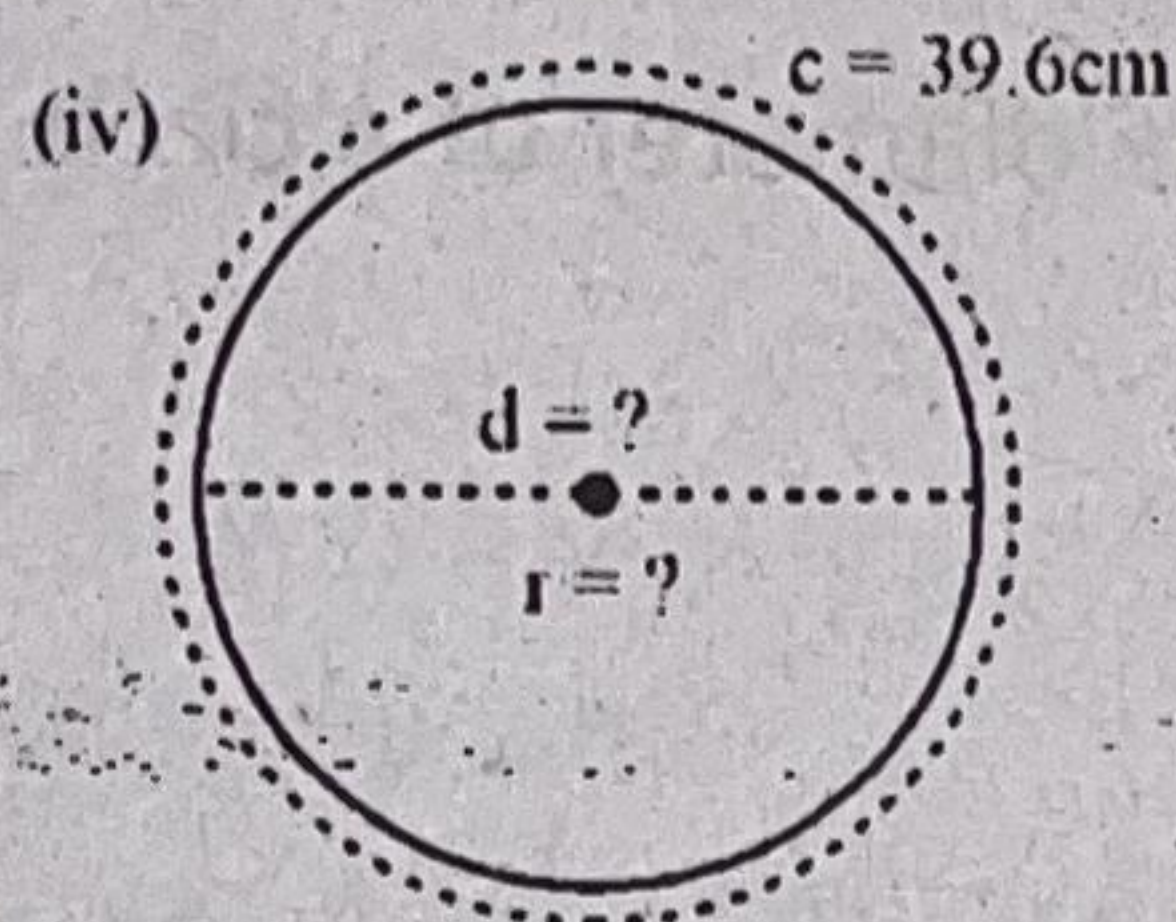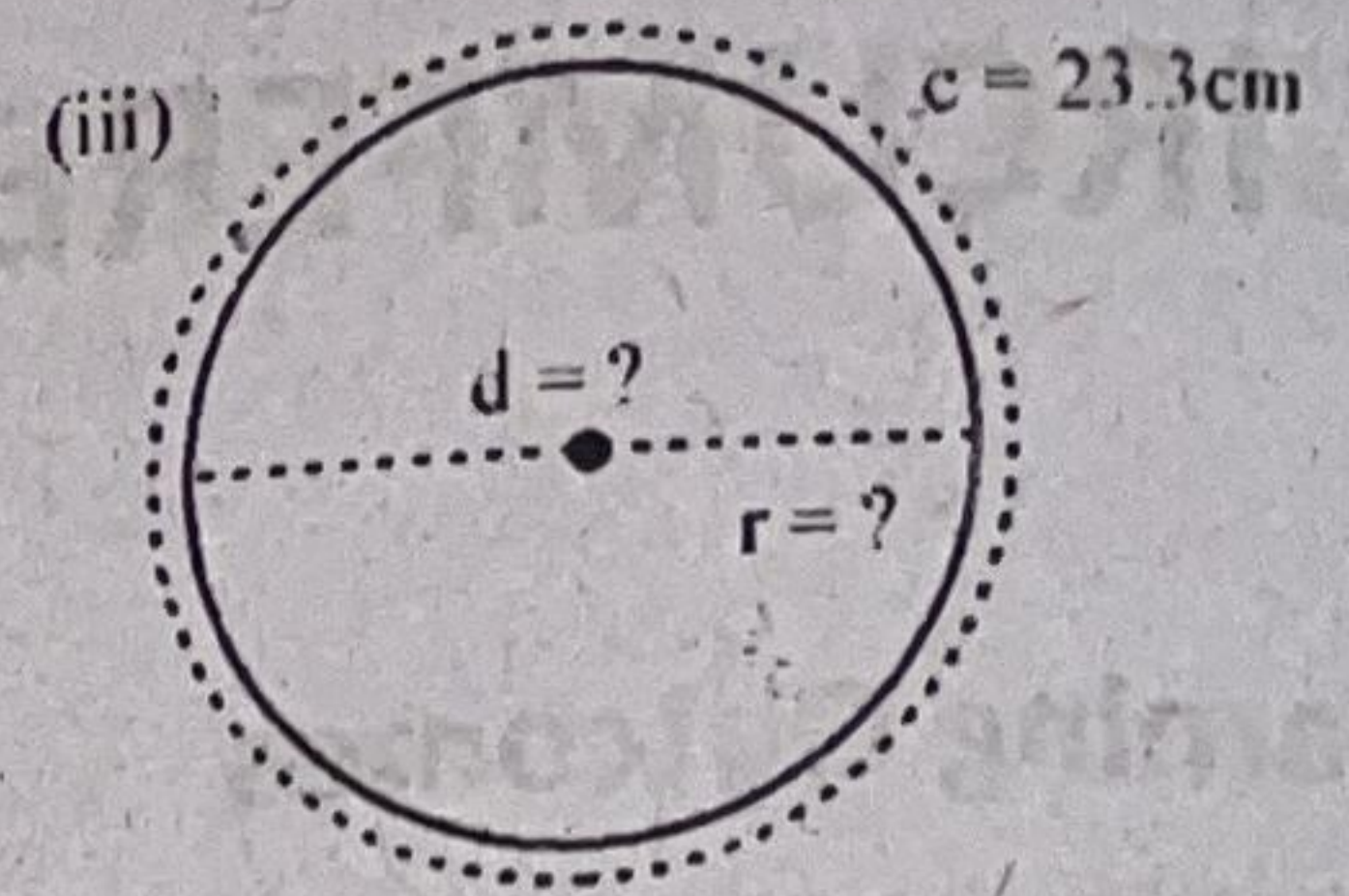- • surface area and volume of a cylinder.

SOLVED EXERCISE 12.1

1. Find the unknown quantity when π ≈ .

(i) c = ?, d = ?, r = 1.8cm

(ii) c = ?, d = 9.8cm, r = ?

(iii) c = 23.3cm, d = ?, r = ?

(iv) c = 39.6cm, d = ?, r = ?

(v) c = ?, d = ?, r = 2.6cm

(vi) c = ?, d = 11cm, r = ?
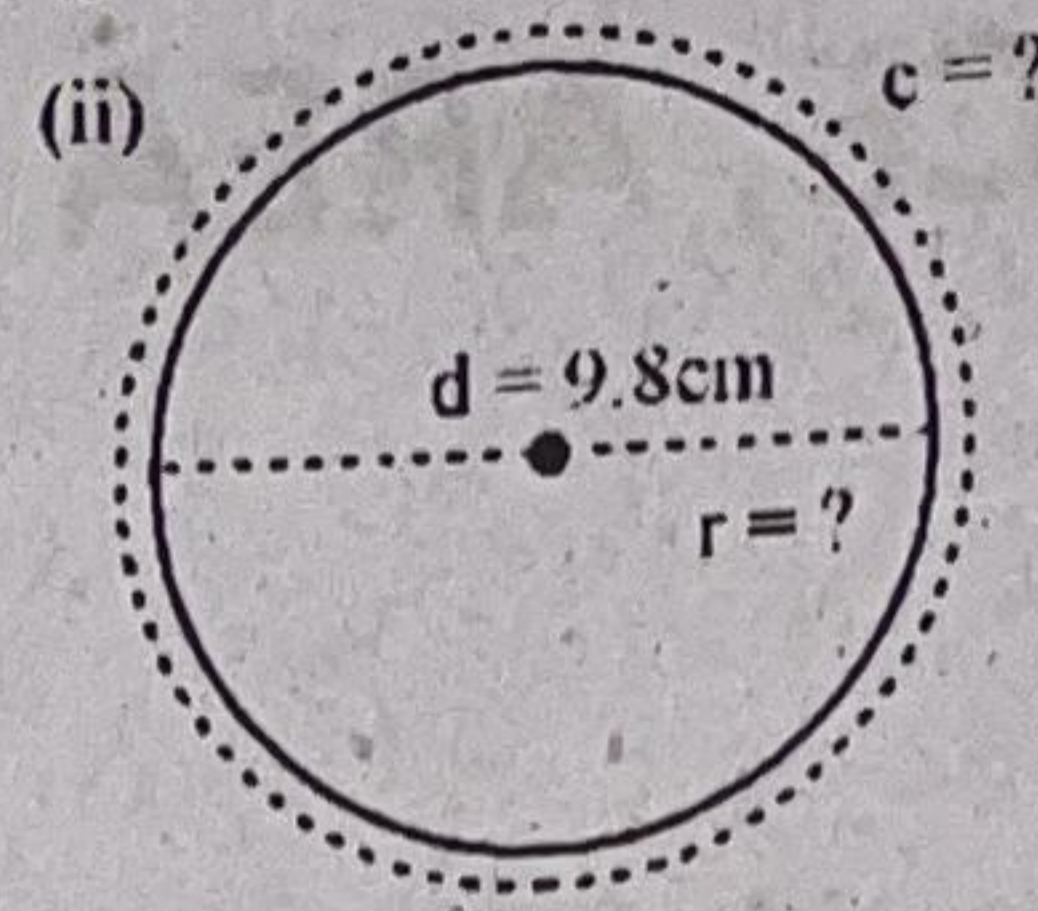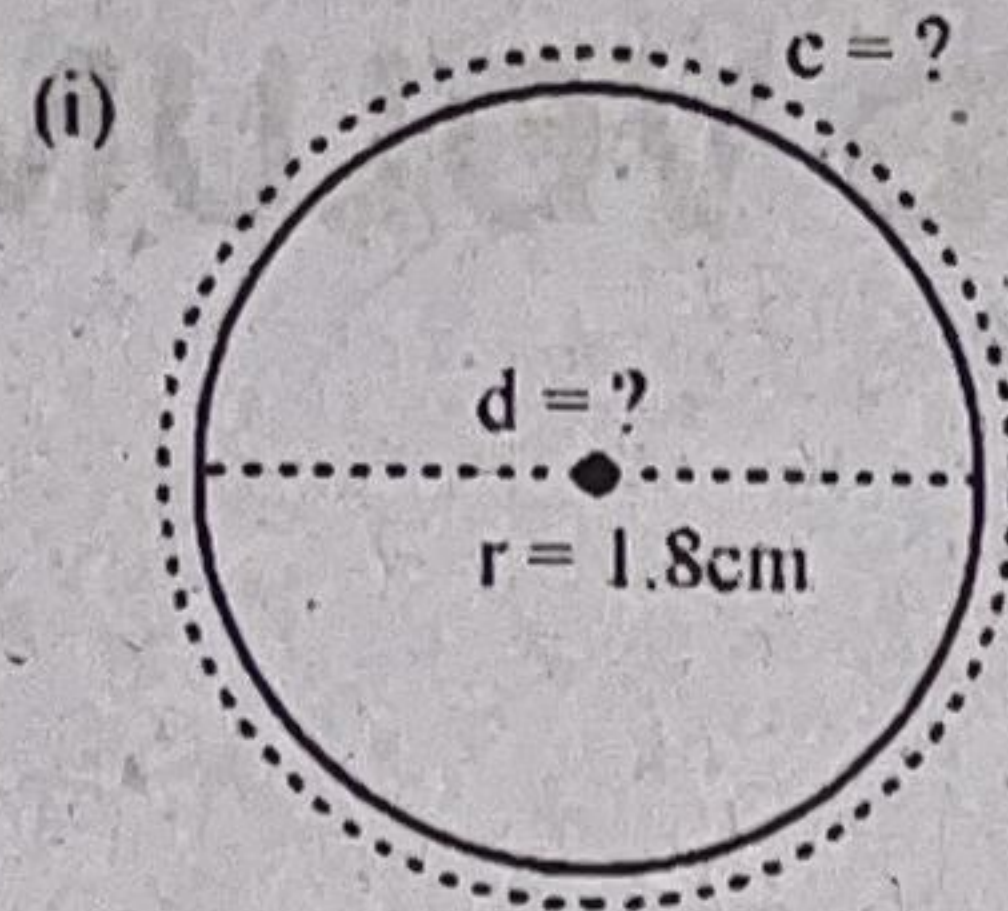
Solution:

(i) r = 1.8cm, π
c = ?, d = ?
r =
1.8 = ⇒ d = 1.8 × 2 = 3.6cm
$c = \pi d = \frac{22}{7} \times 3.6 = 11.314$cm

(ii) d = 9.8cm, π
d = ?, r = ?
r = d/2 = 4.9cm
c = πd = 3.14 × 9.8 = = 30.80cm

(iii) c = 23.3cm, π
d = ?, r = ?
c = πd = 22/7 × d
7 × 23.3 = 22d
3.177 = d
r = d/2 = 3.177/2 = 1.6cm

(iv) c = 39.6cm, π
d = ?, r = ?
c = πd
39.6 = 22/7 × d
39.6 × 7 = 22d
12.6 = d
r = 6.3cm

(v) r = 2.6cm, π
c = ?, d = ?
d = 2.6 × 2 => d=5.2
c = πd
c = 22/7 × 5.2
c = 16.3

(vi) d = 11cm, π
c = ?, r = ?
r = 11/2=
c = πd
= 22/7 × 11 = = 34.57cm

2. The diameter of a circle is 11.6cm. Find the circumference of the circle.

Solution:

$d = 11.6cm, \pi = 22/7$

$c = ?$

$c = \pi d$

$c = 22/7 \times 11.6 = =36.46$ cm

3. The radius of a circle is 9.8 cm. Find the circumference of the circle.

Solution:

$r = 9.8cm, \pi = 22/7$

$c = ?$

$9.8 \times 2 = d = 19.6$

$c = \pi d$

$c = 22/7 \times 19.6 = = 61.6$ cm

4. The circumference of a circle is 1.54cm. Find the diameter and radius of the circle (when ⊡ =)

Solution:

$c = 1.54, \pi = \quad d = ?, \quad r = ?$

$c = \pi d$

$1.54 = 22/7 \times d$

$1.54 \times 7 = 22d$

$0.49 = d$

$r = d/2 = 0.24$

5. The circumference of a circular region is 19.5cm. Find its diameter and radius (when $\pi = 3.14$).

Solution:

$c = 19.5cm, \pi = 3.14 \quad d = ?, \quad r = ?$

$c = \pi d$

$19.5 = (3.14)d$
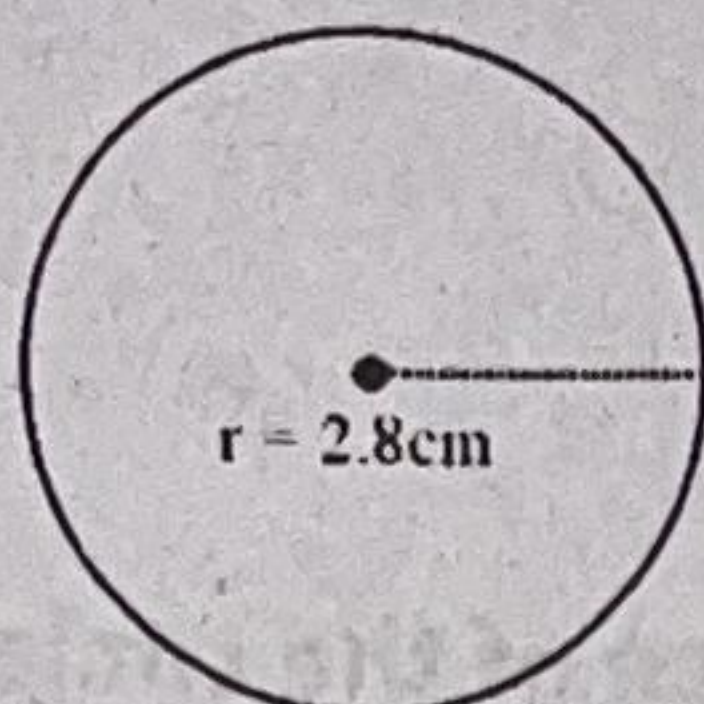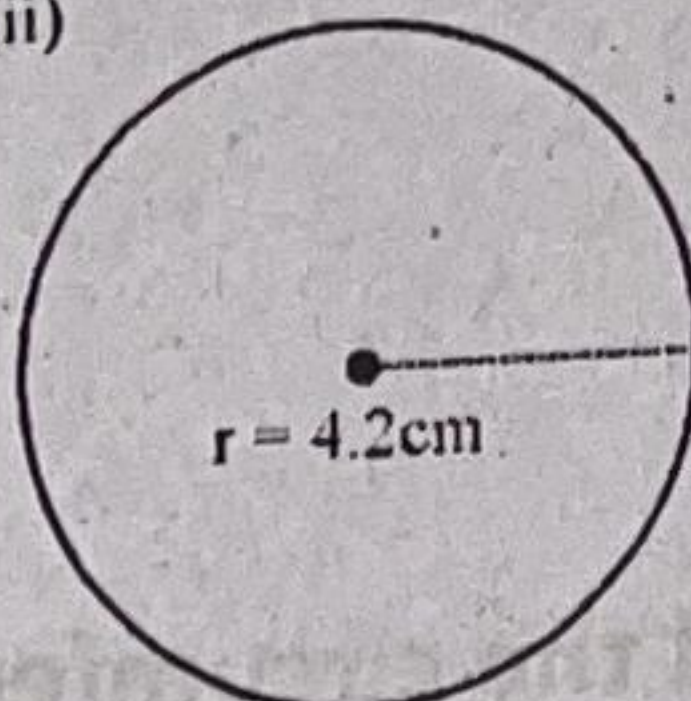
$6.2cm \approx d$

$r = 3.1cm$

SOLVED EXERCISE 12.2

1. Find the area of each of the following circles. When $\pi =$

(i)

(ii)
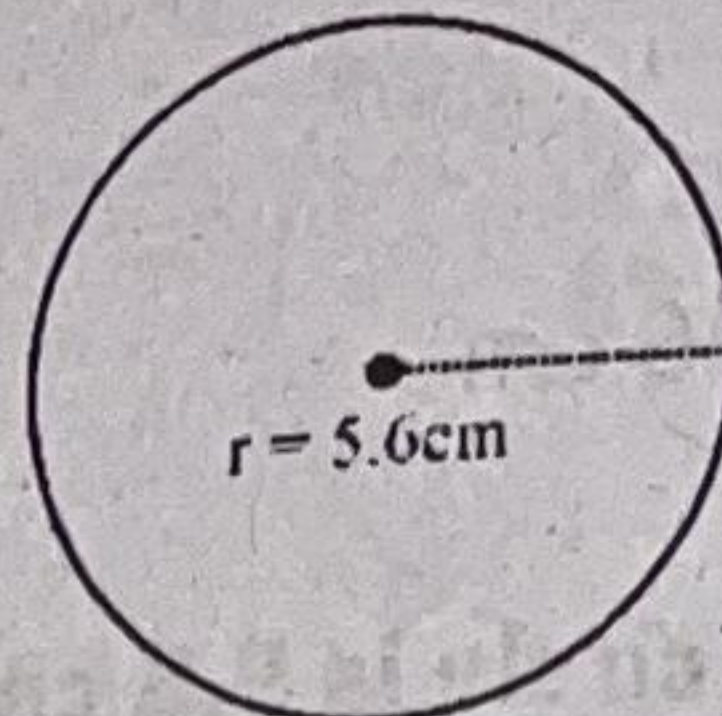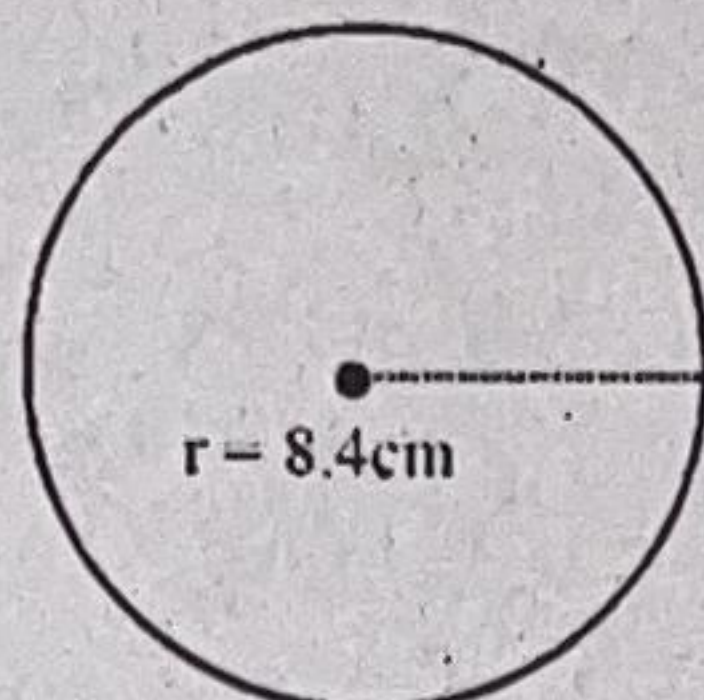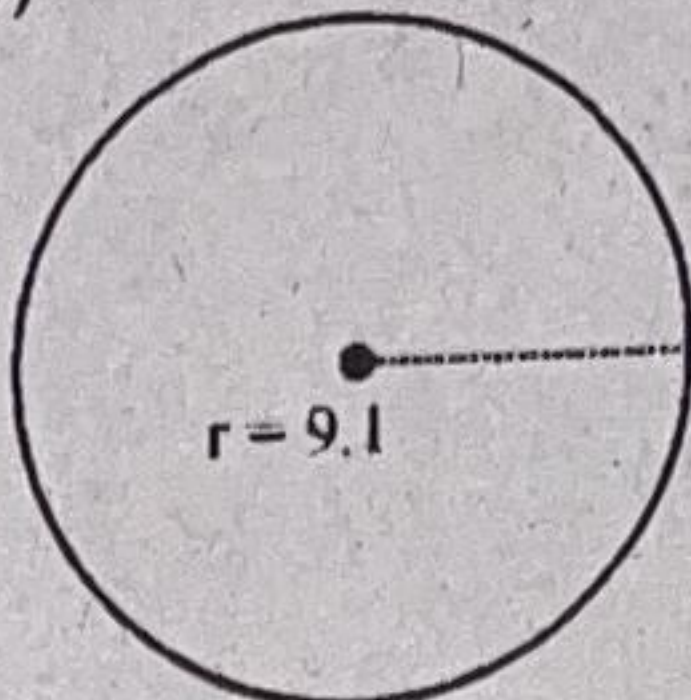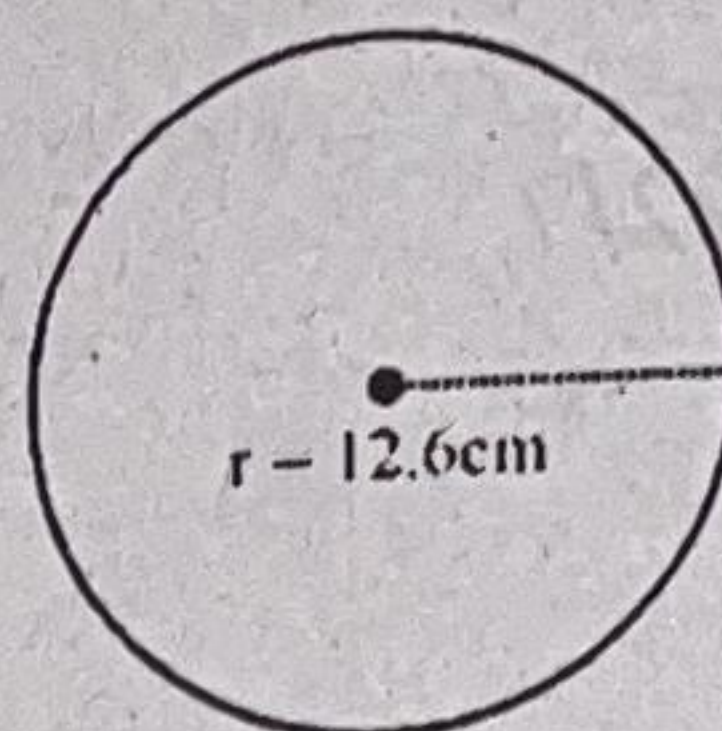
(iii)

$r = 2.8$cm

$r = 4.2$cm

$r = 5.6$cm

(iv)

(v)

(vi)

$r = 8.4$cm

$r = 9.1$

$r = 12.6$cm

Solution:

(i) $r = 2.8$cm   area = ? , $\pi = 22/7$
Area $= \pi r^2 = 22/7 \times (2.8)^2 = = 24.64$cm^2

(ii) $r = 4.2$cm, $\pi = 22/7$, Area = ?
Area $= \pi r^2 = 22/7 \times (4.2)^2 = = 55.44$cm^2

(iii) $r = 5.6$cm, $\pi = 22/7$, Area = ?
Area $= \pi r^2 = 22/7 \times (5.6)^2 = = 98.56$cm^2

(iv) $r = 8.4$cm, $\pi = 22/7$, Area = ?
Area $= \pi r^2 = 22/7 \times (8.4)^2 = = 221.76$cm^2

(v) $r = 9.1$cm, $\pi = 22/7$, Area = ?
Area $= \pi r^2 = 22/7 \times (9.1)^2 = = 260.26$cm^2

(vi) $r = 12.6$cm, $\pi = 22/7$, Area = ?
Area $= \pi r^2 = 22/7 \times (12.6)^2 = = 498.96$cm^2

2. Find the area of a circle whose circumference is 31.43cm. When $\pi \approx 22/7$

Solution:

$c = 31.43$cm, $\pi \approx$, Area?

$c = \pi d$

$31.43 = 22/7 \times d$

$31.43 \times 7 = 22d$

$10 = d$

$d \approx 10$cm

$r = d/2 = 10/2 = 5$cm

Area $= \pi r^2 = 22/7 \times (5)^2 = (22 \times 25)/7 = 78.57$cm^2

3. The radius of a circle is 6.3cm. Calculate the area and circumference of the circle. When

$\pi \approx$

Solution:

r = 6.3cm, π = , Area?

Area = ?, c = ?

Area = πr^2 = 22/7× $(6.3)^2$ = = 124.74cm²

6.3×2 = d

12.6=d

c = πd = 22/7× 12.6 = = 39.6 cm

4. The circumference of a circle is 26.4cm. Find the area of the circle. When $\pi \approx$

Solution:

c = 26.4cm, $\pi \approx$ 22/7

c = πd

26.4 = × d

26.4 × 7 = 22d

8.4 = d $\Rightarrow$ d = 8.4cm

r =d/2 =8.4 / 2 = 4.2

Area = πr^2 = 22/7 × $(4.2)^2$ = 55.44cm²

5. Find the circumference: of a circle whose area is 38.5cm². When $\pi \approx$

Solution:

Area = 38.5cm², π = 22/7

Area = πr^2

38.5 = 22/7 × r^2

38.5×7 = 22r^2

= r^2

12.25 = r^2

r = 3.5cm

3.5×2 = d

7=d

c = πd = 22/7 × 7 = 22 cm

SOLVED EXERCISE 12.3

1. Find the surface area of the following cylinders.

(i)

d = 2cm, h = 6cm

(ii)

r = 1.5cm, h = 34cm

(iii)

r = 3.5cm, h = 14.9cm

(iv)

d = 11.2cm, h = 25cm

(v)

r = 9cm, h = 45.5cm

(vi)

r = 16.3cm, h = 60.7cm
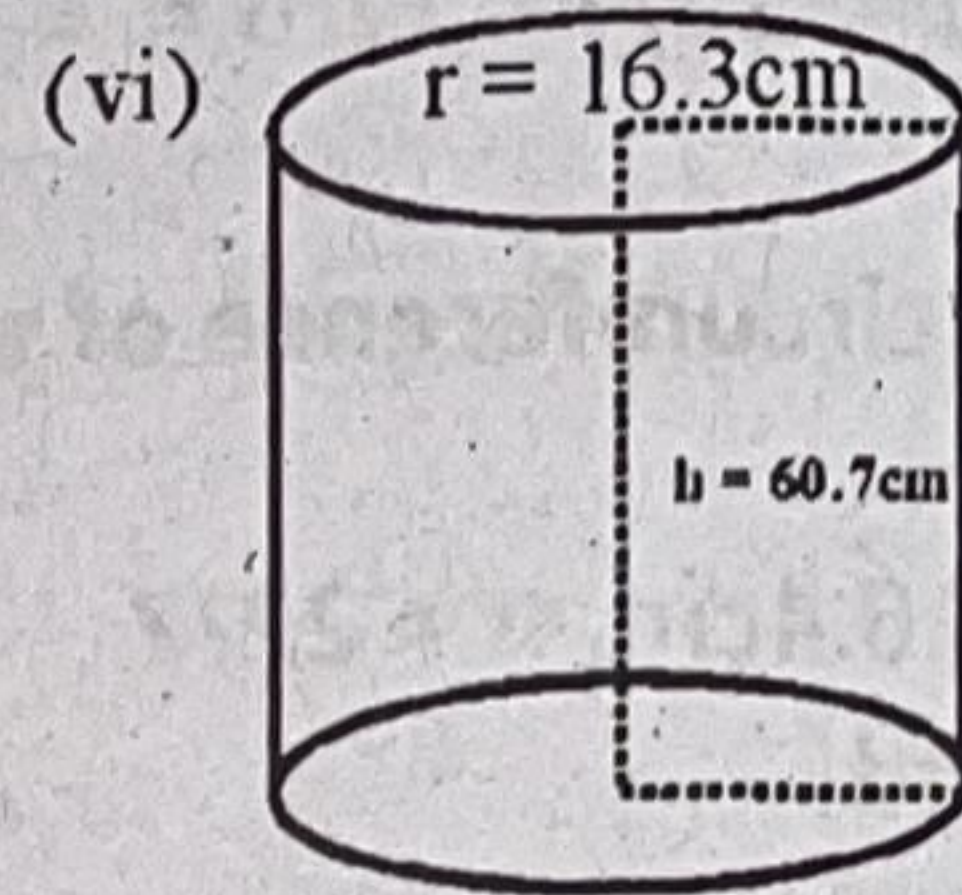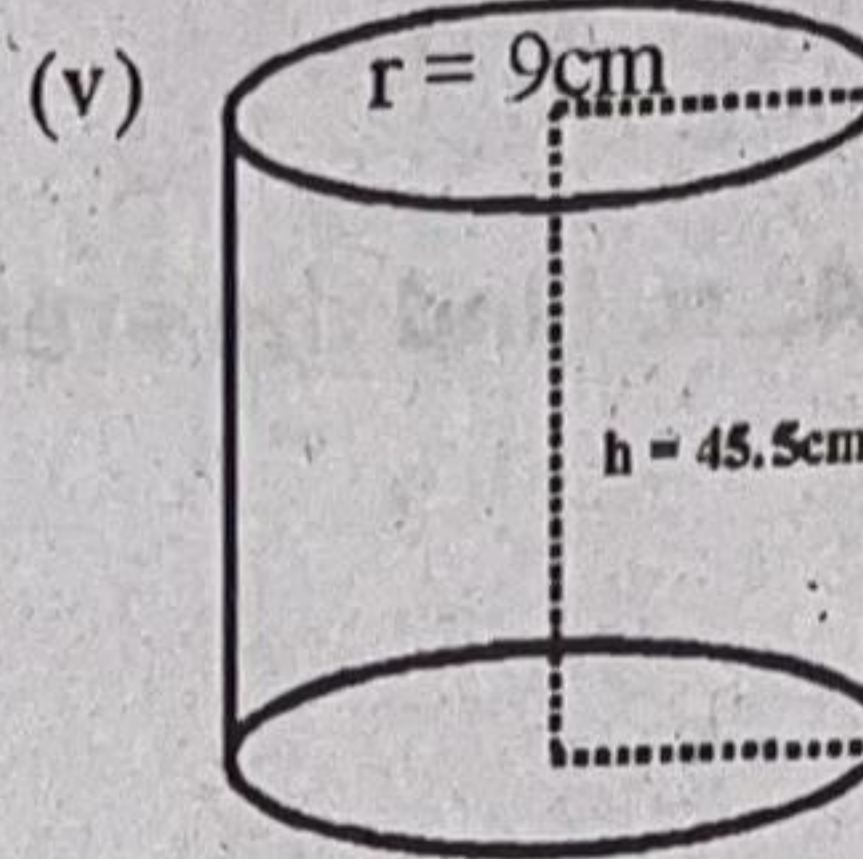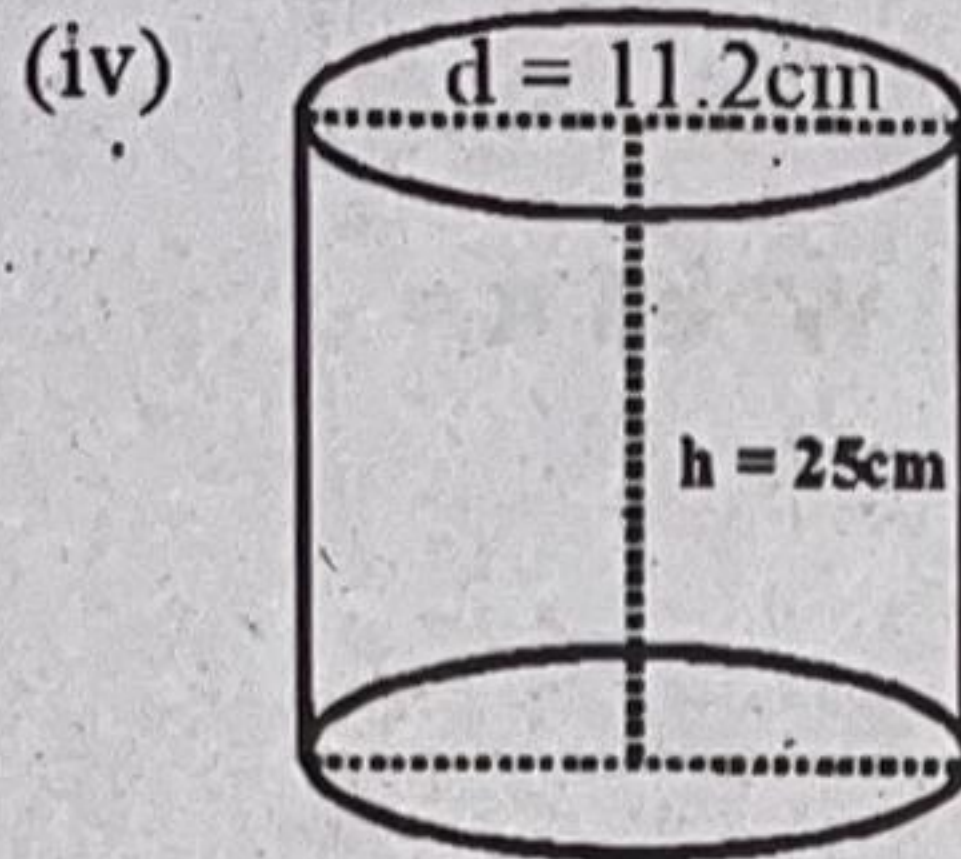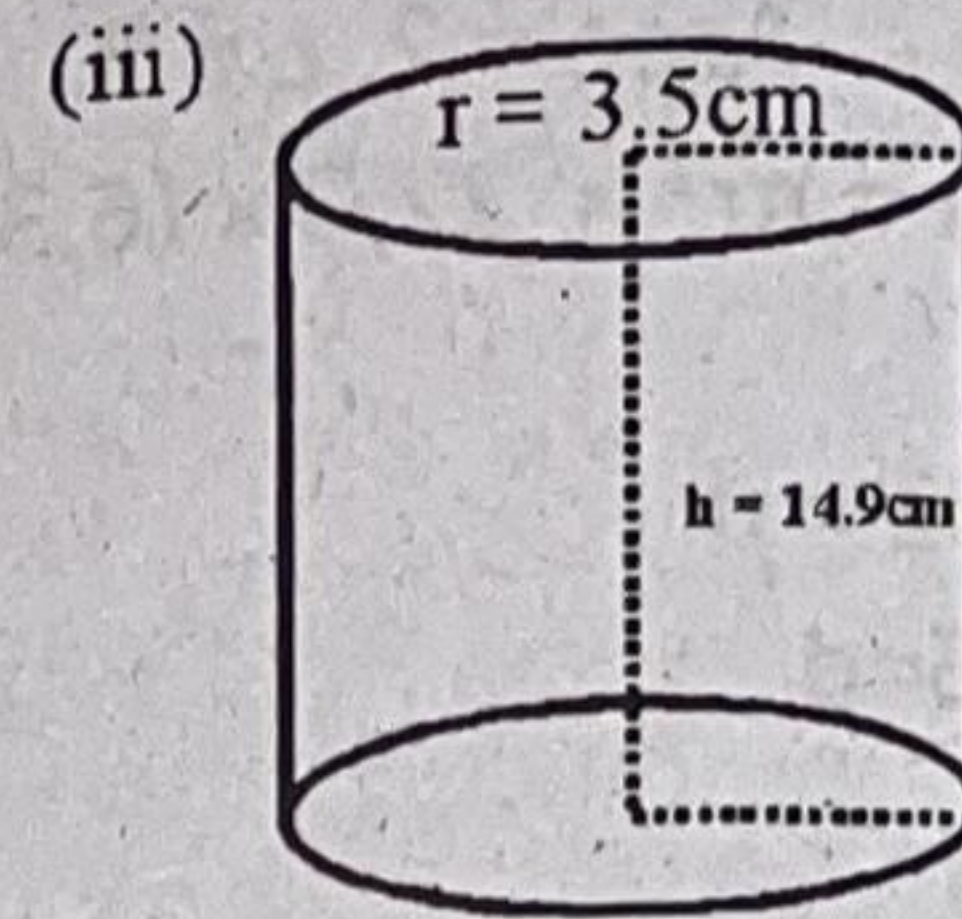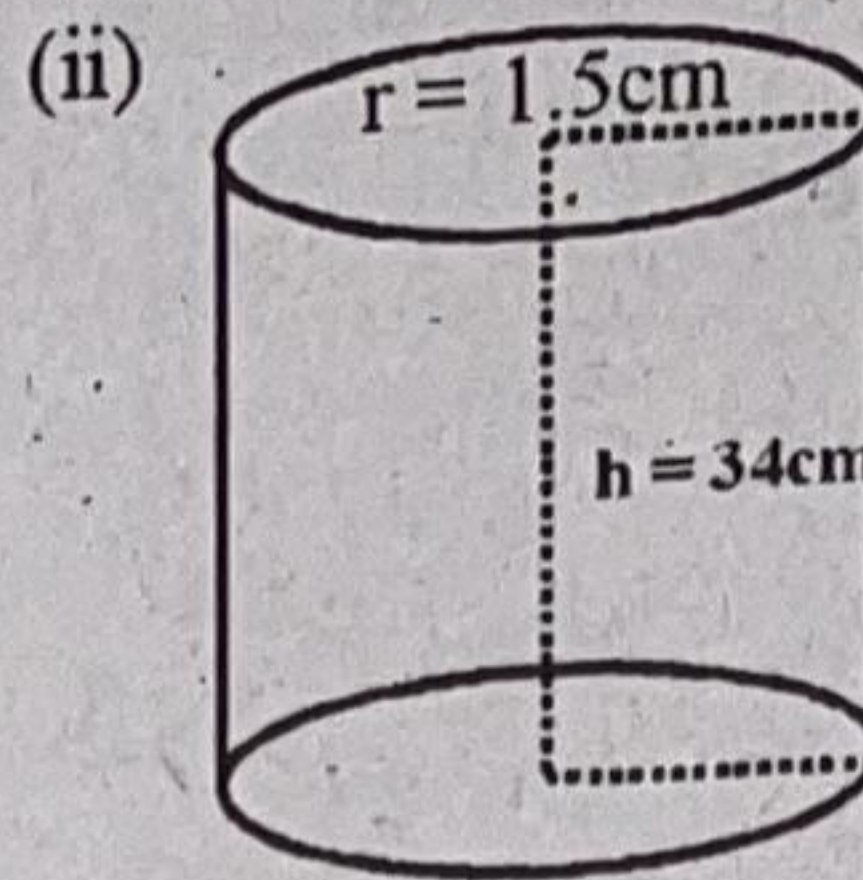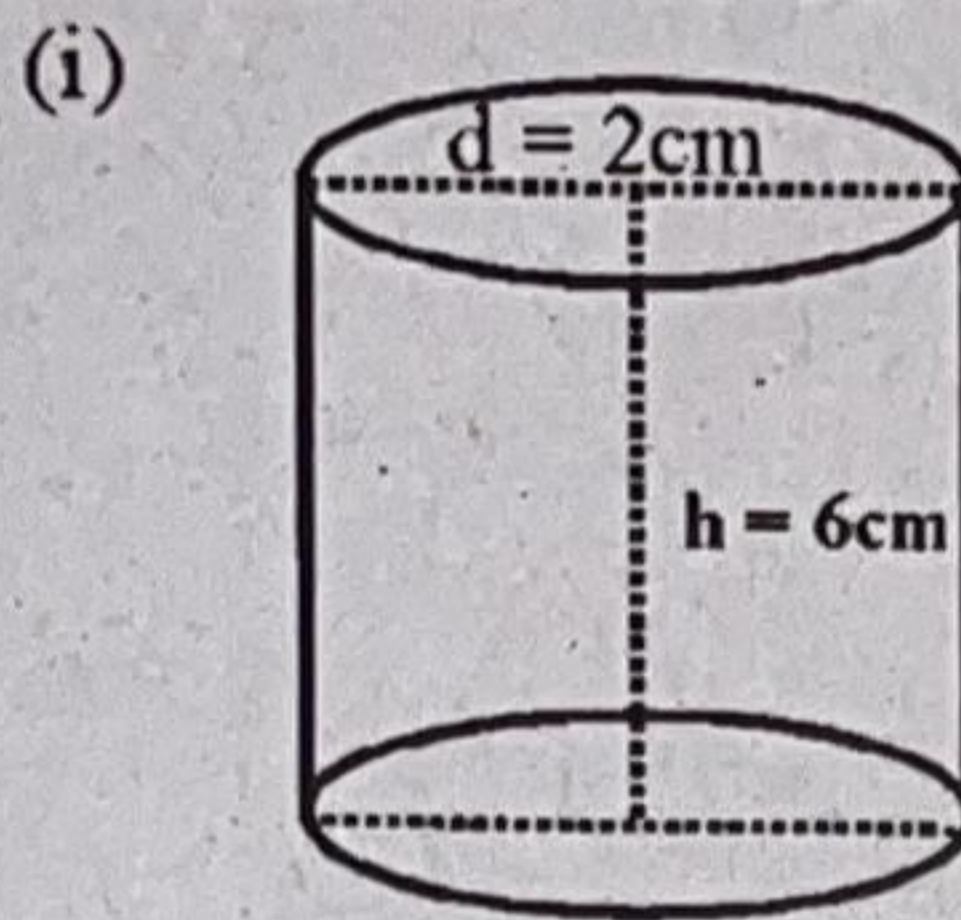
Solution:

(i) d = 2cm, h = 6cm, π =

r = d/2 = 2/2 = 1cm

Surface area of cylinder = $2\pi r (h + r)$

$= 2 \times 22/7 \times 1 (6 + 1) = 2 \times 22/7 \times (7) = 44cm^2$

(ii) r = 1.5cm, h = 3.4cm, π = 22/7

Surface area of cylinder = $2\pi r (h + r)$

$= 2 \times 22/7 \times 1.5 (3.4 + 1.5)$

$= (44/7) \times 1.5(4.9) = (44/7) \times 7.35 = 323.4/7 = 46.2cm^2$

(iii) r = 3.5cm, h = 14.9, π = 22/7

Surface area of cylinder = $2\pi r (h + r)$

$= 2 \times 22/7 \times 3.5 (14.9 + 3.5)$

$= (44/7) \times 3.5(18.4) = 6.3 \times 64.4 = 404.8cm^2$

(iv) d = 11.2cm, h = 25cm, π = 22/7

r= d/2=11.2/2= 5.6cm

Surface Area of cylinder = $2\pi r (h + r)$

$= 2 \times 22/7 \times 5.6 (25 + 5.6)$

$= (44/7) \times 5.6(30.6) = (44/7) \times 171.36$

$=6.3 \times 171.36 = 1077.12cm^2 = 1077.12cm^2$

(v) r = 9cm, h = 45.5cm, π = 22/7

Surface Area of cylinder = $2\pi r (h + r)$

$= 2 \times 22/7 \times 9(45.5 + 9)$

$= 44/7 \times 9(54.5)$

$= 6.3 \times 490.5$

$$= 6.3 \times 490.5 = 3083.14cm^2$$

(vi)   r = 16.3cm, h = 60.7cm, π = 22/7

Surface Area of cylinder = 2πr (h + r)

$$= 2 \times 22/7 \times 16.3(60.7 + 16.3)$$
$$= 44/7 \times 16.3(77)$$
$$= 6.3 \times 1255.1$$
$$= 7889.2 = 7889.2cm^2$$

2.   The radius of a cylinder is 1.4cm and length is 5.2cm. Calculate the surface area of the cylinder.

Solution:

r = 1.4cm, h = 5.2cm, π = 22/7

Surface Area of cylinder = 2πr (h + r)

$$= 2 \times(22/7)\times 1.4(5.2 + 1.4)$$
$$= 6.3 \times 1.4(6.6) = 6.3 \times 9.24 = = 58.08cm^2$$

3.   Find the surface area of a cylinder 7.4cm long iron rod of 3.1cm radius.

Solution:

r = 3.1cm, h = 7.4cm, π = 22/7

Surface Area of cylinder = 2πr (h + r)

$$= 2 \times(22/7)\times 3.1(3.1 + 7.4)$$
$$= 6.3 \times 3.1(10.5) = 6.3\times 32.55 = 204.6= 204.6cm^2$$

4.   A cylinder is 5m long and radius of the cylinder is 5.3cm. Calculate the surface area of the curved surface of cylinder.

Solution:

h = 5m = 5 × 100 = 500cm

r = 5.3cm, h = 500cm, π = 22/7

Area of the curved surface of cylinder   = 2πrh

$$= 2x \; 22/7x \; 5.3 \times 500$$
$$= \frac{44}{7} \times 2650 = \frac{116600}{7} \approx 16657.4cm^2$$

5.   The diameter of a cylinder is 18.5cm and length is 6.1m. Find the surface area of the curved surface.

Solution:

d = 18.5cm, r = d/2= 18.5/2= 9.25cm

h = 6.1m = 6.1 × 100 = 610cm, π = 22/7

Area of curved surface of cylinder   = 2πrh

$$= 2 \times(22/7)\times 9.25 \times 610$$
$$= (44/7)\times5642.5$$

$$= \frac{248270}{7}$$

$$\approx 35467.14 cm^2$$

SOLVED EXERCISE 12.4

1. Find the volume of the following cylinders.

(i) r = 1cm, h = 3.5cm

(ii) r = 2cm, h = 2.8cm

(iii) d = 2.8cm, h = 9cm

(iv) r = 3.3cm, h = 35cm

(v) r = 5.6cm, h = 12.5cm

(vi) d = 21cm, h = 100cm

(vii) d = 11.2cm, h = 25cm

(viii) r = 10cm, h = 21cm

(ix) r = 18cm, h = 175cm
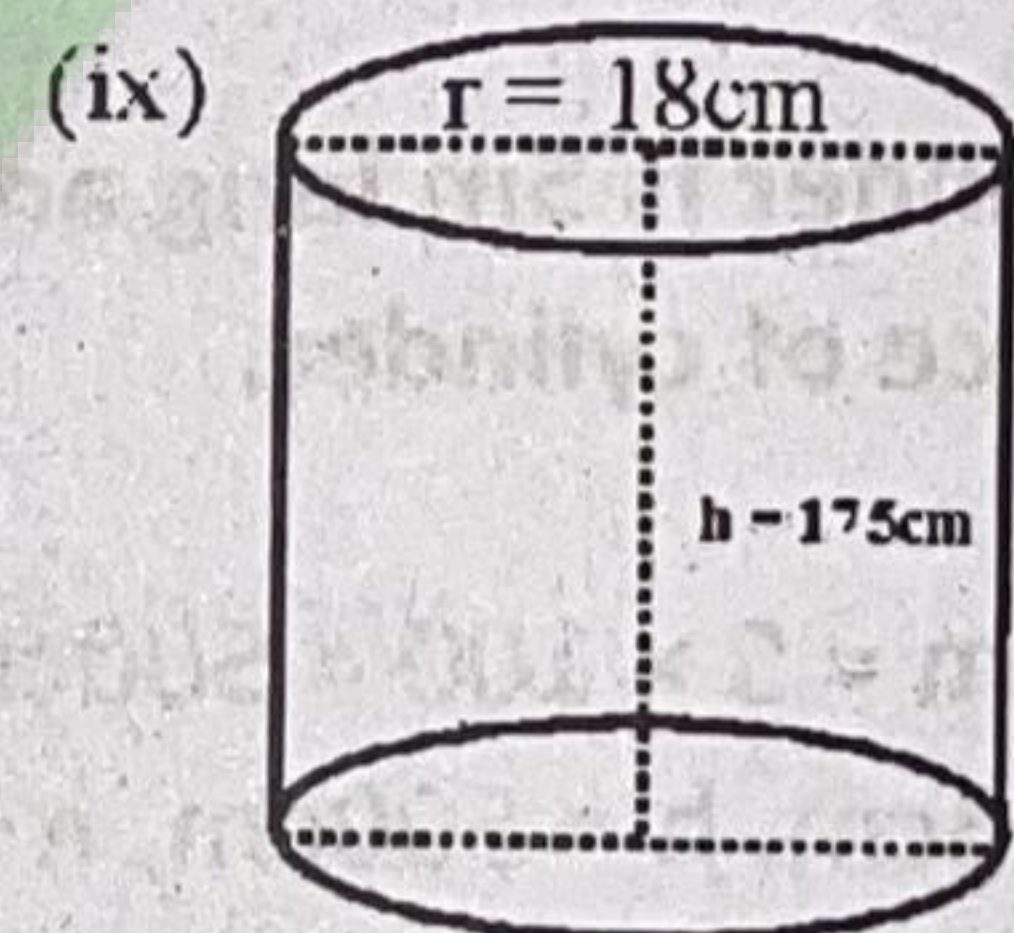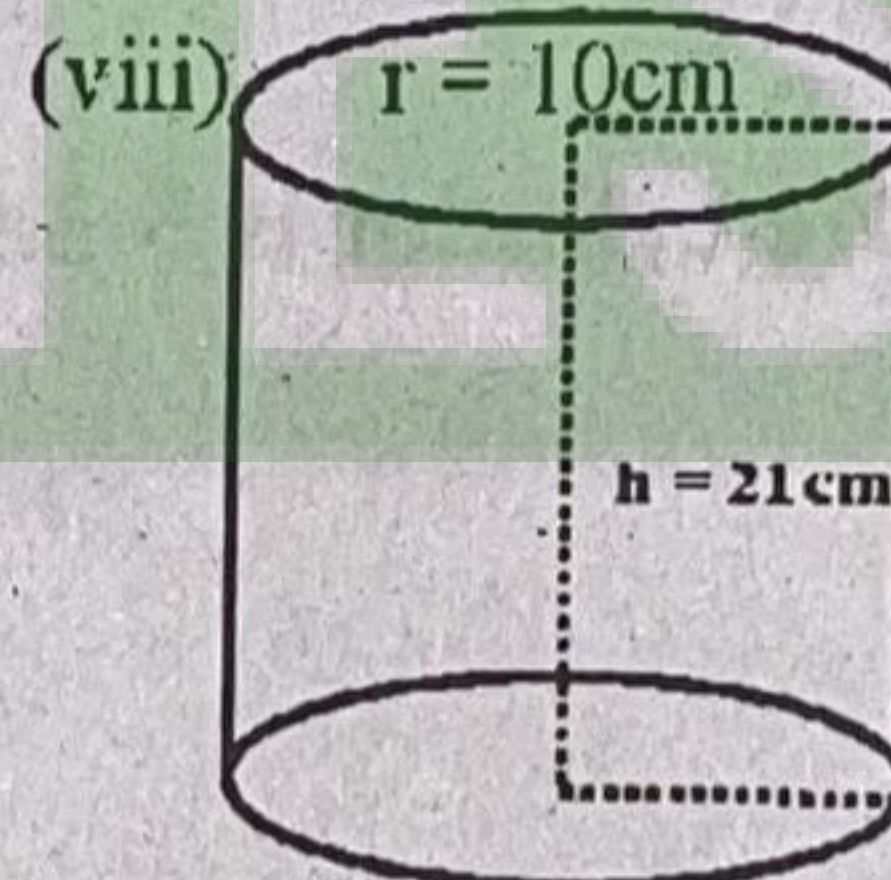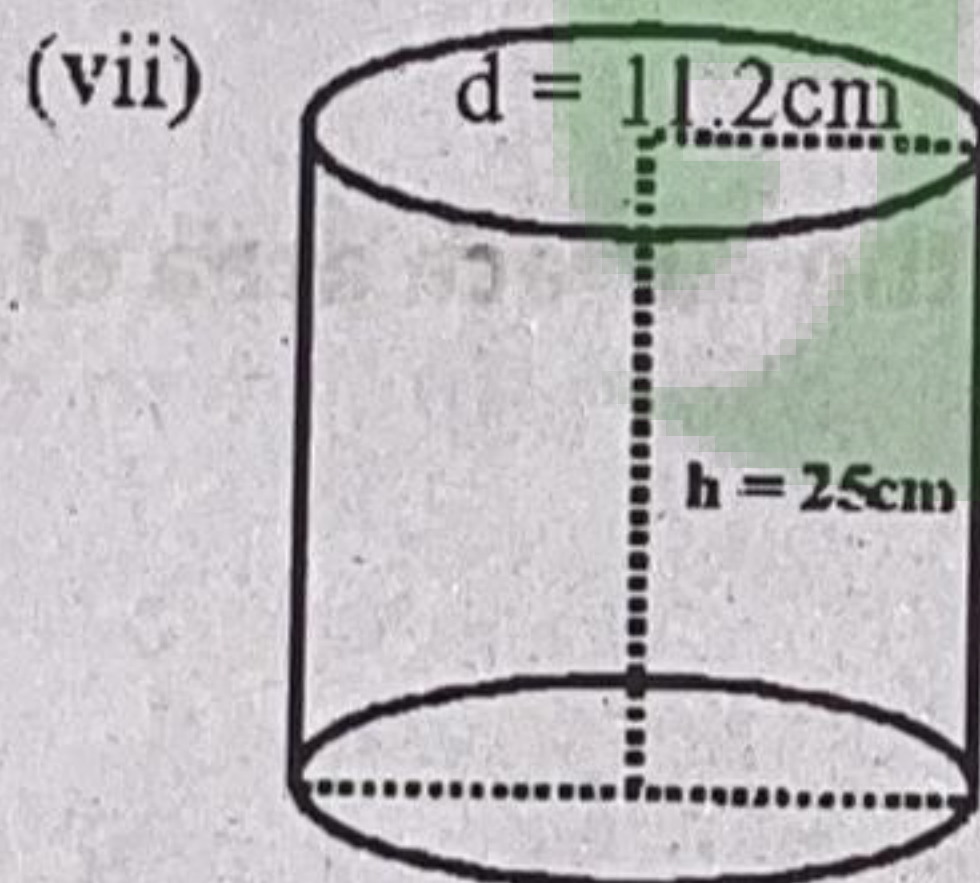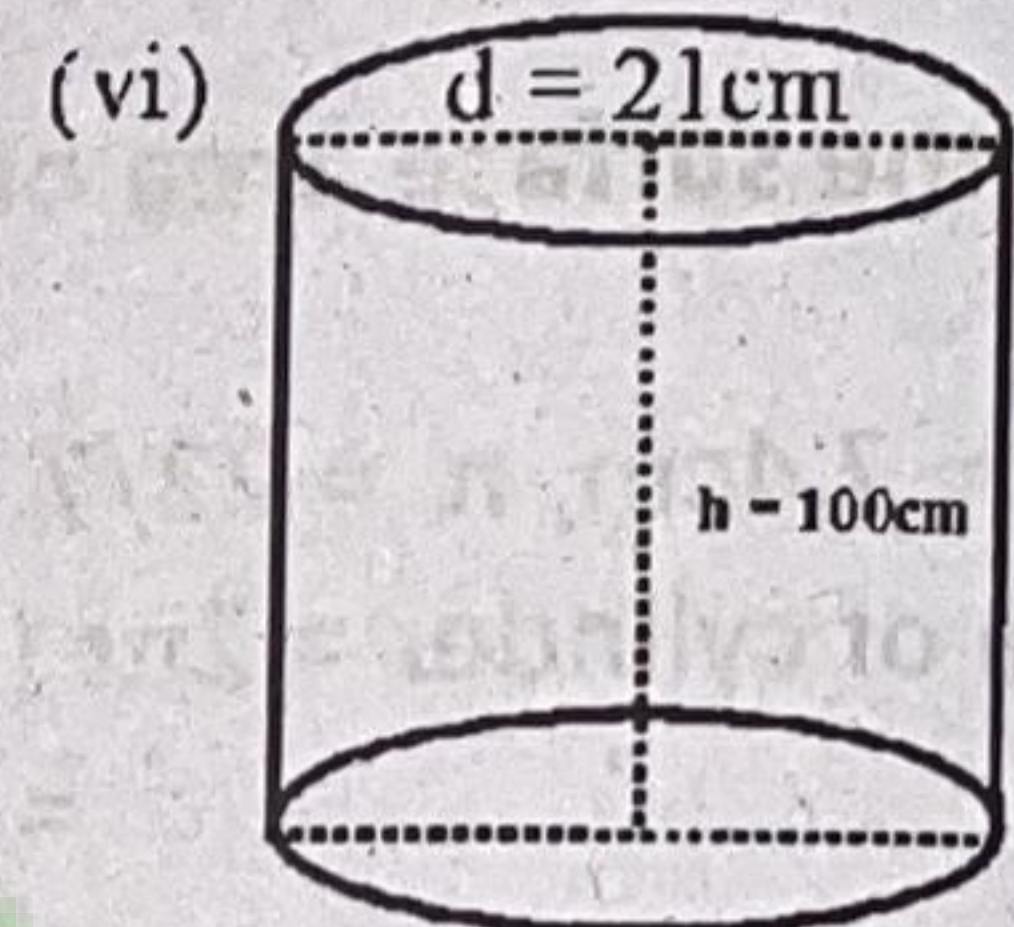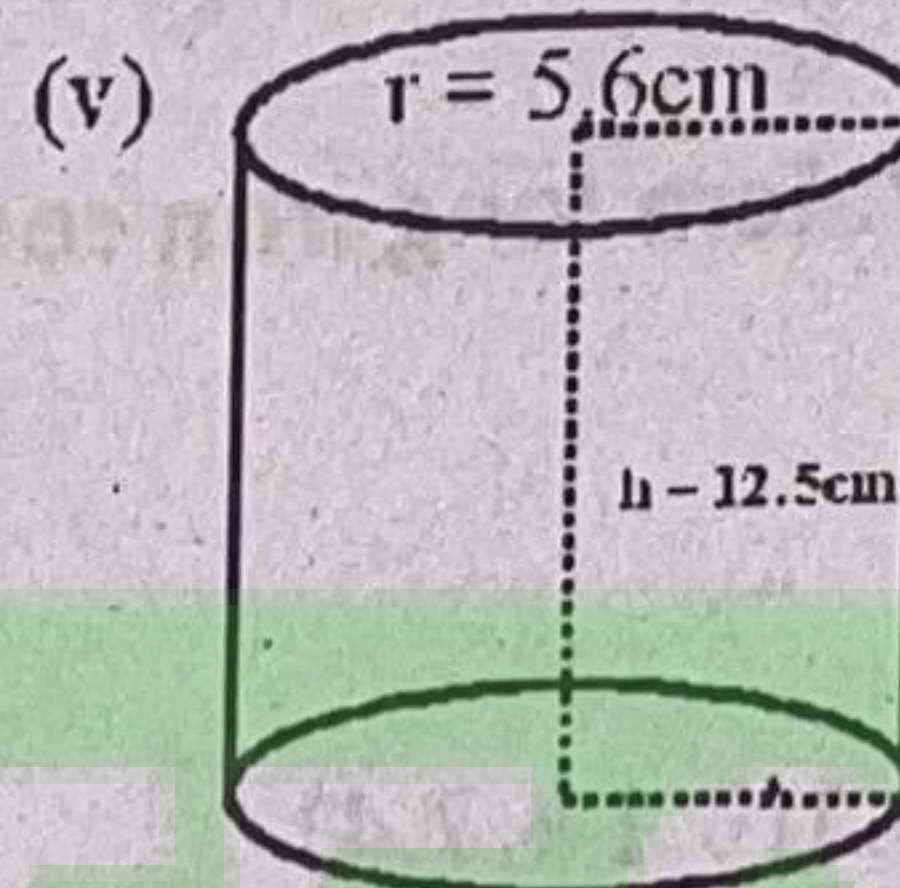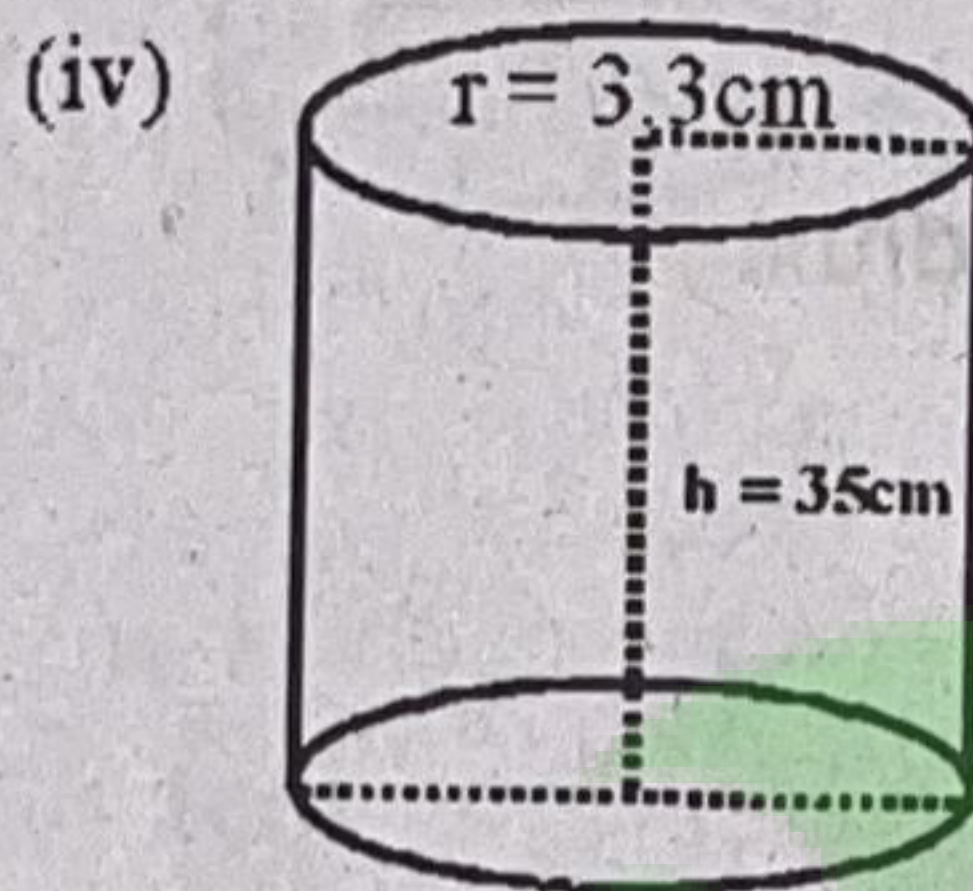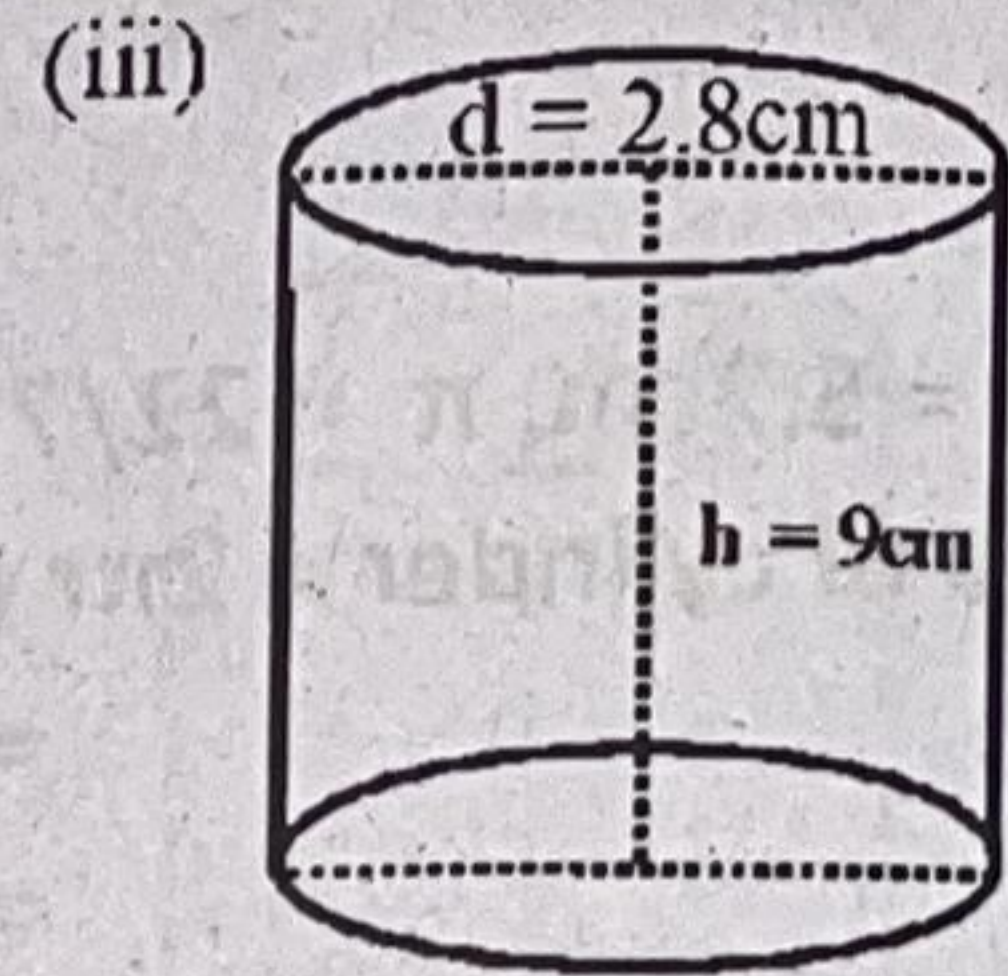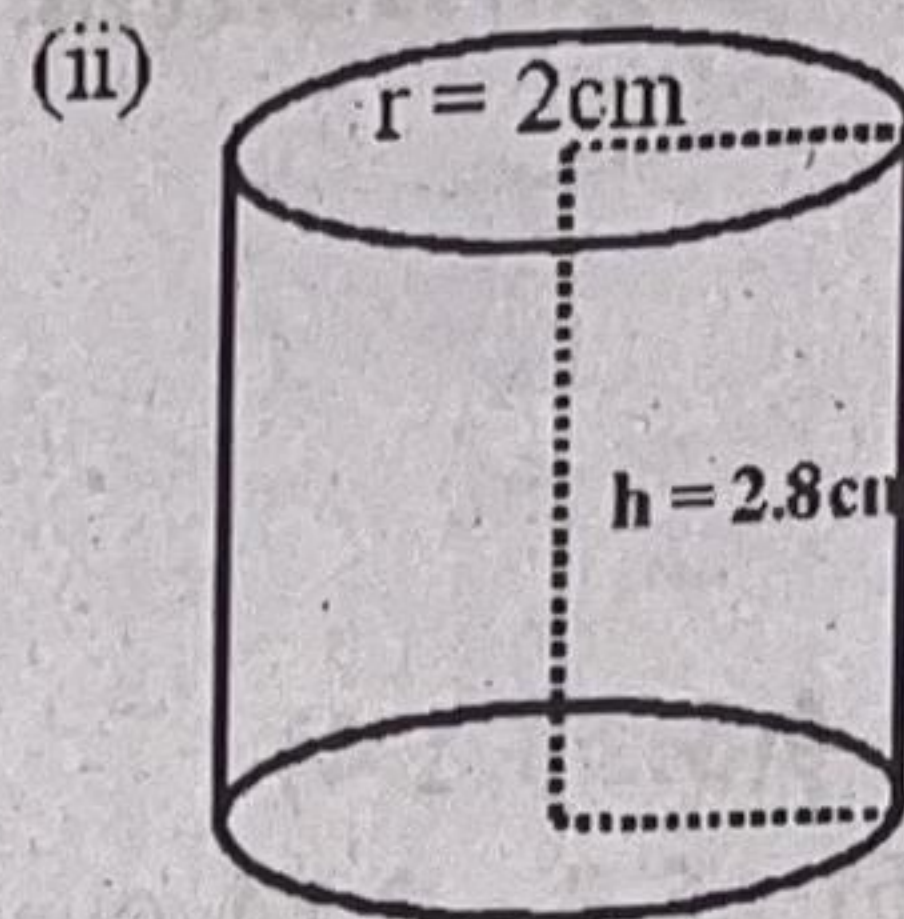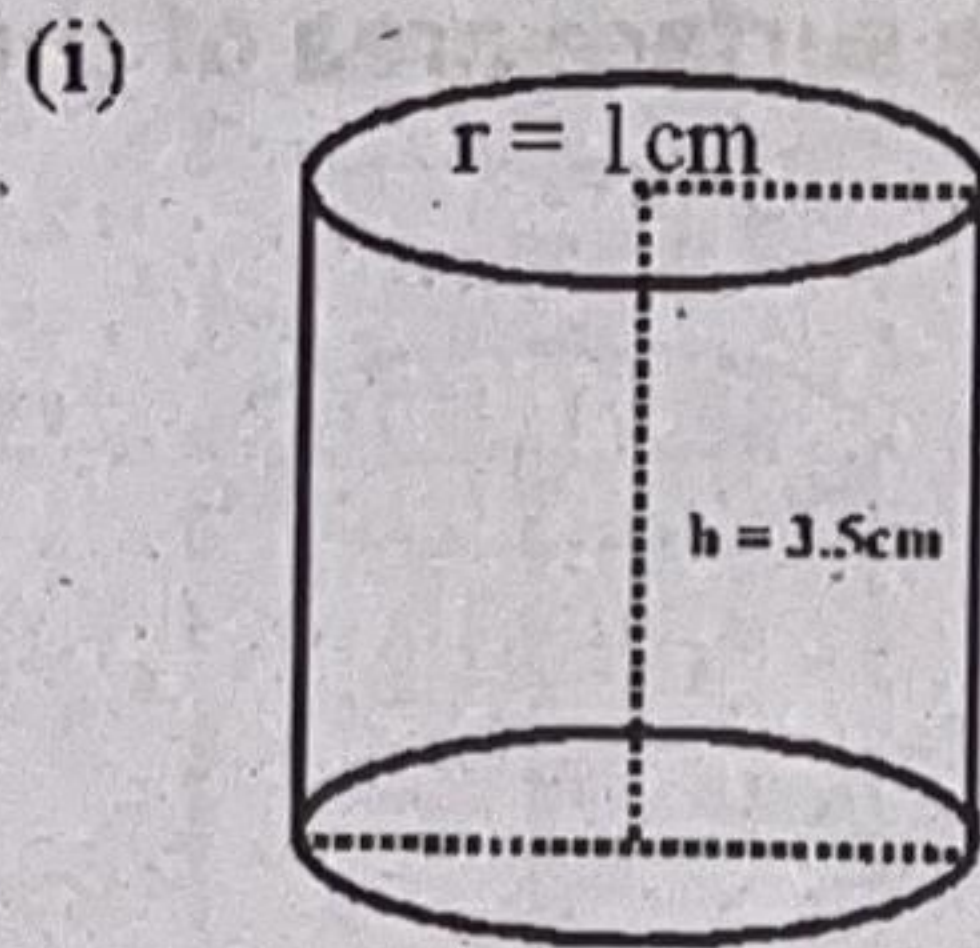
Solution:

(i)   r = 1cm, h = 3.5cm, π = 22/7

Volume   = πr²h

= (22/7) × (1)² × 3.5 = 11cm³

(ii)   r = 2cm, h = 2.8cm, π = 22/7

Volume   = πr²h

= (22/7) × (2)² × 2.8 = × 4 × 2.8 = = 35.2cm³

(iii)   d = 2.8cm, h = 9cm, π = 22/7

R = d/2 = 2.8/2 = 1.4cm

Volume   = πr²h

$$= \frac{22}{7} \times (1.4)^2 \times 9$$

= 3.14× 1.96 × 9 = = 55.44cm³

(iv)   r = 3.3cm, h = 35cm, π = 22/7
Volume   = πr²h
        = (22/7) × (3.3)² × 35
        = (22/7)× 10.89 × 35= = 1197.9cm³
(v)   r = 5.6cm, h = 12.5cm, π = 22/7
Volume   = πr²h
        = (22/7) × (5.6)² × 12.5
        = (22/7) × 31.36 × 12.5= = 1232cm³
(vi)   d = 21cm, h = 100cm, π = 22/7=3.14
r = = = 10.5cm
Volume   = πr²h
        = 3.14× (10.5)² × 100
        = 3.14 × 110.25 × 100 =3.14×11025= 34618cm³
(vii)   d = 11.2cm, r = $\frac{d}{2}$ = $\frac{11.2}{2}$ = 5.6cm, h = 25cm

Volume   = πr²h
        = (22/7) × (5.6)² × 25
        = (22/7)× 31.36 × 25
        = (22/7)× 784
        = 22 × 112
        = 2464 cm³
(viii)   r = 10cm, h = 21cm, π = 22/7
Volume   = πr²h
        = (22/7) × (10)² × (21)
        = (22/7)× 100 × 21 =(22/7)×2100 = 6600cm³
(ix)   r = 18cm, h = 175cm, π = 22/7
Volume   = πr²h
        = (22/7) × (18)² × 175
        = (22/7) × 324 × 175 = 22×8100= 178200cm³

2.   Find the volume of a cylinder whose height is 9.8cm and radius of 5.6cm.
Solution:
        h   = 9.8cm, r = 5.6cm
Volume   = πr²h
                = (22/7) × (5.6)² × 9.8
        = 22/7× 31.36 × 9.8 = 22×(4390.4) ≈ 965.89cm³

3.   The volume of a cylinder is 311.85cm³ and height is 10cm. Find the radius of the circular
region of the cylinder.
Solution:
Volume   = 311.85cm³, h = 10cm
        r   = ?
Volume   = πr²h.
        311.85 = (22/7)× r² × 10
311.85×7   = r² (220)

9.923 $= r^2$

         $3.15cm = r$

4.   The radius of the cylinder is 7cm and its volume is 2233cm³. Find the height of the cylinder.

Solution:

$r = 7cm$, $v = 2233cm$, $\pi = 22/7$

Volume $= \pi r^2 h$

2233 $= (22/7) \times (7)^2 \times h$

2233 $=$ $154\, h$

h $= \dfrac{2233}{154}$

     $=$ $\dfrac{29}{2} =$ $14.5cm$

5.   Find the radius of a cylinder when its height is 9.2cm and its volume is 5667.2cm³.

Solution:

$v = 5667.2cm^3$

$h = 9.2$

$\pi =$, $r = ?$

Volume $= \pi r^2 h$

5667.2 $= (22/7) \times r^2 \times 9.2$

$5667.2 \times 7 = 22 \times 9.2\, r^2$

       39670.4 $= 202.4\, r^2$

$\sqrt{\dfrac{39670.4}{202.4}} =$ r

$\sqrt{196}$ $=$ r

$R = 14cm$

SOLVED EXERCISE 12.5

1. The diameter of the wheel of Man's bike is 0.7m. The wheel completes 1800 revolutions when he reaches home from the office. Find the distance between Man's house and office.

Solution:

diameter = d= 0.7m

circumference = c = ?

$c = \pi d$

$c = 22/7 \times 0.7 = 2.2m$

Distance covered in 1 revolution = 2.2m

Distance covered in 1800 revolution = 2.2 × 1800 = 3960m

2. The radius of a truck wheel is 0.55m. Calculate how much distance the truck will cover in 1,500 revolutions of the wheel.

Solution:

radius = r = 0.55

circumference = c = ?

d=2r=> 0.55 × 2= 1.1m

$c = \pi d = (22/7) \times 1.1 = 3.4571m$

Distance covered by wheel in 1 revolution = 3.4571

Distance covered by wheel in 1500 revolution = 3.4571 × 1500 = 5185.7m

3. The radius of the minute hand of a watch is 1.75cm. Find in how many hours, the minute hand will move to cover 165cm.

Solution:

r = 1.75, π = 22/7, c = ?

$c = 2\pi r = 2 \times (22/7) \times 1.75 = 44 \times 0.25 = 11cm$

c = 11cm = Distance cover in one hour

Number of hours = 15 hours

4. The radius of the hour hand of a watch is 1.2cm. Find the distance covered by the hour hand in 24hours.

Solution:

r = 1.2cm, π = 22/7

$c = 2\pi r = 2 \times 3.14 \times 1.2$

c = 7.54cm

Distance covered in 12 hours = 7.54cm

Distance covered in 24 hours = 7.54 x 2 = 15.08cm

5. The radius of a circular garden is 24.5m. Find the cost of fencing the garden at the rate of Rs. 175 per meter.

Solution: radius = r = 24.5m

π = 3.14

$$c = 2\pi r$$
$$= 2 \times 3.14 \times 24.5 = 154m$$
cost of fencing the garden $= 154 \times 175 = Rs\ 26950$

6. The diameter of a circular room is 4.2m. Find the cost of flooring at the rate of Rs. 150/m².
Solution:
$$d = 4.2m$$
$$r = d/2 = 4.2/2 = 2.1m$$
Area of circular region $= \pi r^2 = (22/7) \times (2.1)^2 = 13.86m^2$
The cost of 1m² $= 150$
The cost of 13.86m² $= 150 \times 13.86 = Rs.\ 2079$

7. Find the wages of grass cutting of a circular park at the rate of Rs. 5/m, where the radius of the park is 105m.
Solution:
Radius $= r = 105m$
Area of circular region $= \pi r^2 = \times (105)^2$
$$= (22/7) \times 105 \times 105$$
$$= 22 \times 15 \times 105 = 330 \times 105 = 34650m^2$$
The wages of grass cutting $= 5 \times 34650 = 173250m^2$

8. The radius of a circular pool is 10.5m. Calculate the cost of flooring tiles used on the floor of the pool at the rate of Rs.180/m².
Solution:
Radius $= r = 10.5m$
Area of circular region $= \pi r^2 = \times (10.5)^2$
$$= (22/7) \times 10.5 \times 10.5 = 22 \times 1.5 \times 10.5$$
$$= 33 \times 10.5 = 346.5\ m^2$$
The wages of grass cutting $= 180 \times 346.5 = Rs.\ 62370$

9. The diameter of a circular playground is 21m. Calculate the cost of repairing the floor of the playground at the rate of Rs.230/m² and also find the cost of fencing the playground at the rate of Rs.75/m.
Solution:
$$d = 21cm,\ \pi = 22/7$$
$r = d/2 = 21/2 = 10.5$ If called with
$c = 2\pi r = 2 \times (22/7) \times 10.5 = 2 \times 22 \times 1.5 = 44 \times 1.5 = 66m$
Cost of the fencing the ground $= 75 \times 66 = Rs.\ 4950$
Area of circular region $= \pi r^2 = (22/7) \times (10.5)^2 = 346.5\ m^2$
Cost of repairing the floor $= 346.5 \times 230 = 79695\ Rs$

SOLVED EXERCISE 12.6

1. A cylindrical wooden piece is 1.9.4cm long. Find the surface area of the wooden piece if its diameter is 14cm.

Solution:

Length = h = 19.4cm, d = 14cm

r = = 7cm, Area?

Surface area of cylindrical wooden piece = $2\pi r (h + r)$

$$= 2 \times (22/7) \times 7 \, (19.4 + 7) = 44(26.4) = 1161.6 cm^2$$

2. A tin pack of a soft drink is 10cm long and the radius of the tin pack is 3.3cm. Find the surface area of the tin pack.

Solution:

h = 10cm, r = 3.3cm

π = 22/7

Area of tin pack = $2\pi r (r + h)$

$$= 2 \times (22/7) \times 3.3(3.3 + 10)$$
$$= (20.7429)(13.3)$$
$$= 275.88 cm^2$$

3. A circular pillar of 22.5cm radius is 6.3m long. Calculate the surface area of the pillar.

Solution:

r = 22.5cm, h = 6.3m

π = 22/7 h = 6.3 × 100 = 630cm

rea of circular pillar = $2\pi r (r + h)$

$$= 2 \times (22/7) \times 22.5(22.5 + 630) = \frac{44 \times 22.5 \times 652.5}{7}$$

$$= \frac{990 \times 652.5}{7} = \frac{645975}{7}$$

$$= 92282.14 cm^2$$

4. A cylindrical chemical drum is 220.5cm long and the radius of the drum is 42cm. Calculate the cost of painting the drum at the rate of Rs.0.15/cm².

Solution:

h = 220.5cm, r = 42cm

Area = $2\pi rh$

$$= 2 \times (22/7) \times 42 \times 220.5 = 58212$$

Cost of painting = $58212 cm^2 \times 0.15$

$$= 8731.8 \, Rs$$

5. Radius of a round swimming pool is 17.5m and the depth of the pool is 3m. Calculate the cost of tiles used on the wall of the pool at the rate of Rs.120/m².

Solution:

r = 17.5m, h = 3m

Area of swimming pool = $2\pi rh$

$$= 2×(22/7)×17.5 × 3 = 44 × 2.5 × 3 = 44 × 7.5$$
$$= 330 \text{ m}^2$$

Cost of tiles $= 330 × 120$

$$= 39600 \text{ Rs}$$

6. The internal diameter of a round mosque is 31.5m and height of walls is 7m. Find the cost of cementing the round wall of the mosque at the rate of Rs. 19/m².

Solution:

$$d = 31.5m, h = 7m$$
$$r = d/2 = 31.5/2 = 15.75m$$

Wall's surface Area $= 2πrh$

$$= 2 ×(22/7) ×15.75×7 = 44 × 15.75$$
$$= 693 \text{m}^2$$

Cost of cementing $= 693 × 19$

$$= 13167 \text{ Rs.}$$

7. A cylindrical water tank is 7.7m high and its inner radius is 5m. Calculate the price of marble used in the inner side of the tank at the rate of Rs.500/m².

Solution:

$$h = 7.7, r = 5m$$

Area $= 2πrh$

$$= 2 ×(22/7)×5×7.7 = 44 × 5 × 1.1 = 220 × 1.1 = 242 \text{ m}^2$$
$$= 242 \text{m}^2$$

The price of marble used $= 242×500$

In inner side $= 121000 \text{ Rs.}$

8. Find the height of an oil drum whose volume is 12474m³ and radius is 6.3m.

Solution:

height $= h = ?$

volume $= 12474 \text{m}^3, r = 6.3m$

volume $= πr^2h$

$$12474 = (22/7) × (6.3)^2× h$$
$$12474 = \frac{22 × 6.3 × 6.3 × h}{7}$$
$$12474 = 22 × .9 × 6.3 × h$$
$$12474 = 124.74 × h$$
$$h = \frac{12474}{124.74}$$
$$h = 100 \text{ m}$$

9. A cylindrical tin can is 77cm high and its radius is 20cm. Find how many litre of oil may be contained in the tin can.

Solution:

Height $= h = 77cm, r = 20cm$

Volume $= πr^2h$

$= (22/7) \times (20)^2 \times 77$

$= 22 \times 400 \times 11$

$= 96800 cm^3$

$1000 cm^3 \quad = 1$ liter

Volume (litre) $= = 96.8$ litre

10. Find the capacity of a circular water tank in litres when the height of the tank is 420cm and its diameter is 510cm.

Solution:

Height $= h = 420 cm$, $d = 510 cm$

$r = d/2 = 510/2 = 255 cm$

Volume $\quad = \pi r^2 h$

$= (22/7) \times (225)^2 \times 420 = 66824998 cm^3$

$1000 cm^3 \quad = 1$ liter

Volume (litre) $=$

$= 66824.99 \quad \approx \quad 66825$ liters

REVIEW EXERCISE 12

1. Answer the following questions.

(i) Define the circumference of a circle.

Answer:

The circumference of a circle is the distance around the edge of the circle. It could be called the perimeter of the circle.

(ii) What is an area of a circular region?

Answer:

The area of a circular region is the number of square units inside the circumference of the circle.

(iii) Write the formula for finding the surface area and volume of a cylinder.

Answer:

Surface area $= 2\pi r(h + r)$, volume $= \pi r^2 h$

(iv) Write the formula for finding the circumference and area of a circle.

Answer:

$C = 2\pi r \quad\quad$ Area $= \pi r^2$

(v) What is the approximate value of π?

Answer: 3.14 or

(i) The _____ of a circle is the measurement of its closed curve.

(ii) Two circular region of a cylinder are _____ to each other.

(iii) The length of the _____ is called the height of the cylinder.

(iv) The ratio between circumference and diameter of a circle is denoted by the symbol _____.

(v) Surface area of a cylinder = area of the curved surface + _____.

Answer:
(i)   circumference   (ii)   parallel
(iii)   curved surface   (iv)   π
(v)   area of the two circles

(i)   The approximate value of π is:
(a)   3.04   (b)   3.41   (c)✓   3.14   (d)   4.13
(ii)   Circumference of a circle = _____.
(a)✓   πd   (b)   πr²   (c)   2π²   (d)   2πd
(iii)   In a circle the length of its curved surface is called:
(a)   radius   (b)   diameter
(c)   height   (d)✓   circumference
(iv)   Area of a circle = _____.
(a)✓   πr²   (b)   2πr²   (c)   3π²   (d)   4π²
(v)   If the diameter of a circle is 10cm, then its radius will be:
(a)✓   5cm   (b)   10cm   (c)   15cm   (d)   20cm
(vi)   The circumference of a circle with radius m is:
(a)   1m   (b)✓   2m   (c)   3m   (d)   4m

4.   Find the area and circumference of the circle, if π = and radius is:
(i)   2.8cm
Solution:

$r = 2.8cm$, $\pi =$

Area $= \pi r^2 = \times (2.8)^2 = \dfrac{22}{7} \times 2.8 \times 2.8$

$= 8.8 \times 2.8 = 24.64 cm^2$

$C = 2\pi r = 2 \times \times 2.8 = 17.6 cm$

(ii)   9cm
Solution:

$r = 4.9cm$, π

Area $= \pi r^2 = 22/7 \times (4.9)^2 = 75.46 cm^2$

$C = 2\pi r = 2 \times 22/7 \times 4.9 = 44 \times 0.7 = 30.8 cm$

(iii)   10.5cm
Solution:

$r = 10.5cm$, π

Area $= \pi r^2 = 22/7 \times (10.5)^2 = \times 10.5 \times 10.5$

$= 33 \times 10.5 = 346.5 cm^2$

$C = 2\pi r = 2 \times 22/7 \times 10.5 = 66 cm$

(iv)   10
Solution:

$r = 10 = = 10.5cm$ π

Area $= \pi r^2 = (22/7) \times (10.5)^2 = 346.5 cm^2$

$C = 2\pi r = 2 \times (22/7) \times 10.5 = 66 cm$

(v) 6

Solution:

r   = 6.5

Area $= \pi r^2 = 22/7 \times (6.5)^2 = 132.79 \text{cm}^2$

C $= 2\pi r = 2 \times (22/7) \times 6.5 = 40.86 \text{cm}$

(i)   r = 14cm, h = 15cm

Solution:

r = 14cm, h   = 15cm

Surface Area $= 2\pi r (r + h) = 2 \times (22/7) \times 14(14 + 15)$

$= 44 \times 2 \times 29 = 44 \times 58 = 2552 \text{cm}^2$

Volume $= \pi r^2 h = 22/7 \times 196 \times 15 = 9240 \text{cm}^3$

(ii)   r = 3.5cm, h = 100cm

Solution:

r = 3.5cm, h = 100cm

Surface Area $= 2\pi r (r + h)$

$= 2 \times (22/7) \times 3.5(3.5 + 100)$

$= 44 \times 0.5 \times 103.5 = 22 \times 103.5$

$= 2277 \text{cm}^2$

Volume $= \pi r^2 h = 22/7 \times (3.5)^2 \times 100$

$= 22/7 \times 12.25 \times 100 = 22 \times 1.75 \times 100 = 3850 \text{cm}^3$

(iii)   r = 10cm, h = 21cm

Solution:

r = 10cm, h = 21cm

Surface Area $= 2\pi r (r + h)$

$= 2 \times 22/7 \times 10(10 + 21) = 1948.57 \text{cm}^2$

Volume $= \pi r^2 h$

$= 22/7 \times (10)^2 \times 21 = 22 \times 100 \times 3 = 6600 \text{cm}^3$

(iv)   r = 4cm, h = 12cm

Solution:

r = 4cm, h = 12cm

Surface Area $= 2\pi r (r + h)$

$= 2 \times 22/7 \times 4(4 + 12) = 402.29 \text{cm}^2$

$= \dfrac{44 \times 4 \times 16}{7} = \dfrac{2816}{7} = 402.29 \text{ cm}^2$

Volume $= \pi r^2 h$

$= \dfrac{22}{7} \times (4)^2 \times 12$

$= 22/7 \times 16 \times 12 = 603.43 \text{cm}^3$

6. Area of a round bed of roses is 7,065m². Find the cost of making fencing around it at the rate of Rs.20 per meter (π = 3.14).

Solution:

$A = \pi r^2$

$7065 = 3.14 \times r^2$ $\pi \approx 3.14$

$r^2 = \dfrac{7065}{3.14} = 2250$

$\sqrt{r^2} = \sqrt{2250}$

$r = 47.43m$

$c = 2\pi r$

$= 2 \times 3.14 \times 47.43$

$= 297.86$

$\cos t = 20 \times 297.86$

$= 5957.21$

$\approx$ Rs.5957

7. The radius of the wheel of Aslam's cycle is 35cm. To reach school from house, the wheel completes 1200 rounds. Find the distance from house to school. When π =

Solution:

$r = 35cm$

$r = \Rightarrow 35 \times 2 = d$

$c = \pi d = 3.14 \times 70 = 220cm$

1 revolution distance covered $= 220cm$

1200 revolution distance covered $= 1200 \times 220 = 26400cm$

$= 264$ meter

8. Find the surface area of 2m long drum whose radius of base is 21cm (when π =)

Solution:

$h = 2m = 2 \times 100 = 200cm$

$r = 21cm$

Area of surface $= 2\pi r(r + h)$

$= 2 \times 3.14 \times 21(21 + 200) = 44 \times 3 \times 221 = 29172cm^2$

9. A well is 20m deep and its diameter is 4m. How much soil is required to fill it (when $\pi = 3.14$)

Solution:

$d = 4m = 4 \times 100 = 400$ cm, $\pi = 3.14$

$d = 4m$

$h = 20m$

$r = = 2m$

$A = \pi r^2 h$

$= 3.14 \times 4 \times 20$

$= 3.14 \times 4 \times 20$

$= 251.2m^3$

10. Find the cost of spraying a chemical in a circular field at the rate of Rs. 10/m² where the radius of the circular field is 73.5m and also calculate the cost of making hurdle round the field at the rate of Rs.25/m.

Solution: $r = 73.5m$, $\pi = 22/7$

$c = 2\pi r = 2 \times 22/7 \times 73.5 = 44 \times 10.5 = 462m$

$A = $ area $= 22/7 \times (73.5)^2 = \dfrac{22}{7} \times 73.5 \times 73.5$

$= 22 \times 771.75$

$= 16978.5m^2$

Cost of spraying a chemical in a circular field $= 10 \times 16978.5$

$= $ Rs.169785

Cost of making hurdle round the field $= 462 \times 25$

$= $ Rs. 11550