EXERCISE-15C

Answer

1-: Base Radius (r) = 5.25 cm

Slant Height (l) = 10 cm

Curved Surface Area of Cone = $\pi rl = \left(\frac{22}{7}\right) \times 5.25 \times 10 = 165\ cm^2$

Answer 2-: Slant Height (l) = 21 m

Diameter of Base (d) = 24 m

Radius of base (r) = $\frac{d}{2} = \frac{24}{2} = 12\ m$

Total Surface Area of Cone = $\pi rl + \pi r^2$

$$= \left[\left(\frac{22}{7}\right) \times 12 \times 21\right] + \left[\left(\frac{22}{7}\right) \times 12 \times 12\right] = 1244.57\ m^2$$

Answer 3-: Base Radius (r) = 7 cm

Height (h) = 24 cm

Slant Height (l) = $\sqrt{(h^2 + r^2)} = \sqrt{(24^2 + 7^2)} = 25\ cm$

Area of Sheet required to make one Cap= Curved Surface Area of cone= πrl

$$= \left(\frac{22}{7}\right) \times 7 \times 25 = 550\ cm^2$$

For 10 Caps required Sheet = $550 \times 10 = 5500\ cm^2$

Answer 4-: Curved Surface Area of Cone = 308 cm^2

Slant Height (l) = 14 cm

Let Radius of cone (r) = r cm

πrl = 308

$$\left(\frac{22}{7}\right) \times r \times 14 = 308$$

r = 7 cm

Total Surface Area of Cone = $\pi rl + \pi r^2 = \pi r\ (l + r)$

$$= \left(\frac{22}{7}\right) \times 7 \times (14 + 7) = 462\ cm^2$$

Answer 5-: Slant Height (l) = 25 m

Base Diameter (d) = 14m

Base Radius (r)= $\frac{d}{2} = \frac{14}{2} = 7\ m$

Curved Surface Area of Cone = $\pi rl = \left(\frac{22}{7}\right) \times 7 \times 25 = 550\ m^2$

Given 1 m^2 cost = ₹12

$\therefore 550\ m^2\ cost = 12 \times 550 =$ ₹6600

Answer 6-: Conical Tent Height (h) = 10 m

Base Radius (r) = 24 m

Slant Height $(l) = \sqrt{(h^2 + r^2)} = \sqrt{10^2 + 24^2)} = 26\ m$

Area of Canvas required for Tent = Curved Surface Area of Cone = πrl

$$= \left(\frac{22}{7}\right) \times 24 \times 26\ m^2$$

Given 1 m^2 cost = ₹70

$$\therefore \left(\frac{22}{7}\right) \times 24 \times 26\ m^2 cost = \left(\frac{22}{7}\right) \times 24 \times 26 \times 70 = ₹137280$$

Answer 7-: Total Numbers of Hollow Cones = 50

Base Diameter of Cone (d) = 40 cm

Base Radius (r)= $\frac{d}{2} = 20\ cm = 0.2\ m$

Height (h) = 1 m

Slant Height (l) = $\sqrt{(h^2 + r^2)} = \sqrt{(1^2 + (0.2)^2)} = \sqrt{1.04} = 1.02m$

Curved Surface Area of one cone = $\pi rl = \left(\frac{22}{7}\right) \times 0.2 \times 1.02 = 0.64056\ m^2$

Total Curved Surface Area = $50 \times 0.640565 = 32.028\ m^2$

Given 1 m^2 cost = ₹25

$\therefore 32.028\ m^2\ cost = 25 \times 32.028 = ₹800.7$

Answer 8-: Base Radius (r) = 35 cm

Height (h) = 12 cm

Slant Height (l) = $\sqrt{(h^2 + r^2)} = \sqrt{12^2 + 35^2)} = \sqrt{1369} = 37\ cm$

Volume of Cone = $\left(\frac{1}{3}\right)\pi r^2 h = \left(\frac{1}{3}\right) \times \left(\frac{22}{7}\right) \times 35 \times 35 \times 12 = 15400\ cm^3$

Curved Surface Area = $\pi rl = \left(\frac{22}{7}\right) \times 35 \times 37 = 4070\ cm^2$

Total Surface Area of Cone= $\pi rl + \pi r^2 = \pi r\ (l + r)$

$$= \left(\frac{22}{7}\right) \times 35(37 + 35) = 7920\ cm^2$$

Answer 9-: Height (h) = 6 cm

Slant Height (l) = 10 cm

Let radius = r

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

$l^2 = h^2 + r^2$

$r^2 = 10^2 - 6^2 = 64$

$r = 8\ cm$

Volume of Cone = $\left(\frac{1}{3}\right)\pi r^2 h = (\frac{1}{3}) \times 3.14 \times 8 \times 8 \times 6 = 401.92\ cm^3$

Curved Surface Area = $\pi rl = 3.14 \times 8 \times 10 = 251.2\ cm^2$

Total Surface Area of Cone = $\pi rl + \pi r^2$

$= \pi r\ (l + r) = 3.14 \times 8 \times (10 + 8) = 452.16\ cm^2$

Answer 10-: Diameter of conical pit (d) = 3.5 m

Radius (r)= $\frac{d}{2} = \frac{3.5}{2} = 1.75\ m$

Height of pit (h) = 12 m

Capacity of pit=Volume of pit= $\left(\frac{1}{3}\right)\pi r^2 h = \left(\frac{1}{3}\right) \times \left(\frac{22}{7}\right) \times 1.75 \times 1.75 \times 12 = 38.5\ m^3$

Given 1 m^3 capacity = 1 $kilolitre$

$\therefore$38.5 m^3 capacity = 38.5 kilolitres

Answer 11-: Diameter (d) = 9 m

Radius (r) = $\frac{d}{2} = \frac{9}{2} = 4.5\ m$

Height (h) = 3.5 m

Given heap of wheat is conical

$\therefore$ Canvas Require for cover the heap = Curved Surface area of cone

Curved Surface Area = $\pi rl = 3.14 \times 4.5 \times \sqrt{((4.5)^2 + (3.5)^2)} = 80.54\ m$

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

Volume = $\frac{1}{3} \times \pi \times r^2 \times h = \frac{1}{3} \times 3.14 \times 4.5 \times 4.5 \times 3.5 = 74.1825\ m^3$

Answer 12-: Area of canvas = 551 m^2

Base Radius of conical tent = 7 m

But 1 m^2 canvas is waste so, area of canvas to make tent = 550 m^2

$$\pi \times r \times l = 550$$

$$\frac{22}{7} \times 7 \times l = 550$$

$$l = 25\ m$$

Height of tent= $\sqrt{(l^2 - r^2) = 24m}$

Volume of tent = $\frac{1}{3} \times \pi \times r^2 \times h = \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24 = 1232\ m^3$

Answer 13-: Base Radius (r) = 7 m

Tent Height (h) = 24 m

Slant Height (l) = $\sqrt{(h^2 + r^2)} = \sqrt{24^2 + 7^2} = 24\ m$

Area of cloth required to make tent = $\pi \times r \times l = \frac{22}{7} \times 7 \times 25 = 550\ m^2$

Let total meters of cloth = l m

Width = 2.5 m

Area = $l \times 2.5$

$$550 = l \times 2.5$$

l = 220 m

Answer14-: let,Heights of cones h1 & h2, base radius r1 & r2

$$\frac{h1}{h2} = \frac{1}{3} \quad and \quad \frac{r1}{r2} = \frac{3}{1}$$

Volume of first cone V1 = $\frac{1}{3} \times \pi \times (r1)^2 \times h1$

Volume of first cone V2 = $\frac{1}{3} \times \pi \times (r2)^2 \times h2$

$$\frac{V1}{V2} = \frac{\left(\frac{1}{3} \times \pi \times (r1)^2 \times h1\right)}{\frac{1}{3} \times \pi \times (r2)^2 \times h2}$$

$$\frac{V1}{V2} = \left(\frac{r1}{r2}\right)^2 \times \left(\frac{h1}{h2}\right)$$

$$\frac{V1}{V2} = \frac{3}{1}$$

$$V1 : V2 = 3 : 1$$

Answer 15-: Cylinder and cone have equal Radii and Heights

Let Height = h

Base Radius = r

Curved Surface Area of cone C2 = $\pi rl = \pi r\sqrt{(h^2 + r^2)}$

Curved Surface Area of cylinder C1 = $2\pi rh$

Given,

$$\frac{C1}{C2} = \frac{8}{5}$$

$$\frac{2\pi rh}{\pi r\sqrt{(h^2 + r^2)}} = \frac{8}{5}$$

$$\sqrt{\frac{h^2}{h^2 + r^2}} = \frac{4}{5}$$

$$25h^2 = 16h^2 + 16r^2$$

$$\frac{r^2}{h^2} = \frac{9}{16}$$

$$\frac{r}{h} = \frac{3}{4}$$

$$r : h = 3 : 4$$

Answer 16-: Height of circular cone (h) = 3.6 cm

Base Radius (r) = 1.6 cm

Volume of cone = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 1.6 \times 1.6 \times 3.6 = 9.65\ m^3$

Base Radius of new cone (R) = 1.2 cm

Volume of new cone = volume of old cone

Let Height of new cone = H

$$\frac{1}{3} \times \frac{22}{7} \times 1.2 \times 1.2 \times H = \frac{1}{3} \times \frac{22}{7} \times 1.6 \times 1.6 \times 3.6$$

H = 6.4 cm

Answer 17-: Height of cylinder (H) = 3m

Base Diameter (D) = 105 m

Base Radius (R) = $\frac{D}{2} = 52.5\ m$

Slant Height (l) = 53 m

Area of canvas require to cover the tent = Curved surface area of cylinder + Curved Surface area of cone

$$= 2\pi rh + \pi rl = \pi r(2h + l) = \frac{22}{7} \times 52.5 \times (2 \times 3 + 53) = 9735\ m^2$$

Length of Canvas $= \frac{Area\ of\ Canvas}{width} = \frac{9735}{5} = 1947\ m$

Answer 18-: For Cylinder

Height (H) = 2.8 m

Diameter = 20 cm 0.2 m

Radius (R) $= \frac{0.2}{2} = 0.1\ m$

For Cone

Height (h) $= 42\ cm = 0.42\ cm$

Diameter $= 20\ cm = 0.2\ m$

Radius (r) = 0.1 m

Weight of pillar = Total Volume of Pillar

$$= \frac{1}{3}\ \pi r^2 h + \pi R^2 H$$

(For Cone) (For Cylinder)

$= \pi r^2(\frac{1}{3} \times h + H)$ {r=H}

$$= \frac{22}{7} \times 0.1 \times 0.1(\frac{1}{3} \times 0.42 + 2.8) = 0.092400\ cm^3$$

$1\ m^3 = 100000\ cm^3$

$\therefore 0.092400\ m^3 = 92400\ cm^3$

$1\ cm^3$ weight = 7.5 gm

$\therefore 92400\ cm^3 = 92400 \times 7.5 = 69300\ gm = 693\ kg$

Answer 19-: Height of cone = Height of Cylinder = h = 10 cm

Radius of cone = Radius of Cylinder = r = 6 cm

Volume of remaining part $= Volume\ of\ cylinder - Volume\ of\ cone$

$$= \pi r^2 h - \frac{1}{3}\pi r^2 h = \frac{2}{3}\pi r^2 h$$

$$= \frac{2}{3} \times \frac{22}{7} \times 6 \times 6 \times 10 = 753.6\ cm^3$$

Answer 20-: Rate of flow of water = 10m/min

Pipe is cylindrical

So, volume of water flow in 1 min. $= Base\ Area\ of\ cylinder * 10$

$$= \pi \times r^2 \times 10\ m$$

Diameter of pipe (d) = 5 mm = 0.5 cm

Radius of pipe (r) $= \frac{0.5}{2} = 2.5\ cm$

Diameter of cone = 40 cm

Radius (R) $= \frac{40}{2} = 20\ cm$

Height (h) = 24 cm

Volume of cone $= \frac{1}{3}\ \pi R^2 h$

Require time to fill the cone $= \frac{Volume\ of\ cone}{Volume\ of\ Water\ flow\ per\ min}$

$$= \frac{\frac{1}{3} \times \pi \times R^2 \times h}{\pi \times r^2} = \frac{153.6}{3} = 51.2\ min.$$

1 min = 60 sec

$\therefore$ 0.2 min $= 60 \times 0.2 = 12\ sec$

$=$ 51 min 12 seconds

Answer 21-: Area of cloth = 165 m^2

Conical tent Radius = 5 m

(i) One Student Occupies $= \frac{5}{7} m^2$

Area of base of cone $= \pi r^2 = \frac{22}{7} \times 5 \times 5$

No. of Students $= \frac{\frac{22}{7} \times 5 \times 5}{\frac{5}{7}} = 110$

(ii) Volume of cone $= \frac{1}{3}\ \pi R^2 h$

Curved Surface Area of cone $= \pi r l$

$$165 = \frac{22}{7} \times 5 \times l$$

$$l = 10.5 \text{ m}$$

Volume $= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times \sqrt{((10.5)^2 - 5^2)} = 241.8\ m^3 \quad \{h = \sqrt{(l^2 - r^2)}\}$