19 Mensuration

EXERCISE 19A

For SSC GD & MTS Exams

1. The total surface area of a hemisphere is very nearly equal to that of an equilateral triangle. The side of the triangle is how many times (approximately) of the radius of the hemisphere?

SSC MTS 02/11/2021 (Shift-3)

(a) $\left(\frac{8\pi}{\sqrt{3}}\right)^{0.5}$ (b) $\left(\frac{4\pi}{3}\right)^{0.5}$

(c) $\left(2\pi\sqrt{3}\right)^{0.5}$ (d) $\left(4\pi\sqrt{3}\right)^{0.5}$

2. The area of trapezium, whose parallel sides are 25 cm and 19 cm long, is 330 cm^2. The distance between the sides(in cm) is :

SSC MTS 02/11/2021 (Shift-2)

(a) 10 (b) 12

(c) 50 (d) 15

3. A rectangle of dimension 10 cm and 5cm is placed adjacent to another rectangle of the same size to draw an L shape figure. Find the perimeter of the shape so formed. **SSC MTS 02/11/2021 (Shift-1)**

(a) 100 (b) 40

(c) 50 (d) 60

4. A bucket in the shape of the frustum of a cone has its top and bottom radii as 20 cm and 10 cm, respectively. The depth of the bucket is 24 cm. The capacity of the bucket is : $\pi = 22/7$)

SSC MTS 02/11/2021 (Shift-1)

(a) 8800 cm^3 (b) 13200 cm^3

(c) 17000 cm^3 (d) 17600 cm^3

5. A room has length of 15 feet width 12 feet and height 10 feet. It has one door of dimension 8 feet and 3.5 feet, and 2 windows of size 5feet × 3 feet. Find the cost of painting the four walls and the ceiling at ₹ 50 per ft^2. **SSC MTS 02/11/2021 (Shift-1)**

(a) ₹ 19600 (b) ₹ 21,200

(c) ₹ 24,100 (d) ₹ 33,100

6. The perimeter and area of the rectangular sheet are 94 m and 420 m^2 respectively. The length of the diagonal will be : **SSC MTS 27/10/2021 (Shift-3)**

(a) 32 m (b) 36 m

(c) 35 m (d) 37 m

7. The area of the triangular park with sides 78 m, 160 m and 178 m is equal to the area of the rectangular garden whose sides are in the ration of 13:12. The smaller side (in m) of the garden is :

SSC MTS 27/10/2021 (Shift-2)

(a) $26\sqrt{5}$ (b) $24\sqrt{10}$

(c) $12\sqrt{10}$ (d) $13\sqrt{5}$

8. A solid metallic toy has a hemispherical base with radius 3.5 cm surmounted by a cone. If the height of the cone is same as the radius if its base, then the volume of metal used in **SSC MTS 27/10/2021 (Shift-1)**

(a) $89\frac{2}{3}$ (b) $144\frac{3}{4}$

(c) $134\frac{3}{4}$ (d) $179\frac{2}{3}$

9. The radius of a circular park is 23 m. It has inside all around it a 4m wide path. Find the cost of paving the path at the rate of ₹ 500/m^2.

SSC MTS 27/10/2021 (Shift-1)

(a) ₹2,10,000 (b) ₹2,64,000

(c) ₹2,60,000 (d) ₹2,40,000

10. A circular wire of diameter 56 cm is folded in the shape of a rectangle whose sides are in the ratio 7:4. The area enclosed by the rectangle is :

SSC MTS 26/10/2021 (Shift-3)

(a) 1842 (b) 1792

(c) 1684 (d) 1782

11. The curved surface area of the cone is $\frac{3432}{7}$ cm^2 and its radius is 12 cm. What is the radius of a sphere whose volume is 1.2 times the volume of the cone? ($\pi = 22/7$) **SSC MTS 26/10/2021 (Shift-3)**

(a) 8 cm (b) 6 cm

(c) 5 cm (d) 4 cm

12. The ratio of the curved surface area and total surface area of a cylinder is 4:7. If its volume is 4851 cm^3, then its radius is : ($\pi = 22/7$)

SSC MTS 26/10/2021 (Shift-3)

(a) 10 (b) 7
(c) 9.5 (d) 10.5

13. If the side of a square is increased by 40 %, then its area will be increased by :

SSC MTS 26/10/2021 (Shift-3)

(a) 90% (b) 96%
(c) 92% (d) 86%

14. The radius of a solid lead sphere is 2 cm. 2541 such spheres are melted and recast into a cube of edge x cm. The volume x is ($\pi = 22/7$)

SSC MTS 26/10/2021 (Shift-2)

(a) 44 (b) 22
(c) 66 (d) 33

15. An open tank is 25 m long, 12 m wide and 6 m deep. The cost (in ₹) of plastering its walls and bottom from the inside at ₹ 15 per m^2 is :

SSC MTS 26/10/2021 (Shift-1)

(a) 11,160 (b) 12,500
(c) 13,275 (d) 10,800

16. The curved surface area of a right circular cone is 65 π cm^2 and the radius of its base is 5cm. What is 40% of the volume of the cone, in cm^3?

SSC MTS 22/10/2021 (Shift-3)

(a) 50 π (b) 40 π
(c) 180 π (d) 100 π

17. A hall is 18 m long and 12 m broad. If the area of the floor is equal to the sum of the area of the four walls, the volume (in m^3) of the hall is :

SSC MTS 22/10/2021 (Shift-3)

(a) 876.2 (b) 777.6
(c) 576.4 (d) 675.5

18. A field in the form of circle . The area of the field is 3850 m^2, and if the cost of fencing around it is ₹ 11 per metre, then the cost in (in ₹) is : (use $\pi = 22/7$)

SSC MTS 22/10/2021 (Shift-3)

(a) 2,200 (b) 2,400
(c) 2,840 (d) 3,000

19. The area of the floor of a cubical room is 147m^2. The length of the longest rod that can be kept in the room is :

SSC MTS 22/10/2021 (Shift-2)

(a) 15m (b) 18m
(c) 21m (d) 16m

20. The diameter of an iron ball used for the shot put is 21 cm. It is melted and then a cylinder of height 3.5cm is made. The curved surface are of the cylinder will be

SSC MTS 22/10/2021 (Shift-2)

(a) 462 (b) 464
(c) 362 (d) 460

SOLUTIONS

1. (d) According to the question
Area of the equilateral triangle
= Total surface area of the hemisphere

$$\frac{\sqrt{3}}{4} \times \text{side}^2 = 3\pi r^2$$

$$\frac{\text{side}}{r} = \left(\sqrt{3} \times 4 \times \pi\right)^{0.5}$$

$$= \left(4\pi\sqrt{3}\right)^{0.5}$$

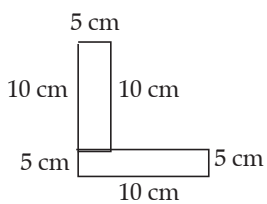
2. (d) Let the distance between sides be x.

$$\text{ATQ, } \left(\frac{25+19}{2}\right) \times x = 330$$

$$\Rightarrow \frac{44}{2} \times x = 330$$

$$\therefore x = \frac{330 \times 2}{44} = 15 \text{ cm}$$

3. (c) According to the question
Perimeter of L shape figure
= Sum of all sides
= 2 × 25
= 50 cm



4. (d) Given,

Depth of bucket(h)= 24 cm
radii of top r_1 = 20 cm
radii of bottom r_2 = 10 cm

$$\therefore \text{Volume of bucket} = \frac{\pi}{3}(r_1^2 + r_2^2 + r_1 r_2)h$$

$$= \frac{22}{7 \times 3}[400 + 100 + 200] \times 24$$

$$= 22 \times 100 \times 8$$

$$= 17{,}600 \text{ cm}^3$$

5. (d) Given length = 15 feet,
width = 12 feet,
height = 10 feet
and Dimension of one door
= 8 ft × 3.5 ft
Dimension of two windows
= 5 × 3

Area of the painted wall

$= 2 \times (15 + 12) \times 10 + 15 \times 12 - 8 \times 3.5 - 2 \times 5 \times 3$

$= 540 + 180 - 28 - 30$

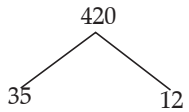
$= 662 \text{ ft}^2$

Total cost of painting four walls

$= 662 \times 50$

$= ₹ 33{,}100$

6. (c) Trick :

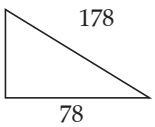


Length = 35 cm

7. (b) According to the question,

$l : b$

$13x \quad 12x$



Area of rectangular = Area of triangle

$$13x \times 12x = \frac{1}{2} \times 78 \times 160$$

$$x^2 = 40$$

$$= 2\sqrt{10}$$

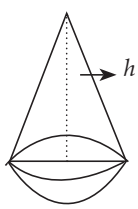
Smallest side of rectangular Garden

$= 12 \times 2\sqrt{10}$

$= 24\sqrt{10}$ cm

8. (c) According to the question,

Volume of metal used = volume of cone + volume of hemisphere



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

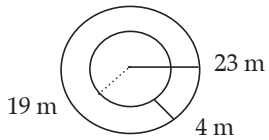
$$= \frac{1}{3}\pi r^3 + \frac{2}{3}\pi r^3$$

$$\Rightarrow \quad \pi r^3 = \frac{22}{7} \times 3.5 \times 3.5 \times 3.5$$

$$= 134\frac{3}{4}$$

9. (b) According to the question

Area of the path = $\pi(R^2 - r^2)$



$$= \frac{22}{7}(23^2 - 19^2)$$

$$\therefore \text{ Cost of path} = 500 \times \frac{22}{7} \times 42 \times 4$$

$= ₹ 264000$

10 (b) Given, Diameter of wire = 56 cm

ratio of triangle(length & breadth) = 7:4

Let length of rectangle = $7a$

and breadth of rectangle = $4a$

According to question

Perimeter = circumference of circle

$2(7a + 4a) = 2\pi r$

$$11a = \frac{22}{7} \times 28$$

$a = 8$

Area of rectangle $= 7 \times 8 \times 4 \times 8$

$= 1792 \text{ cm}^2$

11. (b) Curved surface area $\pi rl = \frac{3432}{7}$

$$\frac{22}{7} \times 12 \times l = \frac{3432}{7}$$

$l = 13$

By Pythagoras triplets 5, 12, 13

$h = 5$ cm

$\therefore$ Volume of sphere = 1.2 × Volume of cone

$$\frac{4}{3}\pi r^3 = 1.2 \times \frac{1}{3} \times \pi \times 12 \times 5$$

$r^3 = 216$

$r = 6$ cm

12. (d) According to question

$$\frac{2\pi rh}{2\pi r(r+h)} = \frac{4}{7}$$

$\Rightarrow \quad 7h = 4r + 4h$

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

Volume of cylinder = $\pi r^2 h$

$$\Rightarrow \quad \frac{22}{7} \times r^2 \times \frac{4}{3} \times r = 4851$$

$$\Rightarrow r^3 = \frac{441 \times 21}{8}$$

$$\Rightarrow r = \frac{21}{2} = 10.5 \text{ cm}$$

13. (b) Trick $\frac{40}{100} = \frac{2}{5} +$

5 7
5 7
25 49

Increase % = $\frac{24}{25} \times 100 = 96\%$

14. (a) Radius of solid lead sphere = 2 cm
Number of sphere = 2541
Number of cube of edge = x
Volume of sphere = Volume of cube

$2541 \times \frac{4}{3} \times \frac{22}{7} \times 2^3 = x^3$

$x = \sqrt{11^3 \times 4^3}$

$= 11 \times 4 = 44$ cm

15. (a) Area of open tank $= 2(l + b) \times h + l \times b$

$= 2(25 + 12) \times 6 + 25 \times 12$

$= 444 + 300 = 744$ cm^2

$\therefore$ Total cost of plaster per $m^2 = 744 \times 15 = ₹11160$

16. (b) CSA of cone $= \pi rl = 65\pi$

$5 \times l = 65$

$l = 13$

By Pythagoras triplets 5, 12, 13

$h = 12$

40% of volume $= \frac{1}{3} \times \pi \times 25 \times 12 \times \frac{40}{100} = 40\pi$

17. (b) According to question

$l \times b = 2(l + b) \times h$

$18 \times 12 = 2 \times 30 \times h$

$h = \frac{18 \times 12}{2 \times 30} = \frac{18}{5}$

$\therefore$ Volume of hall $= lbh = 18 \times 12 \times \frac{18}{5} = 777.6$ m^3

18. (b) Area of circular field $= \pi r^2 = 3850$

$r^2 = \frac{3850 \times 7}{22} = 35 \times 35$

$r = 35$ m

Circumference of circular field $= 2\pi r = 2 \times \frac{22}{7} \times 35$

$= 220$ m

Total cost(fencing) $= 11 \times 220 = ₹ 2420$

19. (c) Let side of cubical room = a

Area $= a^2 = 147$

$\Rightarrow a = \sqrt{147} = 7\sqrt{3}$ m

Diagonal of room $= \sqrt{3}a = \sqrt{3} \times 7\sqrt{3}$

$= 21$ m

20. (a) Radius of ball = $\frac{21}{2}$ cm

height of cylinder = 3.5

Volume of ball = volume of cylinder

$\frac{4}{3}\pi \times \frac{21}{2} \times \frac{21}{2} \times \frac{21}{2} = \pi r^2 \times 3.5$

$R = 21$ cm

CSA of cylinder $= 2\pi rh$

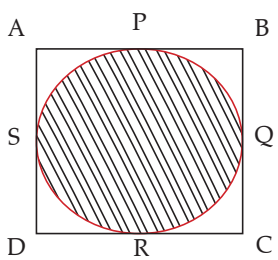
$= 2 \times \frac{22}{7} \times 21 \times 3.5$

$= 462$ cm^2

EXERCISE 19B

For SSC CHSL Exam

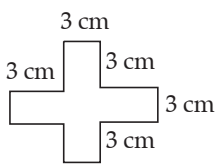
1. ABCD is a square of side 21cm. A circle is inscribed in the square, Which touches the sides of the square at P, Q, R and S as shown in the below figure. What is the area(in cm^2) of the non-shaded region?[figure is not drawn to scale and take $\pi = \frac{22}{7}$]



SSC CHSL 07/06/2022 (Shift-2)

(a) 88.4 (b) 84.6
(c) 90.7 (d) 94.5

2. Calculate the area(in cm^2) of the shaded region in the following diagram. **SSC CHSL 07/06/2022 (Shift-2)**



(a) 45 (b) 42
(c) 48 (d) 50

3. Each edge of the following square is 20 cm long, and a circle is inscribed in the square as shown. What is

the area of the shaded region(in cm^2)?[use $\pi = 3.14$]

20 cm

SSC CHSL 08/06/2022 (Shift-2)

(a) 88 (b) 85
(c) 86 (d) 84

4. What is the area of an equilateral triangle whose each sides is 12cm ? **SSC CHSL 08/06/2022 (Shift-2)**

(a) $36\sqrt{3}\,cm^2$ (b) $38\sqrt{3}\,cm^2$
(c) $34\sqrt{3}\,cm^2$ (d) $40\sqrt{3}\,cm^2$

5. The diameter of a semicircle is 5.6 m. What is its perimeter (in m, correct to one decimal place)? Take ($\pi = \frac{22}{7}$) **SSC CHSL 15/04/2021 (Shift-2)**

(a) 11.2 (b) 8.8
(c) 14.4 (d) 17.6

6. The sum of the radius of two circles is 286 cm and the area between the concentric circle is 50336 cm2. What are the radius(in cm) of the two circle? Take($\pi = \frac{22}{7}$)

SSC CHSL 15/04/2021 (Shift-2)

(a) 115 and 91 (b) 115 and 171
(c) 91 and 84 (d) 171 and 84

7. The perimeter of an isosceles triangle is 3.6 m and its base is 30 cm shorter than each of the equal side. What is area (in m^2) of the triangle?

SSC CHSL 15/04/2021 (Shift-2)

(a) 0.6 (b) 0.72
(c) 0.54 (d) 0.8

8. Ther diameter of the base of a right - circular cylinder is 12 cm and the height of the cylinder is 2.45 times the radius of its base. Find the curved surface area of the cylinder.[use $\pi = 22/7$]

SSC CHSL 10/06/2022 (Shift-3)

(a) 552.4 (b) 556.4
(c) 544.4 (d) 554.4

9. What is the area (in cm^2) of an equilateral triangle of side 20 cm? **SSC CHSL 10/06/2022 (Shift-3)**

(a) $100\sqrt{3}$ (b) 200
(c) 100 (d) $100\sqrt{2}$

10. What is the height of a solid rightcircular cylinder whose radius is 3 cm and total surface area is 60π cm^2?

SSCCHSL 10/06/2022 (Shift-3)

(a) 3 cm (b) 5 cm
(c) 7 cm (d) 9 cm

11. How many spherical balls of radius 5 cm can be made by melting a spherical clay ball having a radius of 15 cm? **SSC CHSL 10/06/2022 (Shift-3)**

(a) 18 (b) 3
(c) 9 (d) 27

12. Whatis the surface area of a sphere whose diameter is 30 cm? [Use $\pi = 3.14$]

SSC CHSL 10/06/2022 (Shift-2)

(a) 1134 (b) 2826
(c) 1413 (d) 1130

13. The base of a parallelogram is twice as long as its corresponding height. If the area of the a parallelogram is 144 cm^2, find the mentioned height.

SSC CHSL 10/06/2022 (Shift-2)

(a) $2\sqrt{2}$ (b) $6\sqrt{2}$
(c) $3\sqrt{2}$ (d) $8\sqrt{2}$

14. The area of the quadrilateral is 336 m^2 and the perpendicular drawn to one diagonal from the opposite vertices are 16 m and 12 m long. Find the length of this diagonal. **SSC CHSL 10/06/2022 (Shift-1)**

(a) 28 cm (b) 26 cm
(c) 21 cm (d) 24 cm

15. If the length, breadth and height of a cuboid are 7.5 m, 22m and 13 m. respectively, then find the volume of the cuboid. **SSC CHSL 10/06/2022 (Shift-1)**

(a) 2145 (b) 1245
(c) 4215 (d) 2154

16. The perimeter of a rectangle is 86 cm. The numbers of its area and breadth are in the ratio of 9:1 respectively. The breadth of the rectangle is:

SSC CHSL 1/08/2021 (Shift-3)

(a) 32 cm (b) 34 cm
(c) 36 cm (d) 30 cm

17. If the radius of a circle is equal to a diagonal of a square whose area is 12 cm^2, then the area of the circle is:

SSC CHSL 11/08/2021 (Shift-2)

(a) 28π (b) 32π
(c) 24π (d) 36π

18. How many bricks each measuring 64 cm × 11.25 cm × 6 cm, will be needed to build a wall measuring 8 m × 3 m × 22.5 m? **SSC CHSL 11/08/2021 (Shift-1)**

(a) 200000 (b) 250000
(c) 67500 (d) 125000

19. The total surface area of a solid cube is 4.86 m^2. It is melted and recast into a right circular cylinder of radius 0.3 m. What is the height of the cylinder(in m)?(correct to one decimal place)Take $\pi = 22/7$

SSC CHSL 09/08/2021 (Shift-3)

(a) 1.8 (b) 2.6
(c) 2.8 (d) 3.5

20. A solid cube having volume 46656 cm^2 is cut into 27 cubes of equal volume. The surface area (in cm^2) of the smaller cube is :

SSC CHSL 09/08/2021 (Shift-1)

(a) 864 (b) 756
(c) 936 (d) 921

21. If the adjacent sides of a rectangle whose perimeter is 60 cm are in the ratio of 3:2, then what will be the area of the rectangle?

SSC CHSL 06/08/2021 (Shift-3)

(a) 300 cm^2 (b) 216 cm^2
(c) 60 cm^2 (d) 864 cm^2

22. In a rectangular park having dimension 60 m × 40 m, two circular flower beds with radius 7m are developed. What is the area of the remaining portion of the park (in m^2) **SSC CHSL 06/08/2021 (Shift-1)**

(a) 1196 (b) 1749
(c) 2092 (d) 2246

23. If one side of te triangle is 7 with its perimeter equal to 18, and area equal to $\sqrt{108}$, then other two sides are:

SSC CHSL 18/03/2020 (Shift-1)

(a) 6 and 5 (b) 3.5 and 7.5
(c) 7 and 4 (d) 3 and 8

24. If the height of an equilateral triangle is 12 cm, then what is the area of the triangle?

SSC CHSL 17/03/2020 (Shift-3)

(a) 89.567 cm^2 (b) 96.897 cm^2
(c) 67.9843 cm^2 (d) 83.1384 cm^2

25. The length and breadth of a rectangle are in the ratio of 5:3. If the length is 8m more than the breadth, what is the area of the rectangle?

SSC CHSL 17/03/2020 (Shift-2)

(a) 240 (b) 380
(c) 360 (d) 400

26. Find the circumference of a circle whose diameter is 12 inches. **SSC CHSL 17/03/2020 (Shift-2)**

(a) 87.4672 cm (b) 95.7072 cm
(c) 88.1876 cm (d) 90.2348 cm

27. A 5cm long perpendicular is drawn from the centre of a circle to a 24 cm long chord. Find the diameter of the circle. **SSC CHSL 17/03/2020 (Shift-1)**

(a) 32 cm (b) 13 cm
(c) 30 cm (d) 26 cm

28. The perimeter of a rectangle is 50 cm. Its area and length are in the ratio of 5:1. Find the length of the rectangle? **SSC CHSL 17/03/2020 (Shift-1)**

(a) 15 cm (b) 20 cm
(c) 18 cm (d) 22 cm

29. If M is mid point of a side BC of ΔABC, and the area of the Δ ABM is 18 cm^2, then the area of the Δ ABC

SSC CHSL 17/03/2020 (Shift-1)

(a) 30 (b) 34
(c) 36 (d) 32

30. In a isosceles triangle ABC, AB = AC and AD is perpendicular to BC at D. If AD = 8 cm and perimeter of ΔABC is 64 cm, then the area of the ΔABC.

SSC CHSL 26/10/2020 (Shift-3)

(a) 130 (b) 124
(c) 120 (d) 125

SOLUTIONS

1. (d) Given, side of square = 21 cm

So, radius of circle = $\frac{21}{2}$ cm

Area (non shaded) = Area of square – Area of circle

$= 22 \times 21 - \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2}$

$= 441 - 346.5$

$= 94.50$

2. (a) ATQ, Side of square = 3
length of rectangle = 9
Breadth of rectangle = 3
Total area of shaded figure = Area of rectangle + Area of square
$= 9 \times 3 + 3^2 \times 2$
$= 27 + 18 = 45$

3 (c) Given side of square = 20 cm

So, radius of circle = $\frac{20}{2} = 10$ cm

Area(shaded region) = Area of square – Area of circle
$= 20 \times 20 - 3.14 \times 10 \times 10$
$= 400 - 314 = 86\ cm^2$

4 (a) Area of equilateral triangle = $\frac{\sqrt{3}}{4}$ $side^2$

$= \frac{\sqrt{3}}{4} \times 12 \times 12$

$= 36\sqrt{3}\ \text{cm}^2$

5 **(c)**According to the question,

radius of semicircle $= \frac{5.6}{2} = 2.8$ m

$\therefore$ Circumference of semicircle $= \pi r + 2r$

$= \frac{22}{7} \times 2.8 + 2 \times 2.8 = 8.8 + 5.6 = 14.4$

6. **(b)** Let radius of big circle $= R$

and radius of small circle $= r$

ATQ, $\pi R^2 - \pi r^2 = 50336$

$\Rightarrow (R - r)(R + r) = 16016$

$\Rightarrow R - r = 56$ ...(II)

and $(R + r) = 286$ ...(I)

Solve eqn. (I) & (II)

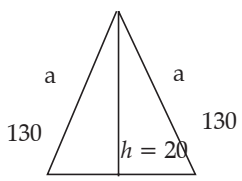
$R = 171$cm and $r = 115$cm

7. **(a)** According to question

perimeter

$3a - 30 = 360$

$a = 130$



$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$

$= \frac{1}{2} \times \frac{100}{100} \times \frac{120}{100}$

$= 0.6\ \text{m}^2$

[$\because$ $h = 120, 50, 120, 130$, triplets]

8. **(d)** radius of cylinder $= \frac{12}{2} = 6$ cm

and height $= 2.45 \times 6 = 14.70$ cm

$\therefore$ CSA of cylinder $= 2\pi rh = 2 \times \frac{22}{7} \times 6 \times 14.7$

$= 554.4\ \text{cm}^2$

9. **(a)** Area of equilateral triangle $= \frac{\sqrt{3}}{4} \times 20 \times 20$

$= 100\sqrt{3}\ \text{cm}^2$

10. **(c)** let height of cylinder $= h$

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

$\Rightarrow 2\pi \times 3 \times (h + 3) = 60\pi$

$\Rightarrow h + 3 = 10$

$\Rightarrow h = 7$ cm

11. **(d)** Numbers of ball melting $= \frac{15 \times 15 \times 15}{5 \times 5 \times 5} = 27$

12. **(b)** Diameter $= 30$ cm

$\text{radius} = \frac{30}{2} = 15\text{cm}$

Surface area of sphere $= 4\pi r^2$

$= 4 \times 3.14 \times 15 \times 15$

$= 2820$

13. **(b)** Let height of parallelogram $= h$

and base $= 2h$

$\therefore$ Area of parallelogram $= b \times h = 144$

$2h^2 = 144$

$\Rightarrow h^2 = 72$

$\Rightarrow h = 6\sqrt{2}$

14. **(d)** Let the length of the diagonal be d.

Area $= \frac{1}{2} \times$ diagonal $\times$ [sum of opposite vertices]

$336 = \frac{1}{2} \times d \times 28$

$d = \frac{336}{14} = 24$ cm

15. **(a)** Volume of cuboid $= 7.5 \times 2.2 \times 13$

$= 2145\ \text{m}^3$

16. **(b)** Area $= 9$

breadth $= 1$

So, Length $= 9$ cm

Perimeter of rectangle $= 2(l + b) = 86$

$\Rightarrow 9 + b = 43$

$\therefore b = 43 - 9 = 34$ cm

17. **(c)** Side of square $= \sqrt{12}$ cm

diagonal $= \sqrt{2} \times \sqrt{12} = \sqrt{24}$ cm

radius of circle = diagonal of square

$= \sqrt{24}$ cm

Area of circle $= \pi r^2 = \pi\left(\sqrt{24}\right)^2 = 24\pi\ \text{cm}^2$

18. **(d)** Number of bricks $= \frac{800 \times 300 \times 2250}{64 \times 6 \times 11.25}$

$= 1,25,000$

19. **(b)** TSA of solid cube, $6a^2 = 4.86$ m

$a = 0.9$ m [$\because$ a = side]

According to the question,

Volume of cylinder = volume of cube

$\pi r^2 h = a^3$

$$\frac{22}{7}\times 0.3\times 0.3\times h = 0.9\times 0.9\times 0.9$$

$$h = 2.57 \text{ m}$$

20. **(a)** Volume of solid cube = 46656

Number of cubes(smaller) = 27

$\therefore$ Volume of small cube = $\frac{46656}{27} = 1728$

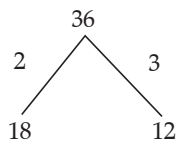
Side of smaller cube = $\sqrt[3]{1728} = 12$ cm

$\therefore$ Surface area of smaller cube = $6 \times 12 \times 12$

$= 864 \text{ cm}^2$

21. **(b)** Perimeter = $2(l + b) = 60$

$l + b = 30$



$\therefore$ Area of triangle = $18 \times 12 = 216 \text{ cm}^2$

22. **(c)** Remaining area of park = $lb - \pi r^2$

$= 2400 - 2\times\frac{22}{7}\times 7\times 7$

$= 2400 - 308$

$= 2092 \text{ m}^2$

23. **(d)**option(d) put the value of 3, 8

Area of triangle and perimeter of triangle verified

24. **(d)** Given, Height of triangle = 12

Side = $\frac{2}{\sqrt{3}}$, Height = $\frac{2}{\sqrt{3}}\times 12 = 8\sqrt{3}$

$\therefore$ Area of equilateral triangle = $\frac{\sqrt{3}}{4}\times 8\sqrt{3}\times 8\sqrt{3}$

$= 48\sqrt{3} \text{ cm}^2$

$= 48 \times 1.732$

$= 83.1384 \text{ cm}^2$

25. **(a)**

L B

5 3

Difference = 2

2 Unit = 8

1unit = 4

$\therefore$ $L = 5 \times 4 = 20$

$\therefore$ $B = 3 \times 4 = 12$

Area = $20\times 12 = 240 \text{ m}^2$

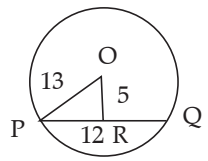
26. **(b)** Circumference of circle = $2\pi r$

$= 30.48\times 3.14 = 95.7072$ cm $\left[\because 2r = 12 \text{ inch} = 12\times 2.54 = 30.48 \text{ cm}\right]$

27. **(d)** radius of a circle = 13

$\because$ 5, 12, 13 is triplets

$\therefore$ Diameter of circle = $2 \times 13 = 26$



28. **(b)** Let length of rectangle = x

breadth = y

Perimeter = $2(x + y) = 50$

$\Rightarrow$ $x + y = 25$

$\Rightarrow$ $y = 25 - x$

ATQ, $(x \times y) : x = 5 : 1$

$$\frac{\left[x\times(25-x)\right]}{x} = \frac{5}{1}$$

$\Rightarrow$ $25x - x^2 = 5x$

$\Rightarrow$ $x = 20$

29. **(c)** According to question

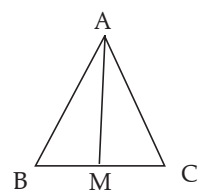
Given M is the mid point of BC

Area of triangle ABM

$\frac{1}{2} \times AM \times BM = 18$

$\Rightarrow$ $AM \times BM = 36$

Area of triangle ABC



$= \frac{1}{2} \times (2 \times AM \times BM)$

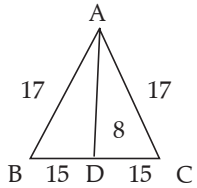
$= \frac{1}{2} \times 2 \times 36 = 36 \text{ cm}^2$

30. **(c)** Height = 8

Let, by Triplets 8, 15, 17 of ΔADC

then base = $2 \times 15 = 30$

Area of triangle = $\frac{1}{2} \times 30 \times 8 = 120 \text{ cm}^2$



EXERCISE 19C

For SSC CGL & CPO Exams

1. The circumference of the base of the right circular cylinder is 62.8 cm and its volume is 8792 cm^3. What is the curved surface area (in cm^2) of the cylinder ? (Take $\pi = 3.14$) **SSC CGL 18/4/2022 (Shift-2)**

(a) 1695.6 (b) 1758.4
(c) 1632.8 (d) 1570.2

2. A hemispherical depression of diameter 4 cm is cut out from each face of a cubical block of sides 10 cm. Find the surface area of the remaining solid (in cm^2). (Use $\pi = 22/7$) **SSC CGL 18/4/2022 (Shift-1)**

(a) $900\frac{4}{7}$ (b) $112\frac{4}{7}$
(c) $675\frac{3}{7}$ (d) $713\frac{1}{7}$

3. The curved surface area of a right circular cylinder is 616 cm^2 and the area of its base is 38.5 cm^2. What is the volume (in cm^3) of the cylinder ? (Use $\pi = 22/7$) **SSC CGL 13/4/2022 (Shift-3)**

(a) 1155 (b) 1408
(c) 1243 (d) 1078

4. Let x cm^2 be the surface area and y cm^3 be the volume of a sphere such that $y = 14x$. What is the radius (in cm) of the sphere ? **SSC CGL 13/4/2022 (Shift-3)**

(a) 102 (b) 42
(c) 51 (d) 68

5. The base of a right pyramid is a square of side $8\sqrt{2}$ cm and each of its slant edge is of length 10 cm. What is the volume (in cm^3) of the pyramid ? **SSC CGL Tier-2 (03/02/2022)**

(a) 256 (b) 224
(c) $426\frac{2}{3}$ (d) $96\sqrt{2}$

6. A cylindrical tube, open at both ends, is made of a metal sheet which is 0.5 cm thick. Its outer radius is 4 cm and length is 2 m. How much metal (in cm^3) has been used in marking the tube ? **SSC CGL Tier 2 (03/02/2022)**

(a) 800 π (b) 450 π
(c) 750 π (d) 550 π

7. The volume of a right circular cone is 308 cm^3 and the radius of its base is 7 cm. What is the curved surface area (in cm^2) of the cone ? (Take $\pi = 22/7$) **SSC CGL Tier-2 (03/02/2022)**

(a) $22\sqrt{21}$ (b) $44\sqrt{21}$
(c) $22\sqrt{85}$ (d) $1\sqrt{85}$

8. Three sides of a triangle are $\sqrt{a^2+b^2}$, $\sqrt{(2a)^2+b^2}$ and $\sqrt{a^2+(2b)^2}$ units. What is the area (in unit squares) of a triangle ? **SSC CGL Tier-2 (03/02/2022)**

(a) $\frac{5}{2}ab$ (b) $3ab$
(c) $4ab$ (d) $\frac{3}{2}ab$

9. A solid metallic sphere of radius 4 cm is melted and recast into spheres of 2 cm each. What is the ratio of the surface area of the original sphere to the sum of surface areas of the spheres, so formed ? **SSC CGL Tier-2 (03/02/2022)**

(a) 2 : 1 (b) 2 : 3
(c) 1 : 2 (d) 1 : 4

10. The total surface area of a solid hemisphere is 942 cm^2. Its volume (in cm^3) is closest to: ? (Take $\pi = 3.14$) **SSC CGL (03/02/2022)**

(a) 2089 (b) 2093
(c) 2037 (d) 2097

11. The volume of a cylinder is 4312 cm^3. Its curved surface area is one-third of its total surface area. Its curved surface area (in cm^2) is: ? (Use $\pi = 22/7$) **SSC CGL Tier-2 (03/02/2022)**

(a) 572 (b) 528
(c) 660 (d) 616

12. The radius of a spherical balloon is inflated from 7 cm to 10.5 cm. The percentage increase in its surface area is: ? **SSC CGL Tier-2 (03/02/2022)**

(a) 150% (b) 125%
(c) 120% (d) 135%

13. A well with inner radius 3 m, is dug 6 m deep. The soil taken out of it has been spread evenly all around it to a width of 2 m to form an embankment. The height (in m) of the embankment is: ? **SSC CGL Tier-2 (03/02/2022)**

(a) $4\frac{1}{2}$ (b) $4\frac{1}{4}$
(c) $3\frac{1}{4}$ (d) $3\frac{3}{8}$

14. The circumference of the base of a cylindrical vessel is 264 cm and its height is 50 cm. The capacity (in litres) of the vessel is:. (Use $\pi = 22/7$)

SSC CGL Tier-2 (03/02/2022)

(a) 277.2 (b) 278.4
(c) 280.6 (d) 267.4

15. The areas of three adjacent faces of a cuboidal solid block of wax are 216 cm^2, 96 cm^2 and 144 cm^2. It is melted and 8 cubes of the same size are formed from it. What is the lateral surface area (in cm^2) of 3 such cubes ? **SSC CGL Tier-2 (03/02/2022)**

(a) 648 (b) 432
(c) 576 (d) 288

16. The base of a right prism is a triangle with sides 16 cm, 30 cm and 34 cm. Its height is 32 cm. The lateral surface area (in cm^2) and the volume (in cm^3) are, respectively: ? **SSC CGL Tier-2 (29/01/2022)**

(a) 2560 and 7680 (b) 2688 and 7680
(c) 2624 and 7040 (d) 2560 and 6400

17. The curved surface area and the volume of a cylindrical object are 88 cm^2 and 132 cm^3, respectively. The height (in cm) of the cylindrical object is: (Use $\pi = 22/7$) ?

SSC CGL Tier-2 (29/01/2022)

(a) $4\frac{2}{3}$ (b) 6
(c) 4 (d) $3\frac{2}{3}$

18. The slant height and radius of a right circular cone are in the ratio 29 : 20. If its volume is 4838.4 π cm^3, then its radius is: ? **SSC CGL Tier-2 (29/01/2022)**

(a) 20 cm (b) 28 cm
(c) 24 cm (d) 25 cm

19. The volume of a solid hemisphere is 19,404 cm^3. Its total surface area (in cm^2) is:. (Use $\pi = 22/7$)

SSC CGL Tier-2 (29/01/2022)

(a) 4158 (b) 3465
(c) 2079 (d) 2772

20. The base of right pyramid is an equilateral triangle, each side of which is 20 cm. Each slant edge is 30 cm. The vertical height (in cm) of the pyramid is :

SSC CGL Tier-2 (29/01/2022)

(a) $5\sqrt{3}$ (b) $10\sqrt{\frac{23}{3}}$
(c) $10\sqrt{3}$ (d) $5\sqrt{\frac{23}{3}}$

21. The radius of the base of a cylindrical tank is 4 m. If three times the sum of the areas of its two circular faces is twice the area of its curved surface, then the capacity (in kilolitres) of the tank is: ?

SSC CGL Tier-2 (29/01/2022)

(a) 54π (b) 108π
(c) 96π (d) 144π

22. The radius of a solid right circular cone is 36 cm and its height is 105 cm. The total surface area (in cm^2) of the cone is: **SSC CGL Tier-2 (29/01/2022)**

(a) 4296π (b) 3969π
(c) 5292π (d) 3996π

23. A tank is in the form of a cuboid with length 12 m. If 18 kilolitre of water is removed from it, the water level goes down by 30 cm. What is the width (in m) of the tank ? **SSC CGL Tier-2 (13/09/2019)**

(a) 4 (b) 5
(c) 5.5 (d) 4.5

24. A 15 m deep well with radius 2.8 m is dug and the earth taken out from it is spread evenly to form a platform of breadth 8 m and height 1.5m. What will be the length of the platform ? **SSC CGL Tier 2 (13/09/2019)**

(a) 28.4 (b) 28.8
(c) 30.2 (d) 30.8

25. A right prism has height 18 cm and its base is a triangle with sides 5 cm, 8 cm and 12 cm. What is the lateral surface area (in cm^2) ?

SSC CGL Tier 2 (13/09/2019)

(a) 450 (b) 468
(c) 432 (d) 486

SOLUTIONS

1. (d) Circumference of cylinder = $2\pi r = 62.8$

$$R = \frac{62.8}{2\times 3.14} = 10 \text{ cm}$$

Volume of cylinder = $\pi r^2 h = 8792$

$$h = \frac{8792}{10\times 10\times 3.14} = 28 \text{ cm}$$

$\therefore$ CSA of cylinder = $2\pi rh$

$= 2 \times 3.14 \times 10 \times 28 = 1758.4$

2. (c) Diameter of hemispherical = 4 cm

$$\text{radius} = \frac{4}{2} = 2 \text{ cm}$$

$\therefore$ surface area of remaining solid

$= 6 \times \text{side}^2 + 6\pi R^2$

$= 6 \times 10 \times 10 + 6 \times \frac{22}{7} \times 2 \times 2$

$= 600 + 75\frac{3}{7}$

$= 675\frac{3}{7}\ \text{cm}^2$

3. (d) CSA of cylinder $= 2\pi rh = 616$

Area of base of cylinder $= \pi R^2 = 38.5$

$\Rightarrow \quad R^2 = \frac{38.5 \times 7}{22} = \frac{49}{4}$

$\Rightarrow \quad R = \frac{7}{4}$

$\therefore \ 2\pi Rh = 616$

$\Rightarrow \ 2 \times \frac{22}{7} \times \frac{7}{2} \times h = 616$

$\Rightarrow h = 28$ cm

$\therefore$ Volume of cylinder $= \pi r^2 h = 38.5 \times 28$

$= 1078\ \text{cm}^2$

4. (b) According to question

$$\frac{\text{Surface area of sphere}}{\text{Volume of sphere}} = \frac{4\pi R^2}{\frac{4}{3}\pi R^3} = \frac{x}{14x}$$

$\Rightarrow \qquad R = 42$ cm

5. (a) Base of triangle $= \frac{1}{2} \times \sqrt{2} \times 8\sqrt{2} = 8$ cm

By triplets 6, 8, 10

height = 6

$\therefore$ Volume of pyramid $= \frac{1}{3} \times (8\sqrt{2})^2 \times 6$

$= 256\ \text{cm}^3$

6. (c) Given outer radius = 4 cm (R)

and thickness = 0.5 cm (r)

internal radius of tube = 4 – 0.5 = 3.5 cm

$\therefore$ Volume of metal used in making tube $= \pi h(R^2 - r^2)$

$= \pi \times 2 \times (4^2 - 3.5^2)$

$= \pi \times 200 \times 3.75$

$= 750\ \pi$

7. (c) Volume of right circular cone $= \frac{1}{3}\pi r^2 h = 308$

$\Rightarrow \ \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times \text{h} = 308$

$\Rightarrow \quad h = 6$ cm

Now, slant height $l = \sqrt{r^2 + h^2}$

$= \sqrt{49 + 36} = \sqrt{85}$

$\therefore$ Curved surface area $= \pi rl$

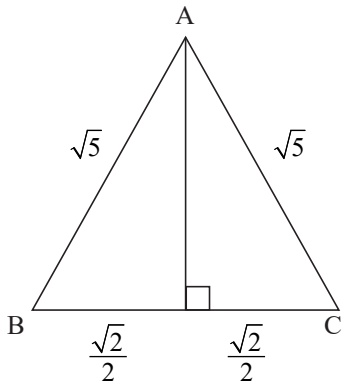
$= \frac{22}{7} \times 7 \times \sqrt{85}$

$= 22\sqrt{85}$

8. (d) Let $a = 1$, $b = 1$

Put the value a and b

$\sqrt{2}, \sqrt{5}, \sqrt{5}$



height of triangle ABC

$= \sqrt{(\sqrt{5})^2 - \left(\frac{\sqrt{2}}{2}\right)^2}$

$= \sqrt{5 - \frac{2}{4}} = \frac{3}{\sqrt{2}}$

Area of $\Delta ABC = \frac{1}{2} \times 2 \times \frac{\sqrt{2}}{2} \times \frac{3}{\sqrt{2}} = \frac{3}{2}ab$

9. (c) Number of spheres $\Rightarrow \frac{4}{3}\pi \times 4 \times 4 \times 4$

$= n \times \frac{4}{3}\pi \times 2 \times 2 \times 2$

$\Rightarrow n = 8$

ratio between area of original sphere and sum of surface area

$= \frac{4\pi \times 4 \times 4}{4\pi \times 2 \times 2 \times 8}$

$= 1 : 2$

10. (b) TSA of hemisphere = 942

$3\pi \times r^2 = 942$

$\Rightarrow \qquad r = 10$ cm

Volume of sphere $= \frac{2}{3}\pi r^3 = \frac{2}{3} \times 3.14 \times 1000$

$= 2093.33\ \text{cm}^3$

11. (d) According to question,

CSA $= \frac{1}{3}$ TSA

$2\pi rh = \frac{2\pi r(h + r)}{3}$

$\Rightarrow \quad 3h = h + r^3$

$\Rightarrow \quad 2h = r$

$\Rightarrow \quad h = r/2$

Volume of cylinder $= \pi r^2 h = 4312$

$$\frac{22}{7}\times r^2\times\frac{r}{2} = 4312$$

$$r = 14 \text{ cm}$$

$$h = 7 \text{ cm}$$

$$\text{CSA} = 2\pi rh = 2\times\frac{22}{7}\times 14\times 7 = 616 \text{ cm}^2$$

12. (b) Radius $r_1 = 7$ cm

Surface area $= 4\pi r_1^2 = 4\pi \times 7 \times 7 = 196\pi$

Radius $r_2 = 10.5$ cm

Surface area $= 4\pi r^2 = 4\pi \times 10.5 \times 10.5 = 441\ \pi$

$$\text{Percentage (increase)} = \frac{441\pi - 196\pi}{196\pi}\times 100$$

$$= \frac{245}{196}\times 100 = 125\%$$

13. (d) Given:

$h = 6$m, inner radius $r = 3$ m

outer radius R = 3 + 2 = 5

ATQ,

$\Rightarrow \pi r^2 h_1 = \pi(R^2 - r^2)\, h_2$

$\Rightarrow 3 \times 3 \times 6 = (5^2 - 3^2)\, h_2$

$\Rightarrow 54 = 16\, h_2$

$$\Rightarrow h_2 = \frac{27}{8} = 3\frac{3}{8} \text{ m}$$

14. (a) Trick Ist option (a) will be divisible by 11

$\therefore$ The correct answer is 277.2

15. (b) Given $lb = 216$ cm^2

$bh = 96$ cm

$hl = 144$

So, $(lbh)^2 = 6^2 \times 4^2 \times 6^2 \times 12^2$

$lbh = 6 \times 4 \times 6 \times 12$

$\therefore 8a^3 = 6 \times 4 \times 6 \times 12$

$\Rightarrow a^3 = 6^3$

$\Rightarrow a = 6$

LSA of 3 cubes $= 3 \times 4 \times 6 \times 6$

$= 432$ cm^2

16. (a) 16, 30, 34 is a triplet which forms a right angle triangles

$$\therefore \text{ Area of Prism} = \frac{1}{2}\times 16\times 30 = 240 \text{ cm}^2$$

Perimeter of base $= 16 + 30 + 34 = 80$ cm

$\therefore$ LSA = Perimeter of base × height

$= 80 \times 32 = 2560$ cm^2

$\therefore$ Volume = Area × height

$= 240 \times 32 = 7680$ cm^3

17. (c) ATQ,

$$\frac{\text{CSA of Cylinder}}{\text{Volume of Cylinder}} = \frac{2\pi rh}{\pi r^2 h} = \frac{88}{132}$$

$r = 3$

$$\therefore\ h = \frac{88\times 7}{2\times 22\times 3} = \frac{14}{3} = 4\frac{2}{3} \text{ cm}$$

18. (c) Let $l : r : h$ [$\because$ 20, 21, 29 is a triplet]

$29x : 20x : 21x$

$$\therefore\ \frac{1}{3}\pi \times 20x \times 20x \times 21x = 4838.4\pi$$

$\Rightarrow x = 1.2$

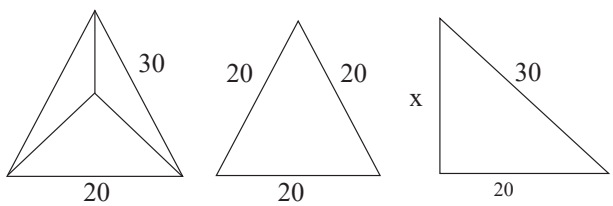
$\therefore$ radius $= 20 \times 1.2 = 24$ cm

19. (d) Volume of hemisphere $= \frac{2}{3}\times\frac{22}{7}\times r^3 = 19404$

$r = 21$ cm

$$\therefore \text{ TSA} = 3\pi r^2 = 3\times\frac{22}{7}\times 21\times 21 = 2772$$

20. (b)



Centre of equilateral triangle $= \frac{a}{\sqrt{3}} = \frac{20}{\sqrt{3}}$

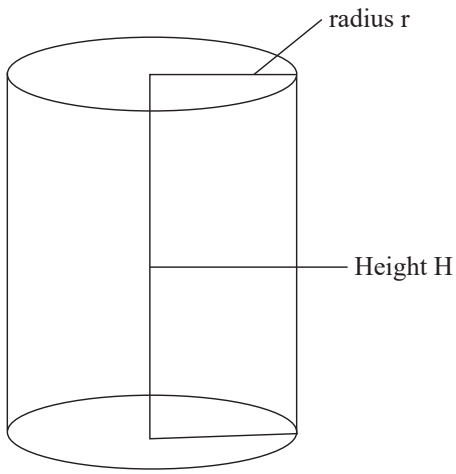
Let vertical height be x

By Pythagoras theorem

$$x^2 = \frac{2700 - 400}{3} = 10\sqrt{\frac{23}{3}} \text{ cm}$$

21. (c) ATQ,

Sum of areas of two circular faces



$\pi r^2 + \pi r^2 = 2\pi r^2$

CSA of cylinder = $2\pi rh$

$3 \times 2\pi r^2 = 2 \times 2\pi rh$

$h = \frac{3}{2}r = \frac{3}{2} \times 4 = 6$ m

Volume of tank = $\pi r^2 h$

$= \pi \times 4 \times 4 \times 6$

$= 96\ \pi$ kl

22. **(c)** Given radius = 36 cm

height = 105 cm

slant height = 111 cm

By triplets 36, 105, 111

TSA = $\pi r\ (l + r)$

$= \pi \times 36\ (111 + 36)$

$= 5292\ \pi$

23. **(b)** According to question,

Volume of cuboid = $L \times B \times h$

$\Rightarrow 1\ M^3 = 1000$ L

$\Rightarrow 18000$ L $= 18\ m^3$

$\Rightarrow 12 \times 30 \times B = 18 \times 100$

$\therefore \quad B = 5$ m

24. **(d)** Given, Height platform (h) = 1.5 m

Height of well (H) = 15 m

Breadth of platform = 8 m

$r = 2.8$

ATQ,

$\pi r^2 H = l \times b \times h$

$\frac{22}{7} \times 2.8 \times 2.8 \times 15 = 1.5 \times 8 \times l$

$\therefore \quad l = 30.8$ m

25. **(b)** LSA = $2(5 + 8) \times 18$

$= 26 \times 18 = 468\ cm^2$