

Class: 9

Subject: Mathematics

Topic: Surface Areas and volumes of Solids

No. of Questions: 20

Duration: 60 Min

Maximum Marks: 60

1. If the dimensions of a cuboid are 3 cm, 4 cm and 10 cm, then its surface area is

- A. 82 CM²
- B. 123 CM²
- C. 164 CM²
- D. 216 CM²

Sol: C

$$\begin{aligned}\text{Surface area is} &= 2(lb + bh + hl) \\ &= 2(12+40+30) \\ &= 2 \times 82 = 164 \text{ CM}^2\end{aligned}$$

2. The volume of the cuboid in Q. 1 is

- A. 17 CM³
- B. 164 CM³
- C. 120 CM³
- D. 240 CM³

Sol: C

$$\begin{aligned}\text{Volume} &= lbh \\ &= 3 \times 4 \times 10 = 120 \text{ cm}^3\end{aligned}$$

3. The surface area of a cuboid is 1372 sq. cm. if its dimensions are in the ratio of 4: 2: 1, then its length is

- A. 7 cm
- B. 14 cm
- C. 21 cm
- D. 28 cm

Sol: D

$$l : b : h :: 4 : 2 : 1$$

$$2(4x \times 2x + 2x \times x + x \times 4x) = 1372$$

$$2(8x^2 + 2x^2 + 4x^2) = 1372$$

$$14x^2 = 686$$

$$x^2 = 49$$

$$x = 7$$

$$\text{Hence, length} = 7 \times 4 = 28 \text{ cm}$$

4. The base radius and height of a right circular cylinder are 7 cm and 13.5 cm. The volume of cylinder is
- A. 1579 cm³
 - B. 1897 cm³
 - C. 2079 cm³**
 - D. 2197 cm³

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

$$H = 13.5 \text{ cm}$$

$$\text{Volume} = \pi r^2 h$$

$$= \frac{22}{7} \times 49 \times 13.5$$

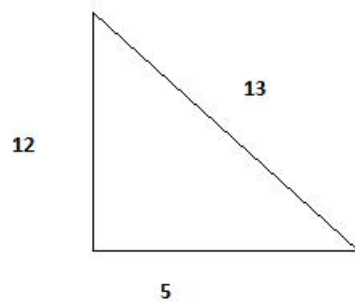
$$= 154 \times 13.5$$

$$= 2079 \text{ cm}^3$$

5. The base radius of a cone is 5 cm and its height is 12 cm. its slant height is
- A. 13 cm
 - B. 19.5 cm
 - C. 26 cm
 - D. 52 cm

Sol: C

Using Pythagoras theorem



6. The curved surface area of a cylinder of height 14 cm is 88 sq. cm. The diameter of the cylinder is
- A. 0.5 cm
 - B. 1.0 cm
 - C. 1.5 cm
 - D. 2.0 cm

Sol: A

$$CSA = 2\pi rh$$

$$88 = 2 \times \frac{22}{7} \times r \times 14$$

$$R = 1\text{cm}$$

$$\text{Hence } D=2R = 2 \text{ cm}$$

7. The lateral surface area of a right circular cone of height 28 cm and base radius 21 cm is
- A. 1155 cm²
 - B. 1055 cm²
 - C. 2110 cm²
 - D. 2310 cm²

Sol: D

$$CSA = \pi rl$$

$$= \frac{22}{7} \times 21 \times 35$$

$$= 110 \times 21 = 2310$$

8. The circumference of the base of a 8 m high conical tent is $\frac{264}{7}$ m. The area of canvas required to make the tent is
- A. $\frac{1320}{7} \text{ cm}^2$
 - B. $\frac{1360}{14} \text{ cm}^2$
 - C. 286 cm^2
 - D. 98 cm^2

Sol: A

$$2\pi r = \frac{264}{7}$$

$$2 \times \frac{22}{7} \times r = \frac{264}{7}$$

$$R = 6 \text{ cm}$$

$$\text{CSA} = \pi r l$$

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

$$= \frac{1320}{7} \text{ cm}^2$$

9. The area of metal sheet required to make a closed hollow cone of height 24 m and base radius 7 m is
- A. 154 m^2
 - B. 352 m^2
 - C. 704 m^2
 - D. 550 m^2

Sol: C

$$\text{Slant height} = \sqrt{(24)^2 + (7)^2} = 25 \text{ cm}$$

$$\text{CSA} = \pi r l$$

$$= \frac{22}{7} \times 7 \times 25 = \frac{11 \times 100}{2} = 550 \text{ m}^2$$

$$\text{Area of base} = \frac{22}{7} \times 7^2 = 154 \text{ m}^2$$

10. The diameter of a sphere whose surface area is 346.5 cm^2 is

- A. 5.25 cm
- B. 5.75 cm
- C. 11.5 cm
- D. 10.5 cm

Sol: D

$$4\pi r^2 = 346.5$$

$$4 \times \frac{22}{7} \times r^2 = 346.5$$

$$R = 5.25 \text{ cm}$$

$$\text{Diameter} = 10.5 \text{ cm}$$

11. The radius of a spherical balloon increases from 7 cm to 14 cm when air is pumped into it. The ratio of the surface area of original balloon to inflated one is

- A. 1 : 2
- B. 1 : 3
- C. 1 : 4
- D. 4 : 3

Sol: C

$$SA_1 = 4\pi r_1^2$$

$$SA_2 = 4\pi r_2^2 = \frac{49}{49 \times 4} = \frac{1}{4}$$

12. The area of three adjacent faces of a cube is a, b and c. the volume is V what is the appropriate relation between V and a, b, c?

- A. $V^4 = abc$
- B. $V = abc$
- C. $V^3 = abc$
- D. $V^2 = abc$

Sol: D

$$L^2 = a$$

$$V = l^3$$

$$L^2 = b$$

$$V^2 = l^6$$

$$L^2 = c$$

$$V^2 = abc$$

13. The height of a cone is 16 cm and slant height is 20 cm. its radius is?
- A. 12 cm
 - B. 13 cm
 - C. 14 cm
 - D. 10 cm

Sol: A

$$L^2 = h^2 + r^2$$

$$400 = 256 + r^2$$

$$R^2 = 144$$

$$R = 12 \text{ cm}$$

14. In a cylinder, radius is doubled and height is doubled, curved surface area will be?
- A. Become 2 times
 - B. Become 4 times
 - C. Remains same
 - D. Become $\frac{1}{2}$ times

Sol: B

$$R' = 2r$$

$$H' = 2h$$

$$CSA' = 2\pi r' h'$$

$$= \pi r h \times 4$$

$$= CSA \times 4$$

15. The dimensions of a cuboid are 50 cm x 40 cm x 10 cm. its volume in litres is?

- A. 10 litres
- B. 20 litres
- C. 40 litres
- D. 30 litres

Sol: B

$$\text{Volume} = 20000\text{cm}^3$$

$$1\text{m}^3 = 10^6\text{cm}^3$$

$$1\text{m}^3 = 1000\text{l}$$

$$= .02 \times 1000$$

$$= 20 \text{ liters}$$

16. A home chocolate maker has one spherical chocolate of radius 10 cm. with the same amount of material, how many small sphere of chocolates of radius 2.5 cm can be made?

- A. 16
- B. 256
- C. 64
- D. None of these

Sol: C

$$R = 10\text{cm}$$

$$X \times \frac{4}{3} \times \pi \times \frac{5}{2} \times \frac{5}{2} \times \frac{5}{2} = \frac{4}{3} \times \pi \times 10 \times 10 \times 10$$

$$X = 64$$

17. Find the amount of water displaced by a solid spherical ball of diameter 4.2 cm, when it is completely immersed in water?

- A. 31 liters
- B. 2 liters
- C. 1 liters
- D. None of these

Sol: D

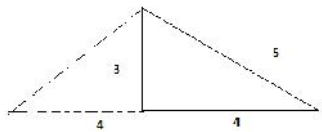
$$R = 2.1 \text{ cm}$$

$$V = \frac{4}{3} \times \frac{22}{7} \times \frac{21}{10} \times \frac{21}{10} \times \frac{21}{10} = 38.808 \text{ cm}^3$$

$$V = 38.808 \text{ cm}^3 = 38.808 \times 10^{-3} \text{ litres}$$

18. A right triangle with sides 3 cm, 4 cm and 5 cm is revolved about the side 3cm to form a cone. Which of these is false?
- A. Curved surface of cone = 20π
 - B. Total surface area = 36π
 - C. Volume = $80/3\pi$
 - D. None of these

Sol: D



$$CSA = \pi r l$$

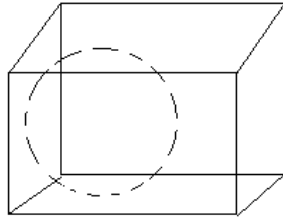
$$= \pi \times 4 \times 5 = 20\pi$$

$$= 20\pi r + \pi r^2 = 16\pi = 36\pi$$

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 16 \times 3 = 16\pi$$

19. A cube of side 42 cm contains a sphere touching its sides; find the volume of the gap in between?
- A. 35280 cm^3
 - B. 35286 cm^3
 - C. 34328 cm^3
 - D. None of these

Sol: A



$$D = 42$$

$$R = 21$$

$$\therefore \text{Volume of cube} = (42)^3$$

$$\begin{aligned} \text{Volume Of sphere} &= \frac{4}{3} \times \frac{22}{7} \times 21 \times 21 \times 21 \\ &= 74088 - 38808 = 35280 \end{aligned}$$

20. McDonald provides cold drink to the consumer daily in cylindrical glasses of radius 7 cm. If the glass is filled with coca cola up to an height of 12 cm, find how many liters of coca cola is needed to serve 100 consumers?
- A. 164 liters
 - B. 184.8 liters
 - C. 200 liters
 - D. 16.5 liters

Sol: B

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

$$\begin{aligned} \text{Volume of cylinder} &= \frac{22}{7} \times 7 \times 7 \times 12 \times 100 \times 10^{-6} \times 1000 \\ &= \frac{22 \times 84}{10} = 184.8 \text{ litres} \end{aligned}$$