

~~St - 2~~

## CUBE & CUBOID

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a) Cube: A cube has three sides: length, breadth & height, where all side equals.

✓ Vertices = 8

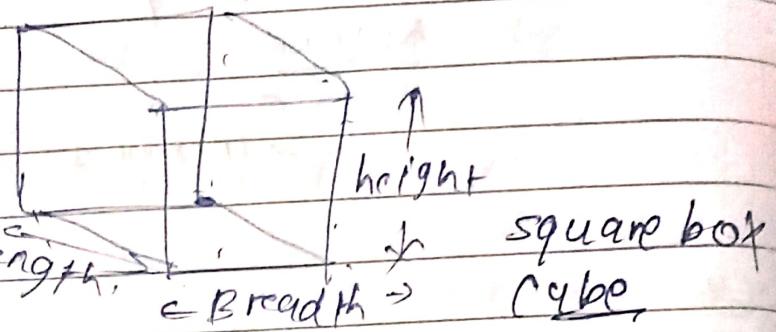
✓ Edges = 12

✓ One face =  $A^2$

✓ CSA =  $4A^2$

✓ TSA =  $6A^2$

✓ Volume =  $A^3$

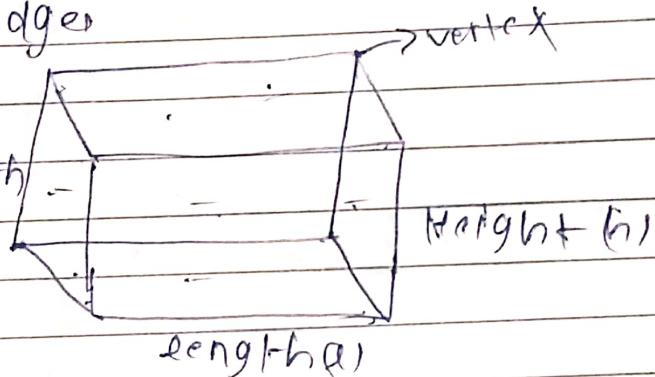


b) Cuboid :- A cuboid is a 3-dimensional structure with three sides where all sides are not equal: length, height & width. A cuboid has 6 faces, 8 vertices & 12 edges.

TSA:  $2(lb + bh + lh)$

LSA =  $2(l+b)h$

length =  $4(l+b+h)$  (per)



→ 6 faces

→ 8 vertices & 12 edges.

# Formula of cube: For each side  $n \times n \times n$  of dimension  $1 \times 1 \times 1$ ,

→ No. of cube with 0 side painted =  $(n-2)^3$

→ No. of cubes with 1 side =  $6(n-2)^2$

→ No. of cubes with 2 sides =  $12(n-2)$

→ No. of cubes with 3 sides =  $8$  (always)

$$6(3.21^2)$$

\* Formula of cuboid :- formula of cuboid  
 → of dimension  $A \times B \times C$  painted. cut into dimension  
 $1 \times 1 \times 1$ .

$$\rightarrow \text{No. of cubes with } 0 \text{ side painted} = (a-2)(b-2)(c-2)$$

$$\rightarrow \text{No. of } 1 \times 1 \times 1 \text{ and } 2 \times 1 \times 1 = 2[(a-2)(b-2) + (b-2)(c-2) + (a-2)(c-2)]$$

$$\rightarrow \text{No. of } 1 \times 1 \times 2 \text{ and } 1 \times 2 \times 1 = 4(a+b+c-6)$$

$$\rightarrow 1 \times 1 \times 1 \text{ and } 3 \times 1 \times 1 = 8 \text{ (a/ways)}$$

~~Cube~~

A cuboid :- cube

total small cube =  $8^3$

$$n = \frac{\text{big cube side}}{\text{small cube side}} = \frac{A}{a}$$

$$\frac{16}{8} = 2$$

$$\text{Q3. Total no. of small cube} = n^3 = 8^3 = 64$$

Q2 QM Total no. of small cube on three surface  
 colored = 8 (a/ways)

Q3 Two surface coloured =  $12(n-2)$

$$= 12(4-2)$$

$$= 12 \times 2 = 24$$

Q4 At least two surface painted = 0 surface +  
 ↓  $\rightarrow$  right

$$\text{surface} \rightarrow \text{right} \Rightarrow (n-2)^3 + 6(n-2)^2$$

$$= (4-2)^3 + 6(4-2)^2$$

$$= 8 + 6 \times 4$$

$$= 32$$

Q5

$$\begin{aligned} \text{Single surface coloured} &= 6(n-2)^2 \\ &= 6(4-2)^2 \\ &= 6 \times 4 = 24 \end{aligned}$$

Q6

$$\begin{aligned} \text{Colourless} &= (n-2)^3 \\ &= (4-2)^3 = 2^3 = 8 \end{aligned}$$

Q7 At least 1 surface = 2 Face + 3 Face  
+ 1 Face

$$\begin{aligned} &= 12(n-2) + 8 + 6(n-2)^2 \\ &= 12(4-2) + 8 + 6(4-2)^2 \\ &= 24 + 8 + 24 \\ &= 56. \end{aligned}$$

Q8

$$\begin{aligned} x &= \frac{\text{big cube}}{\text{small cube}} \\ &= 9/3 = 3 \end{aligned}$$

$$\therefore x = 3.$$

$$\therefore \text{No. of small cubes} = x^3 = 3^3 = 27.$$

Q9 3 surface = 8

$$Q10 2 surface = 12(n-2)' = 12(3-2) = 12 \times 1$$

Q11

$$\begin{aligned} \text{At least 2 surface} &= \cancel{2 \text{ face}} + \cancel{1 \text{ face}} \\ &= (n-2)3 + 6(n-2)^2 \\ &= (3-2)3 + 6(3-2)^2 \\ &= -1 + 6 = 7 \end{aligned}$$

$$= 2 \text{ face} + 3 \text{ face}$$

$$= 12(x-2) + 8$$

$$= 12(3-2) + 8$$

$$= 12 + 8 = 20 \text{ any}$$



→ big cube

$$\begin{aligned}
 \text{Q11} \quad & \text{Total surface area} = 6(x-2)^2 \quad (\text{given } x=3 \rightarrow \text{small}) \\
 & = 6(3-2)^2 \\
 & = 6
 \end{aligned}$$

$$\begin{aligned}
 \text{Q12} \quad \text{an} \quad & \text{At least 1 part surface colour} : - 1 \text{ face} + 2 \text{ face} \\
 & + 3 \text{ face} \\
 & = 6(n-2)^2 + 12(n-2) \\
 & = 6x^2 + 12x + 8 \\
 & = 26
 \end{aligned}$$

$$\text{Q15} - \frac{x}{2} \quad \text{same} \quad \equiv$$

$$\text{Q12} \quad \text{Three surface} = 8$$

$$\begin{aligned}
 \text{Q13} \quad & \boxed{x^3 = 216} \\
 & -x = 6 \\
 \therefore \text{Colourless} & = \frac{16-2)^3}{6} \\
 & = \frac{14^3}{6} \\
 & = 4^3 = 64
 \end{aligned}$$

$$\begin{aligned}
 \text{Q16} \quad \text{Formula:} \quad & x^3 = 216 \\
 \text{No. of faces} & = 3(x-1) \quad \therefore x = 6 \\
 & = 3(6-1) \\
 & = 3 \times 5 \\
 & = 15
 \end{aligned}$$

$$\begin{aligned}
 \text{Q17} \quad T.S.A & = 6A^2 \\
 \therefore A^2 & = \frac{1536}{6} = 256
 \end{aligned}$$

$$\therefore A = 16$$

$$\begin{aligned}
 a^2 & = 4 \\
 a & = 2
 \end{aligned}$$

$$x = \frac{16}{2} = 8$$

$\rightarrow$  No. of small cube =  $x^3 = 8^3 = 512$

Q28 One surface =  $A^2$   
 $= 16 \times 16 = 256 \text{ cm}^2$

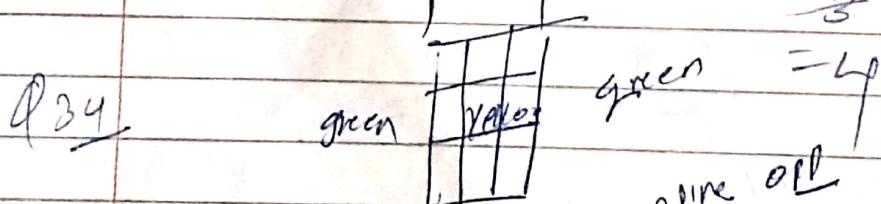
Q29  $T-SA = 6A^2$   
 $= 6 \times 4$   
 $= 24 \text{ cm}^2$

Q30 length of one side of large cube =  
 $T-SA = 6A^2 = 1536$   
 $A = 16 \text{ cm}$

Q31 cubes =  $3(x-1)$   
 $= 3(8-1)$   
 $= 3 \times 7 = 21 \text{ cubes}$

Q32 Three surface colored = 8 (always)

Q33 Two surface =  $\frac{12(n-2)}{3} \rightarrow \text{Formula}$   
 $= \frac{12(3-2)}{3}$



line of  
 $\rightarrow 2 \text{ line } + 3 \text{ line } \times 1^2 \text{ side cube}$   
 $3 \times 4 \times 1^2 = 12$

# CHAPTER

## CUBE & CUBOID

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### Lesson #1 Introduction

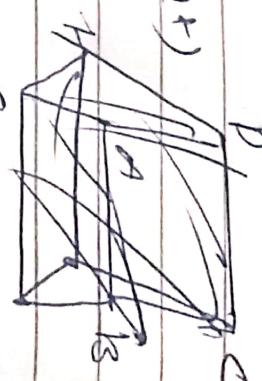
→ cuboid is surround by 6 rectangular planes (faces or sides)

\* Adjacent plane :- Adjacent means neighbouring planes.

$$\rightarrow ABCD \neq ADHE \text{ (adjacent)}$$

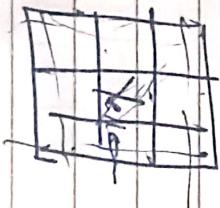
$$\rightarrow ABCD \neq CBDF$$

→ 12 edges in a cuboid.

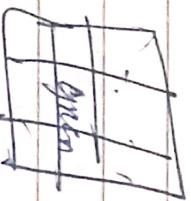


~~cube~~  
 ~~$b(x-y)^2$~~   
 ~~$b(a^2 - b^2)$~~   
 ~~$b(x^2 - y^2)$~~   
 ~~$b(x^2 + y^2)$~~

Q35 Q12



Q36



$$= 9+9 = 18$$

Q37 8 MZ



Q59

~~Step 16~~

Yellow - Red - Yellow

~~Ans: 16~~

$$\text{Quo} = 4 \times 2 = 8$$



$$4 \times 2 = 2 = 5$$

$$\text{Surface colour} = 6(n-2)^2/5 \quad : - \text{Req.}$$

$$= 6 \times (5-2)^2$$

$$= \frac{6 \times 9}{5}$$

$$= 12$$

Ans take side.

~~corner edges~~

$$5 \times 4 = 20.$$



$$\text{Q59} \quad (n-2)^3 = (5-2)^3 = 3^3 = 27$$

$$\text{One side coloured} = 6(n-2)^2$$

$$= 6(5-2)^2$$

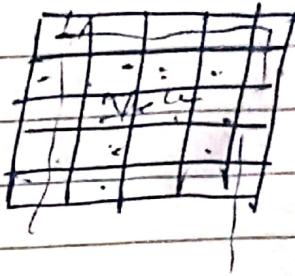
$$= 6 \times 3^2$$

$$= 54 \rightarrow$$

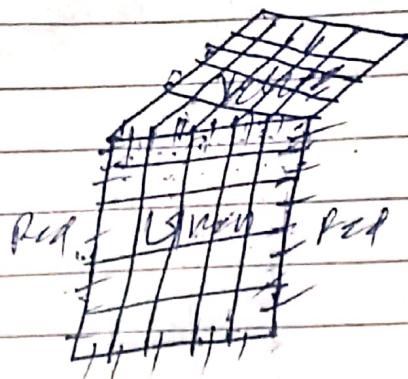
$$12 \times 5$$

top  
bottom

~~Q45~~  $c = 18 \quad g + g = 18$



~~Q46~~



$$\Rightarrow (n-2)^3$$

$$(5-2)^3 = 27$$

$$\Rightarrow 20 \times 9 = 5 \times 8 = 40$$

$$\Rightarrow 5 \times 5 = 25$$

$$25 + 25 = 50$$

45 (5)

73  
97

~~Q47~~ Q49

$$\text{Two side color} = 6(n-2)^2 \quad | \text{total color}$$

$$= 6(7-2)^2 + 8$$

$$\text{Two side color} = 12(n-2) \quad | \text{cancel out}$$

$$= 12(7-2) + 8$$

$$= 12 \times 5 =$$

$$= 60 \text{ cm}^2$$

Q50

- At least two surface colored:

~~Q51~~ = 2 faces + 3 space

$$\Rightarrow 12(n-2) + 8$$

$$\Rightarrow 12 \times (7-2) + 8$$

$$= 68 \text{ cm}^2$$

top

bottom

pink

Black Green Yellow

