Greeting,

Dear students in the previous notes we learn about Combined shapes. Now we are going learn more about Three dimensional (3- D) shapes.

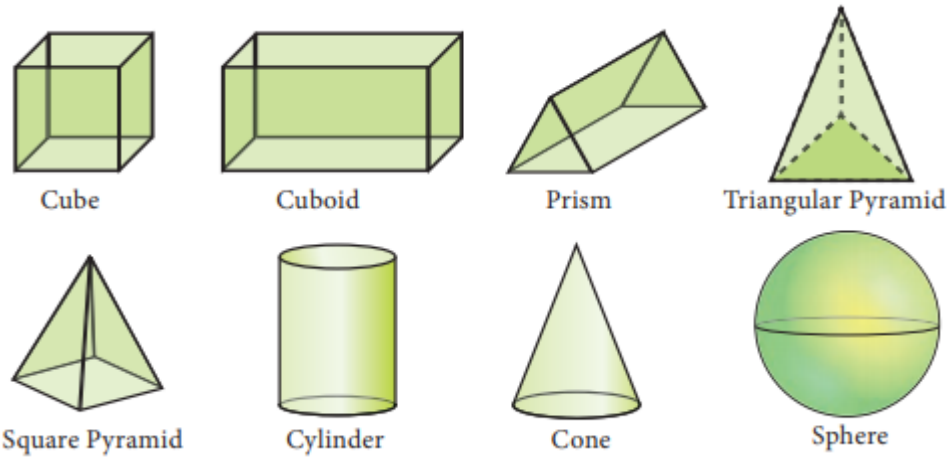
Three dimensional (3- D) shapes

Trace the outline of a ₹ 2 coin, ₹ 10 note and a square shaped biscuit on a paper.

What shapes have you traced? A circle, a rectangle and a square. Isn't it? These shapes represents the plane figures. Also, these plane figures have two dimensions namely length and breadth. Now, you place some two rupee coins, some ten rupee notes and some square shaped biscuits respectively on the drawn shapes as shown in the figure.

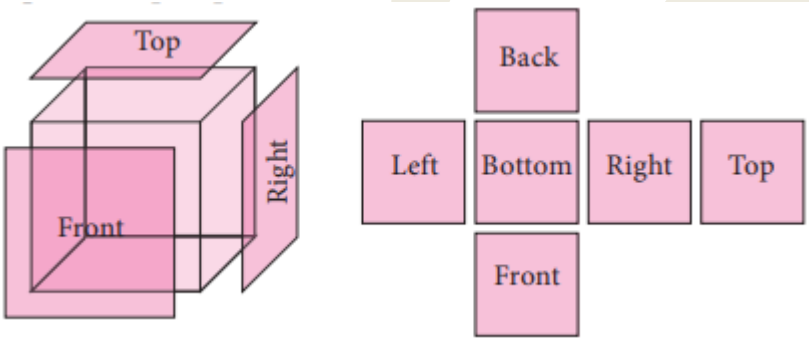
Fig. 2.32

What do you get now? A **cylinder, a cuboid and a cube**. Isn't it? These shapes do not lie completely on the plane and they occupy some space also. That is, they have the third dimension namely the height along with the dimensions length and breadth. Thus, **the shapes which have three dimensions namely length, breadth and height (depth) are called three dimensional shapes**, **simply called as 3-D shapes**. Some examples of 3-D shapes are



Faces, Edges and Vertices

Observe the following shape. What is it? A cube. A cube is made of six square shaped planes. These 6 square shaped planes of the cube are known as its **faces.**



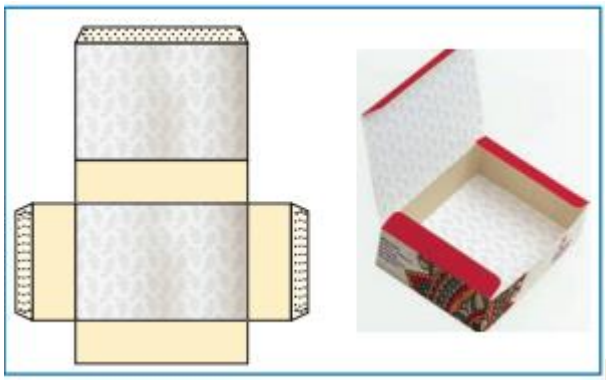
A line segment which connects any two faces of a cube is called as **Edge** and each corner point where three edges meet is called as **Vertex**. So, **a cube has 6 faces, 12 edges and 8 vertices.**

Nets for building three dimensional (3-D) shapes

When we buy sweets, a shop keeper picks a fl at shaped card which has some flips and makes a rectangular shaped box (cuboid) by folding it as shown in the figure. Then, he arranges the sweets in the box and gives it to us.

The flat shaped card already designed for making the box excluding flaps (dotted lines) is known as a net.

For example, from the following nets we can build cubes and square pyramids.



Nets for cubes | Nets for square pyramids

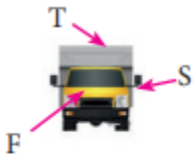
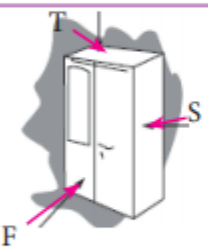
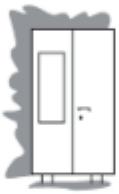
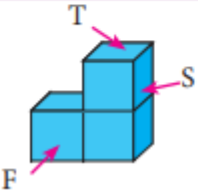
Cross section of solid shapes

When we cut the vegetables in cross section for cooking purpose, we see some plane figures in it. For example, the cross section of a carrot and a plantain stem is a circle.

In the same way, we can see squares and rectangles in the cross section of a bread loaf and bricks etc.,

3-D shapes in different views

A 3-D object may look different from different positions. View of a 3D shape is what you see while observing the object from different positions. Some of the views are **front view, top view and side view**. The different views of some of the objects are as shown below

Object	Front View	Top View	Side View
			
			
			

Now we are going to see exercise problems

Question1.

Fill in the blanks:

(i)The three dimensions of a cuboid are _____ , _____ and _____

Answer:

length, breadth, height

(ii) The meeting point of more than two edges in a polyhedron is called as _____ .

Answer:
Vertex

(iii) A cube has _____ faces.

Answer:

six

(iv) The cross section of a solid cylinder is _____ .

Answer:

circle

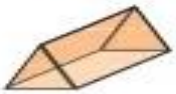
(v) If a net of a 3-D shape has six plane squares, then it is called _____ .

Answer:

cube

Question 2.

Match the following

(i)		-	(a) Cylinder
(ii)		-	(b) Cuboid
(iii)		-	(c) Triangular Prism
(iv)		-	(d) Square Pyramid

Answer:

(i) – b

(ii) – a

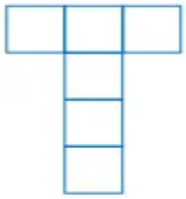
(iii) – d

(iv) – c

Question 3.

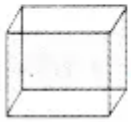
Which 3 – D shapes do the following nets represents? Draw them.

(i)

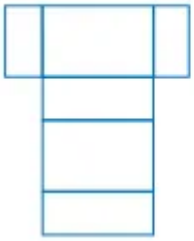


Answer:

The net represents cube, because it has 6 squares.

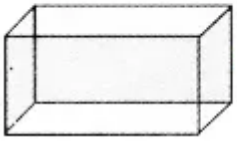


(ii)

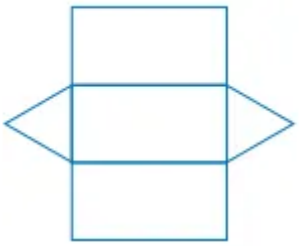


Answer:

The net represents cuboid

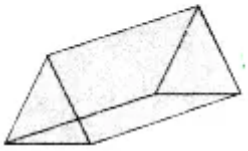


(iii)

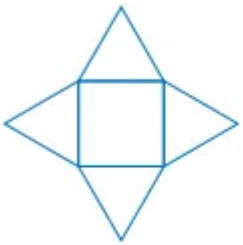


Answer:

The net represents Triangular prism

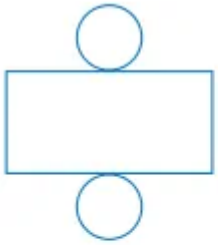


(iv)



The net represents square pyramid

(v)

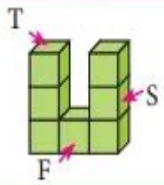
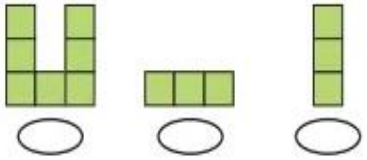
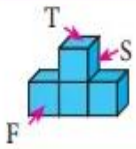
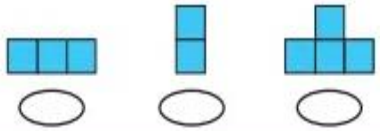
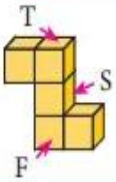
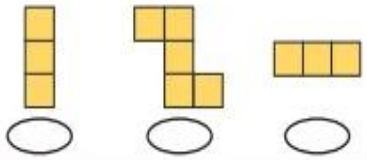


Answer:

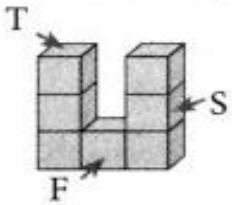
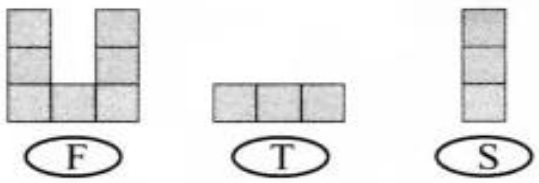
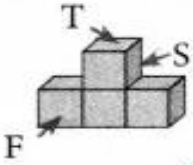
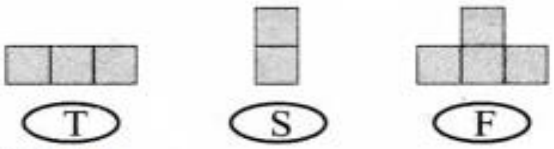
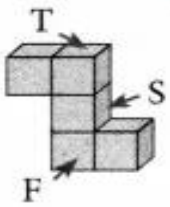
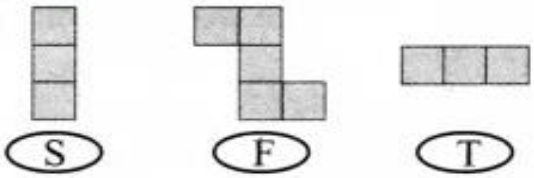
Ine net represents cylinder

Question 4.

For each solid, three views are given. Identify for each solid, the corresponding Top, Front and Side (T, F and S) views.

Solid	Three views
	
	
	

Answer:

Solid	Three views
	
	
	

Question 5.

Verify Euler's formula for the table given below.

S.No.	Faces	Vertices	Edges
(i)	4	4	6
(ii)	10	6	12
(iii)	12	20	30
(iv)	20	13	30
(v)	32	60	90

Answer:

Euler's formula is given by $F + V - E = 2$

(i) $F = 4; V = 4; E = 6$

$F + V - E = 4 + 4 - 6 = 8 - 6$

$F + V - E = 2$

$\therefore$ Euler's formula is satisfied.

(ii) $F = 10; V = 6; E = 12$

$F + V - E = 10 + 6 - 12 = 16 - 12 = 4 \neq 2$

$\therefore$ Euler's formula is not satisfied.

(iii) $F = 12; V = 20; E = 30$

$F + V - E = 12 + 20 - 30 = 32 - 30 = 2$

$\therefore$Euler's formula is satisfied.

(iv) $F = 20; V = 13; E = 30$

$F + V - E = 20 + 13 - 30 = 33 - 30 = 3 \neq 2$

$\therefore$Euler's formula is not satisfied.

(v) $F = 32; V = 60; E = 90$

$F + V - E = 32 + 60 - 90 = 92 - 90 = 2$

$\therefore$ Euler's formula is satisfied.

@@@@ **Thank you** @@@@