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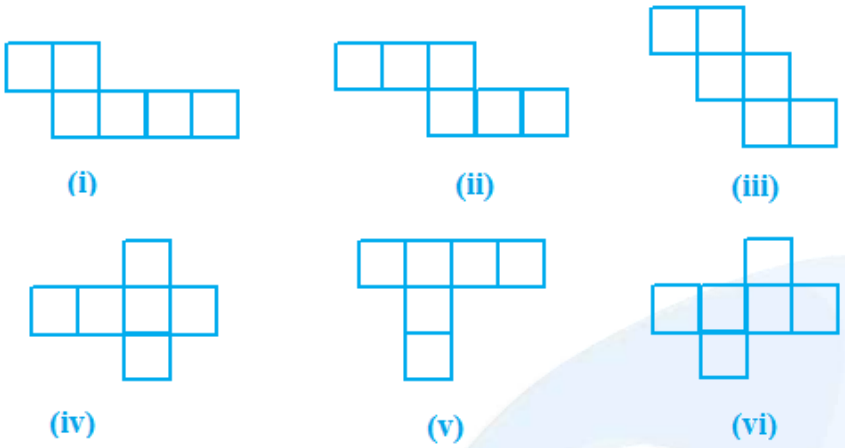
Chapter-15: Visualising Solid Shapes

Exercise 15.1 (Page 281)

Q1. Identify the nets which can be used to make cubes (cut out copies of the nets and try it):



Difficulty Level: Low

What is known:
Different nets.

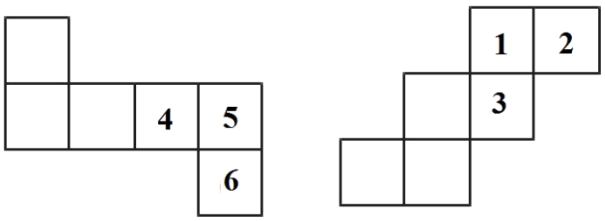
What is unknown:
Which nets can be used to make cube.

Reasoning:
This question is based on the concept of 3D shapes

Solution:
Figure (ii), (iii), (iv) and (vi) will make cubes. As we know a cube has 6 faces, 12 edges and 8 vertices. So, when we will fold the nets of shapes in (ii), (iii), (iv) and (vii) we will be able to make a cube.

Q2. Dice are cubes with dots on each face. Opposite faces of a die always have a total of seven dots on them.

Here are two nets to make dice (cubes); the numbers inserted in each square indicate the number of dots in that box.



Insert suitable numbers in the blanks, remembering that the number on the opposite faces should total to 7.

Difficulty Level: Medium

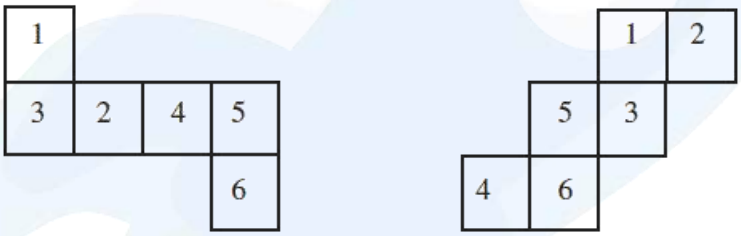
What is given/known:
Two nets of a dice on which number of dots on some faces are given.

What is unknown:
Number in the squares where there are blanks.

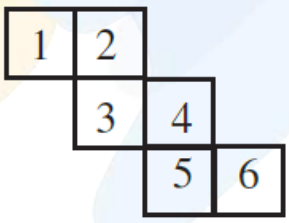
Reasoning:
As we know dice are cubes with dots on each face. Opposite faces of a die always have a total of seven dots on them. Also, in this question nets to make dice (cubes) is given along the numbers inserted in each square indicate the number of dots in that box.

Solution:
In figure (i) 1st blank net will be number 1 in dice because opposite net to it will be 6 as given. 2nd net will be 3 as opposite to it will be 4 as given and last 3rd net will be 2 as opposite to it will be 5.

In figure (ii) 1st blank net will be no. 5 in dice because opposite net to it will be 2 as given. 2nd net will be 6 as opposite to it will be 4 as given and last 3rd net will be 4 as opposite to it will be 3.



Q3. Can this be a net for a die?



Difficulty level: Medium

What is known:
A net.

What is unknown:
Can this be a net for a dice.

Reasoning:
Dice is a cube with dots on each face. Opposite faces of a die always have a total of seven dots on them. Make a cube of this net and if opposite faces of this cube have sum of 7 then it can be a net for dice.

Solution:

No, because we know that dice is a cube with dots on each face. Opposite faces of a die always have a total of seven dots on them.

So, if we will fold this net opposite to 4 will be 1 and opposite to 3 will be 6 which does not make total of 7.

Q4. Here is an incomplete net for making a cube. Complete it in at least two different ways. Remember that a cube has six faces. How many are there in the net here? (Give two separate diagrams. If you like, you may use a squared sheet for easy manipulation.)

Difficulty Level: Low

What is known:

Incomplete net for a cube.

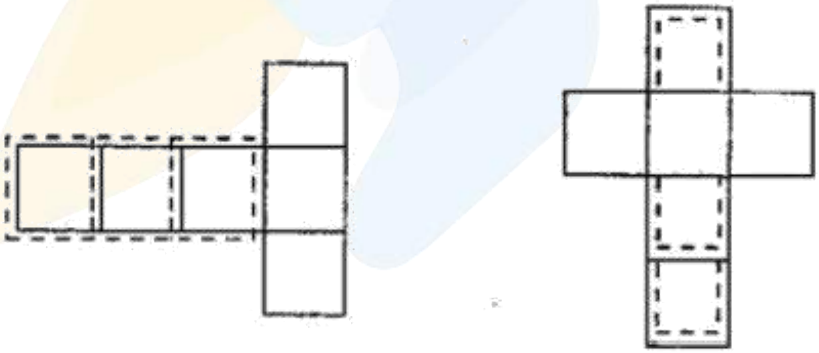
What is unknown:

Complete net for a cube in two different ways.

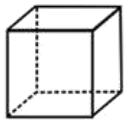
Reasoning:

Three faces of cube have given so we can implement other three faces in this way to get a completed cube.

Solution:

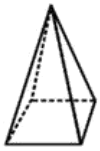


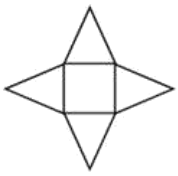
Q5. Match the nets with appropriate solids:

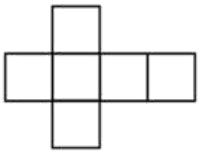
(a) 

(b) 

(c) 

(d) 

(i) 

(ii) 

(iii) 

(iv) 

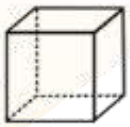
Difficulty Level: Low

What is known:
Nets and solids

What is unknown:
Matching the nets with appropriate solids.

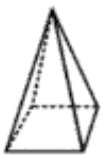
Reasoning:
Match the solids to their appropriate nets.

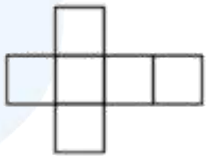
Solution:

(a) 

(b) 

(c) 

(d) 

(ii) 

(iii) 

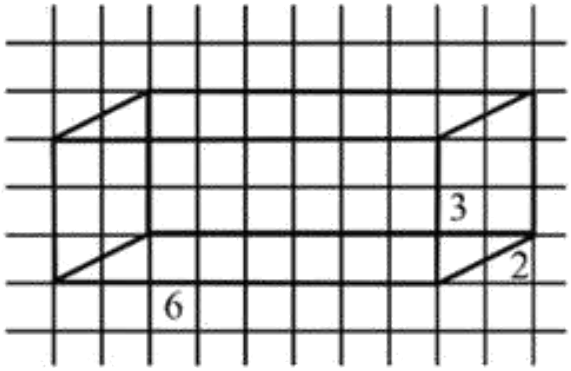
(iv) 

(i) 

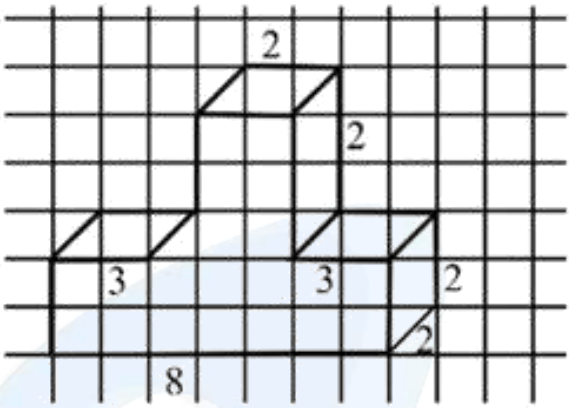
Chapter-15: Visualising Solid Shapes

Exercise 15.2 (Page 285)

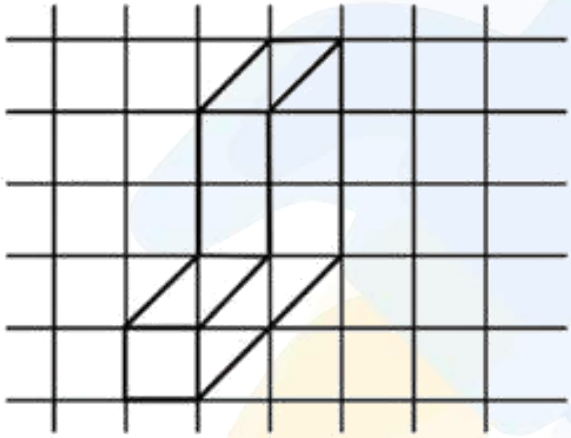
Q1. Use isometric dot paper and make an isometric sketch for each one of the given shapes:



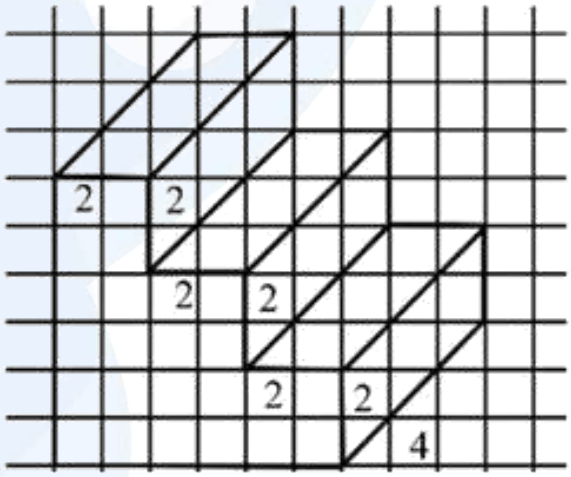
(i)



(ii)



(iii)



(iv)

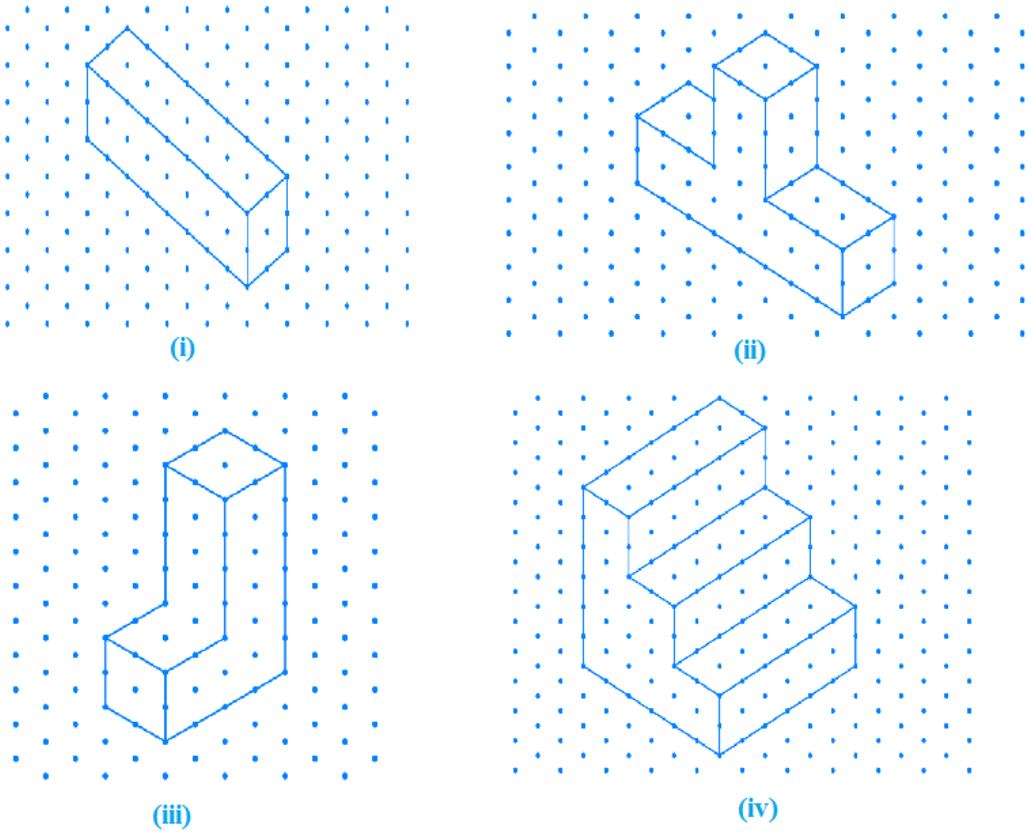
Difficulty Level: Low

What is known:
Oblique sketch

What is unknown:
Isometric sketch

Reasoning:
See the figure carefully and then draw it on isometric dot paper.

Solution:



Q2. The dimensions of a cuboid are 5 cm, 3 cm and 2 cm. Draw three different isometric sketches of this cuboid.

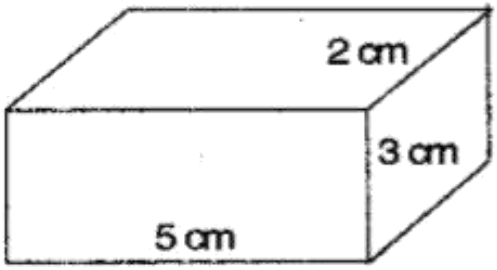
Difficulty Level: Low

What is known:
Dimensions of a cuboid.

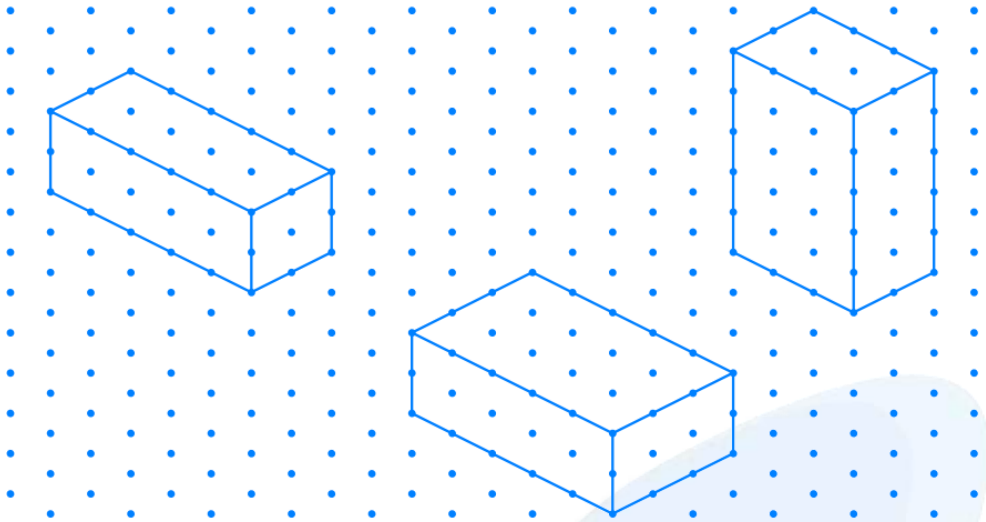
What is unknown:
3 different isometric sketches of this cuboid.

Reasoning:
Draw 3 rough sketch of cuboid having dimensions of 5cm, 2cm and 3 cm then draw it on isometric dot paper.

Solution:
The dimensions of cuboid are 5 cm, 3 cm and 2 cm:



Three different isometric sketches of given cuboid are below:



Q3. Three cubes each with 2 cm edge are placed side by side to form a cuboid. Sketch an oblique or isometric sketch of this cuboid.

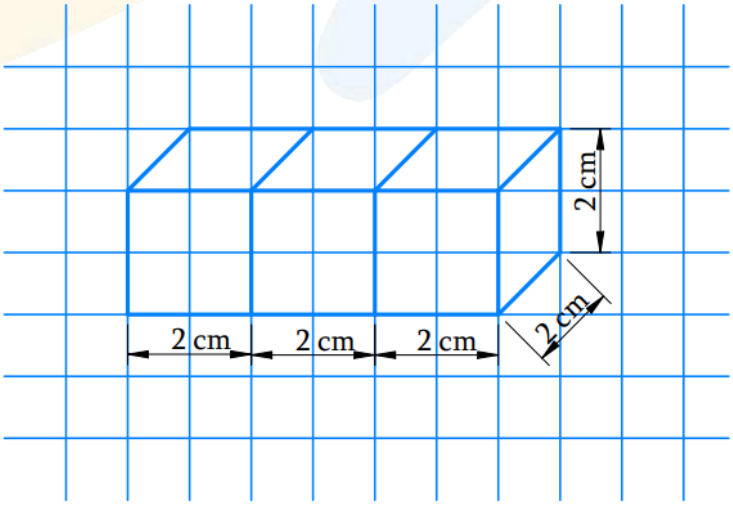
Difficulty Level: Medium

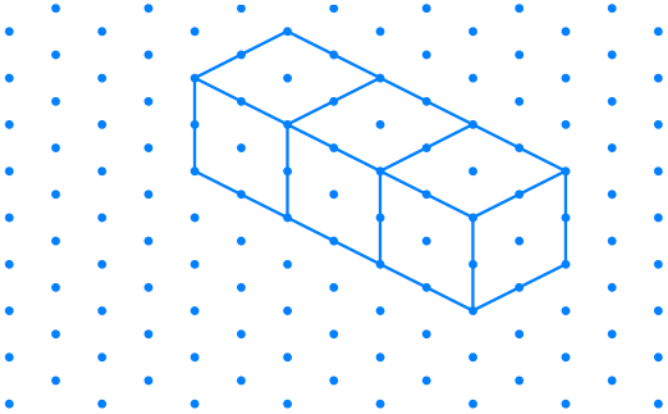
What is known:
Three cubes each with 2 cm edge are placed side by side to form a cuboid.

What is unknown:
Oblique or isometric sketch of this cuboid.

Reasoning:
Draw rough sketch of this cuboid and then draw oblique and isometric sketch.

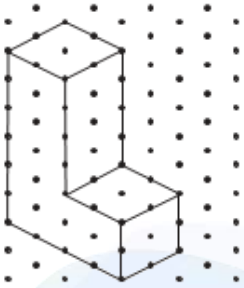
Solution:
Length of three each cube edge = 2 cm
Placing three cubes side by side, then the dimension of cuboid = 6 cm×2 cm × 2 cm



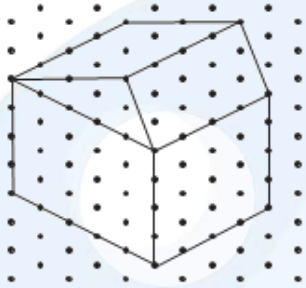


Isometric sketch

Q4. Make an oblique sketch for each one of the given isometric shapes:



(a)



(b)

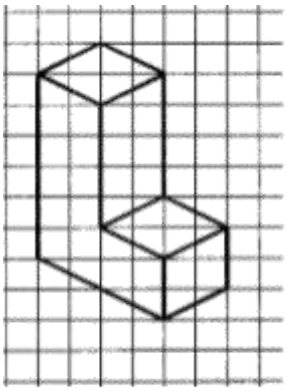
Difficulty Level: Low

What is known:
Isometric sketch

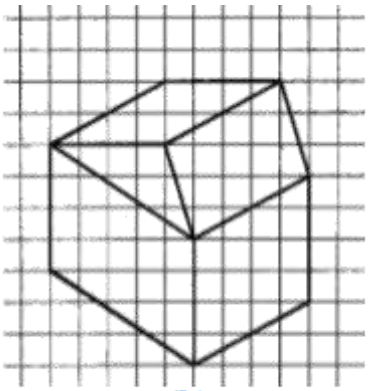
What is unknown:
Oblique sketch

Reasoning:
See the figure carefully and then draw an oblique sketch of these figures.

Solution:
Below are the oblique sketches of given isometric shapes:



(a)



(b)

Q5. Give (i) an oblique sketch and (ii) an isometric sketch for each of the following:
(a) A cuboid of dimensions 5 cm, 3 cm and 2 cm. (Is your sketch unique?)
(b) A cube with an edge 4 cm long.

An isometric sheet is attached at the end of the book. You could try to make on it some cubes or cuboids of dimensions specified by your friend.

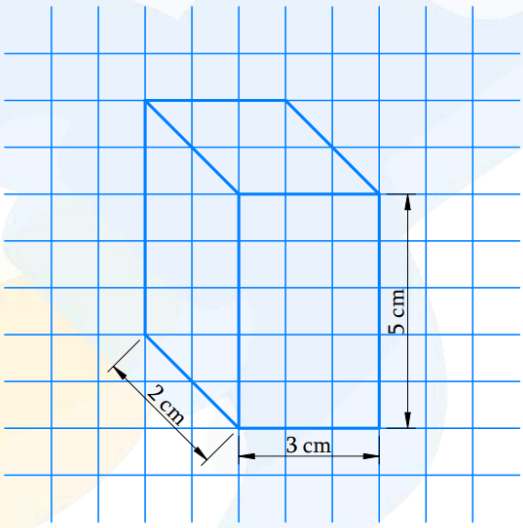
Difficulty Level: Medium

What is known:
Dimensions of the cube and cuboid.

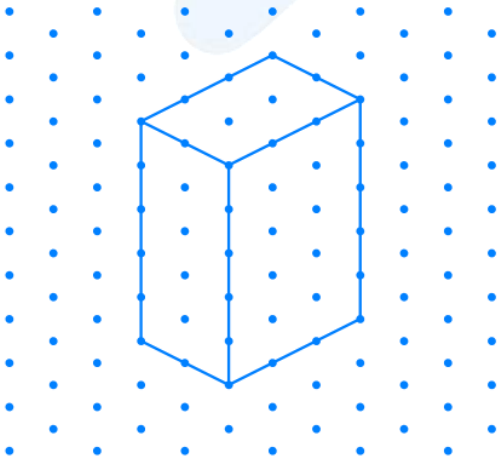
What is unknown:
Oblique and isometric sketch of cube and cuboid.

Reasoning:
First draw a rough sketch then draw oblique and isometric sketch for cube and cuboid.

Solution:
a) oblique and isometric sketch for a cuboid of dimensions 5 cm, 3 cm and 2 cm.

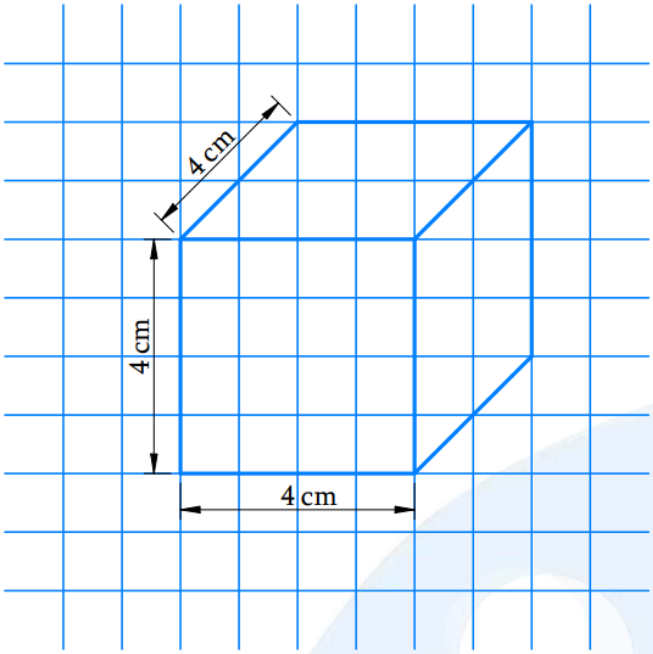


oblique Sketch



Isometric sketch

b) oblique and isometric sketch for a cube with 4 cm length



Chapter-15: Visualising Solid Shapes

Exercise 15.3 (Page 288)

Q1. What cross-sections do you get when you give a
(i) vertical cut (ii) horizontal cut
to the following solids?

(a) A brick (b) A round apple (c) A die
(d) A circular pipe (e) An ice cream cone

Difficulty level: Easy

What is known:
Different solids.

What is unknown:
What cross-sections we get if we cut it vertically and horizontally.

Reasoning:

Shapes	Vertical cut	Horizontal cut
Cube	2 rectangular face shapes	2 rectangular face shapes
Cuboid	2 rectangular face shapes	2 rectangular face shapes
Cylinder	2 rectangular face shapes	2 cylindrical shapes
Sphere	2 semi-circular face shapes	2 semi-circular face shapes
Cone	2 triangular face shapes	1 small cone and 1 frustum

Solution:
(a) A brick

Vertical cut. We will get 2 rectangle shape pieces of length half the length of brick but breath will be same

Horizontal cut. We will get 2 pieces of rectangle shape each of same length but with half the breath of the brick.

(b) A round apple

Vertical cut. We will get 2 semi-circle shape pieces of same diameter.

Horizontal cut. We will get 2 semi-circle shape pieces of same diameter.

(c) A dice

Vertical cut. We will get 2 rectangular shape pieces of length half the side of dice but breath will be same as side of dice.

Horizontal cut. We will get 2 pieces of rectangular shape each of length equals to side of dice, but breadth will be half of side of dice.

(d) A circular pipe

Vertical cut. We will get 2 rectangular shape pieces. Length will be equal to height of circular pipe and breadth will be equal to diameter of circular pipe

Horizontal cut. We will get 2 pieces of circular pipe, but their height will be half of original circular pipe

(e) An ice cream cone

Vertical cut. We will get 2 triangular shape pieces

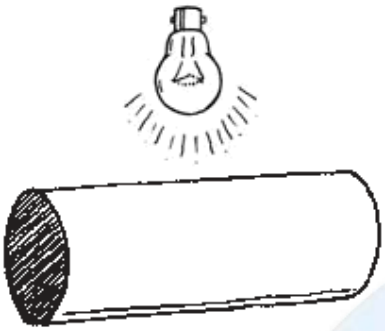
Horizontal cut. We will get 1 piece of small cone shape and 1 frustum shape piece.

Chapter-15: Visualising Solid Shapes

Exercise 15.4 (Page 289)

Q1. A bulb is kept burning just right above the following solids. Name the shape of the shadows obtained in each case. Attempt to give a rough sketch of the shadow. (You may try to experiment first and then answer these questions).

(i) A Ball



(ii) A Cylindrical Pipe

(ii) A Book

Difficulty level: Easy

What is known:
Some solids

What is unknown:
Shape of the shadow obtain in each case.

Reasoning:
A spherical object gives a circular shape shadow.
A cylindrical object gives a shadow of a line.
A cuboidal object gives a rectangular shape shadow.

Solution:
(i) A ball will give the shadow of a circle when torch is above the ball.
(ii) A cylindrical pipe will give the shadow of a line.
(iii) A book will give image of a rectangle.

Q2. Here are the shadows of some 3-D objects, when seen under the lamp of an overhead projector. Identify the solid(s) that match each shadow. (There may be multiple answers for these!)

A circle

(i)

A square

(ii)

A triangle

(iii)

A rectangle

(iv)

Difficulty level: Easy

What is known:
Some shadow of solid shapes

What is unknown:
Solid shapes for each shadow

Reasoning:
A spherical object gives a circular shape shadow.
A cylindrical object gives a shadow of a line.
A cubical object gives a square shape shadow.
A cuboidal object gives a rectangular shape shadow.
A conical object gives a triangular shadow.

Solution:
Solids will be:

(i) A **ball or sphere** will give shadow of a circle.
(ii) A **cube shape object like dice** will give shadow of a square.
(iii) **An ice- cream cone or a birthday cap** will give the shadow of triangle.
(iv) A **book or a cuboid shape** object will give shadow of a rectangle.

Q3. Examine if the following are true statements:
(i) The cube can cast a shadow in the shape of a rectangle.
(ii) The cube can cast a shadow in the shape of a hexagon.

Difficulty level: Easy

What is known:
Statements.

What is unknown:
Statement is true or not.

Reasoning:
A cubical object gives a square shape shadow when light is coming directly and it gives a rectangular shadow when light is coming diagonally.

Solution:

(i) The cube can cast a shadow in the shape of a rectangle is True because when the light is coming diagonally then it will caste shadow of rectangle.

(ii) The cube can cast a shadow in the shape of a hexagon is false as in either case cube will not caste shadow of hexagon as cube can caste shadow of square or rectangle and square and rectangle both have 4 sides, but a hexagon has 6 sides.

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