visualising solid shapes

Exercise 10.1

1. **For each of the given solids, the two views are given. Match for each solid the corresponding top and front views.**

Object	Side view	Top view

(a)   (i)   (i)

(b)   5 KG   (ii)   (ii)

(c)   (iii)   (iii)

(d)   (iv)   (iv)

(e)   (v)   (v)   5 KG

Ans: The following is the solid that has been matched to their corresponding side and top views.

Object   **Side view**   **Top view**

(a)   (iii)   (iv)

(b)   (i)   (v)

(c)   (iv)   (ii)

(d)   (v)   (iii)
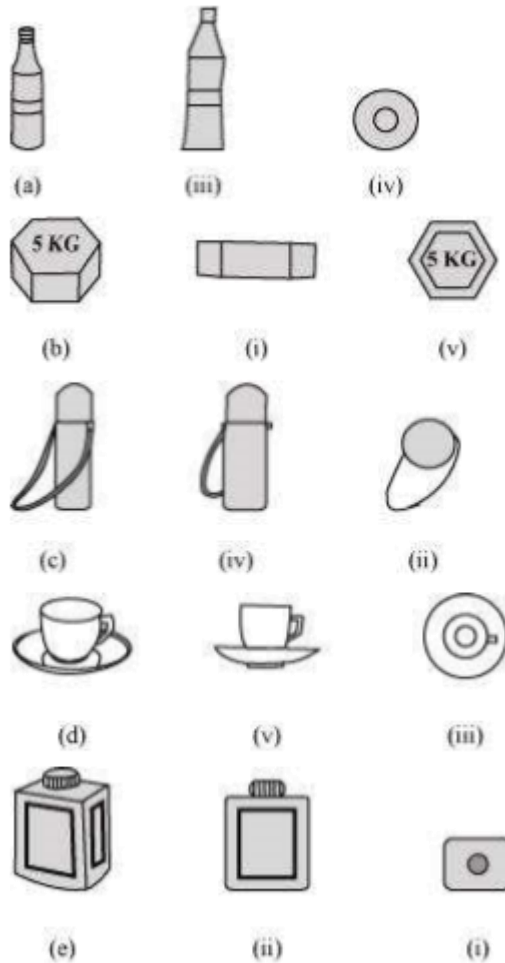
(e)   (ii)   (i)

2. For each of the given solids, the three views are given. Identify for each solid the corresponding top, front and side views.
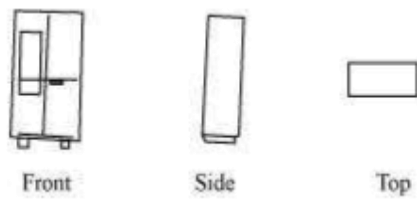
Object

(a) Top

(i) (ii) (iii)

Side

Front

(b) Top

Side

Front

(c) Top

Side

Front

(d) Top

Front Side

Ans:
(a)

Front Side Top

(i) Front
(ii) Side
(iii) Top

(b)

Side   Front   Top

(i) Side
(ii) Front
(iii) Top

(c)
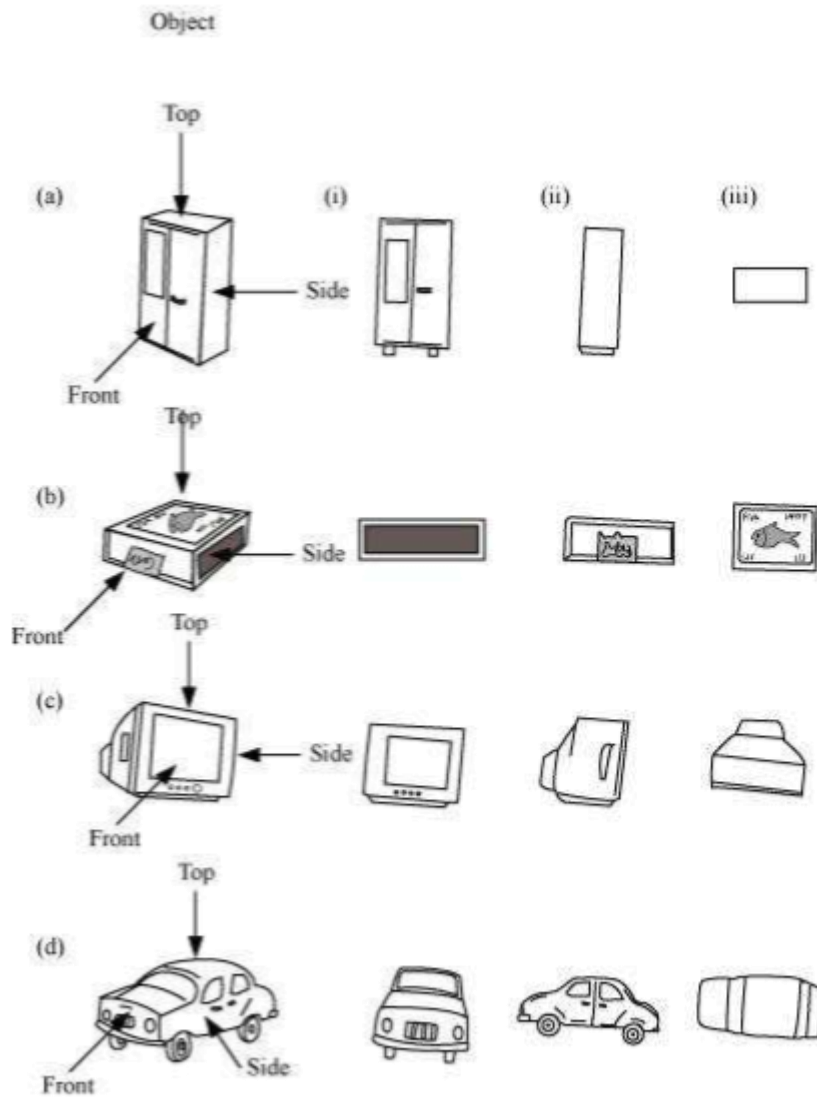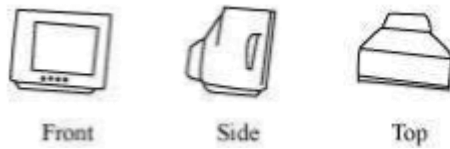
Front   Side   Top

(i) Front
(ii) Side
(iii) Top
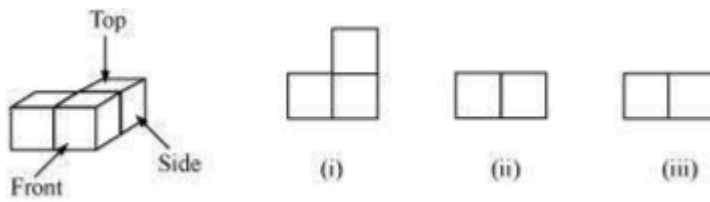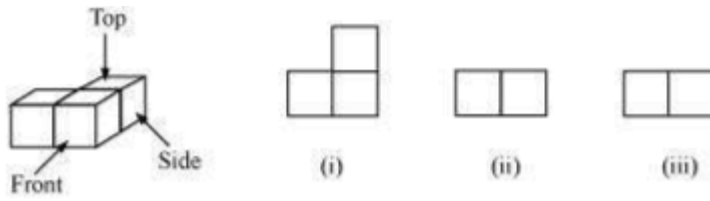
(d)

Front   Side   Top

(i) Front
(ii) Side
(iii) Top

3. For each given solid, identify the top view, front view and side view.
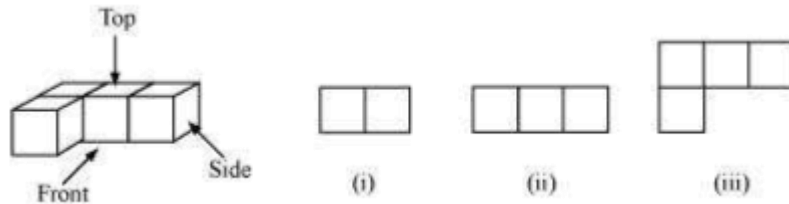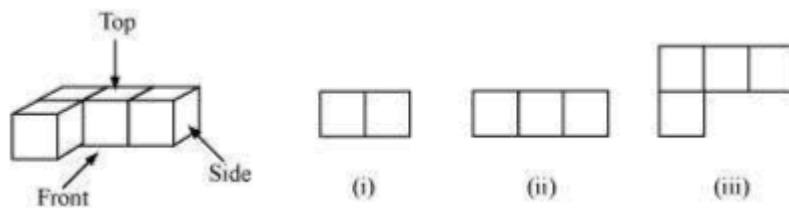**(a)**

Ans.(a)

(i) Top
(ii) Front/Side
(iii) Side/Front

(b)

Ans.(b)

(i) Side
(ii) Front
(iii) Top

(c)

Top

Side

Front

(i)　　(ii)　　(iii)

Ans:

Top

Side

Front

(i)　　(ii)　　(iii)

(i) Top
(ii) Side
(iii) Front

(d)

Top

Side

Front

(i)　　(ii)　　(iii)

Ans:

Top

Side

Front

(i)　　(ii)　　(iii)
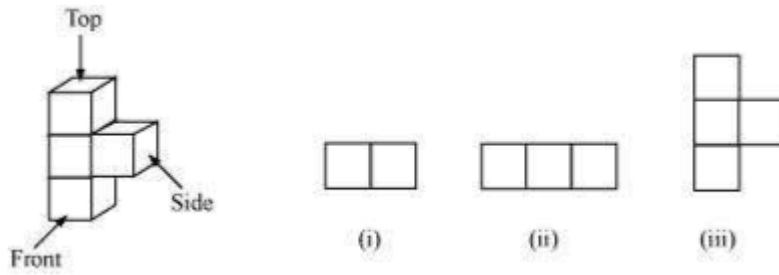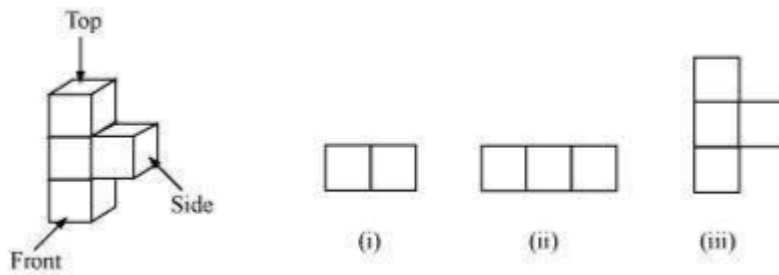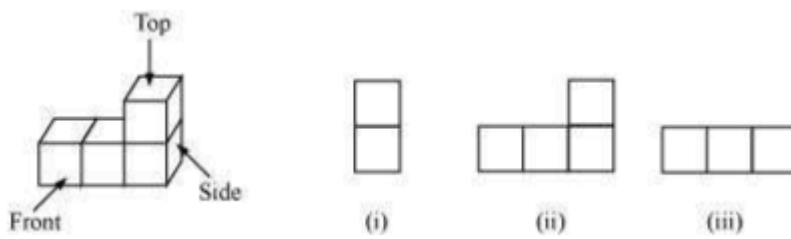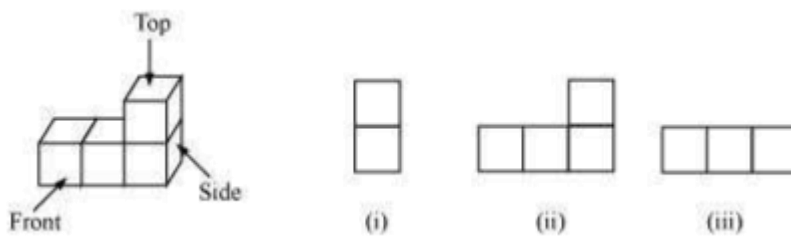
(i) Side
(ii) Front
(iii) Top

(e)

(i)   (ii)   (iii)

Ans:

(i)   (ii)   (iii)
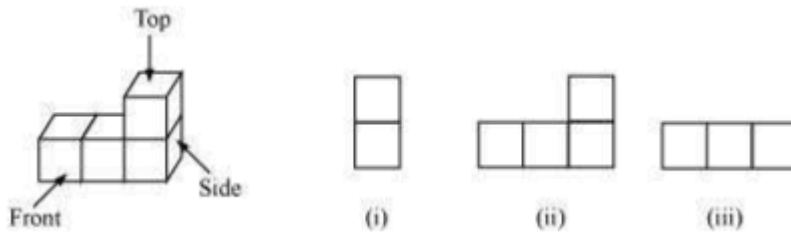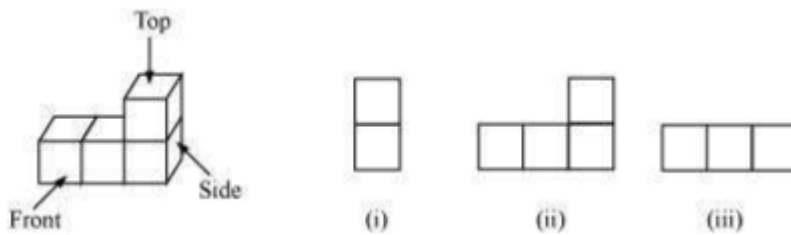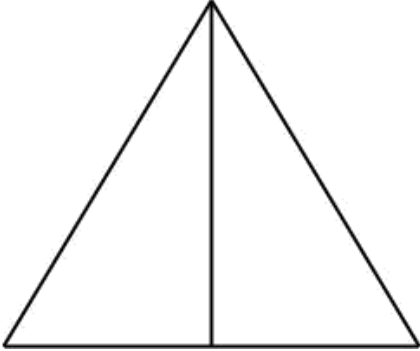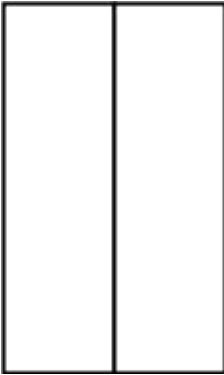
(i) Front/Side
(ii) Top
(iii) Side/Front

4. Draw the front view, side view and top view of the given objects.
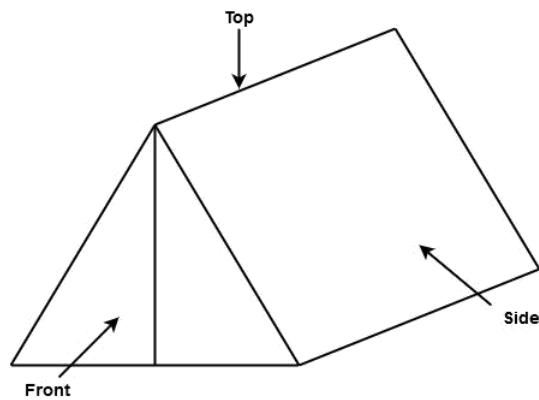
(a) A military tent

Front view	
Top view	
Side view	
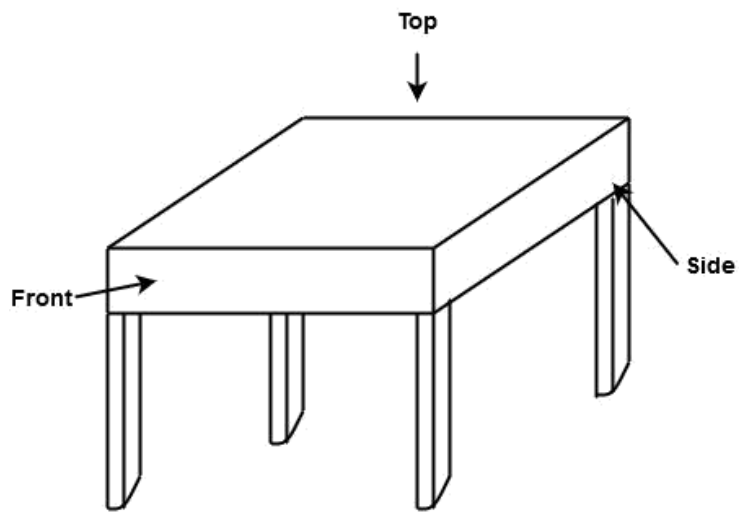
(b) A table

Front view	
Top view	

| Side view | |
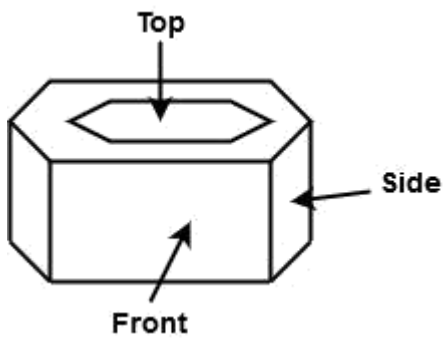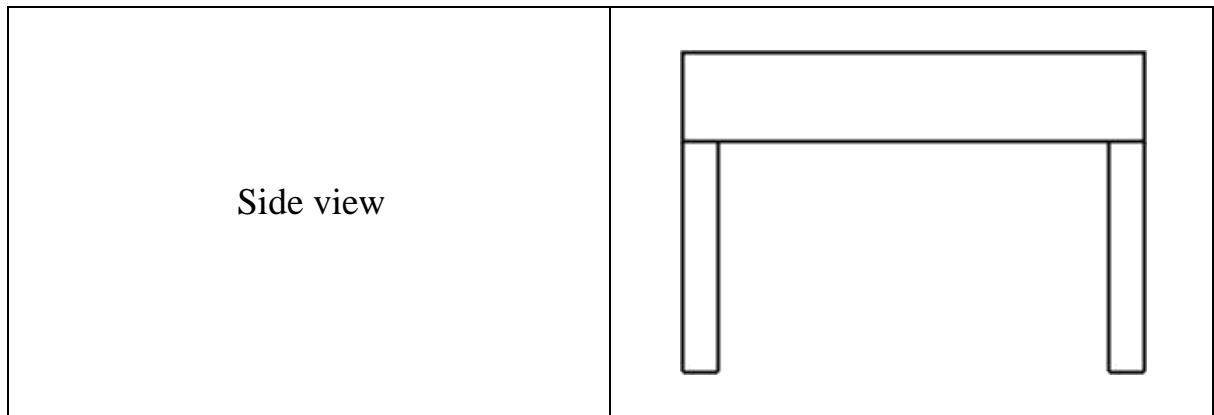
(c) A nut
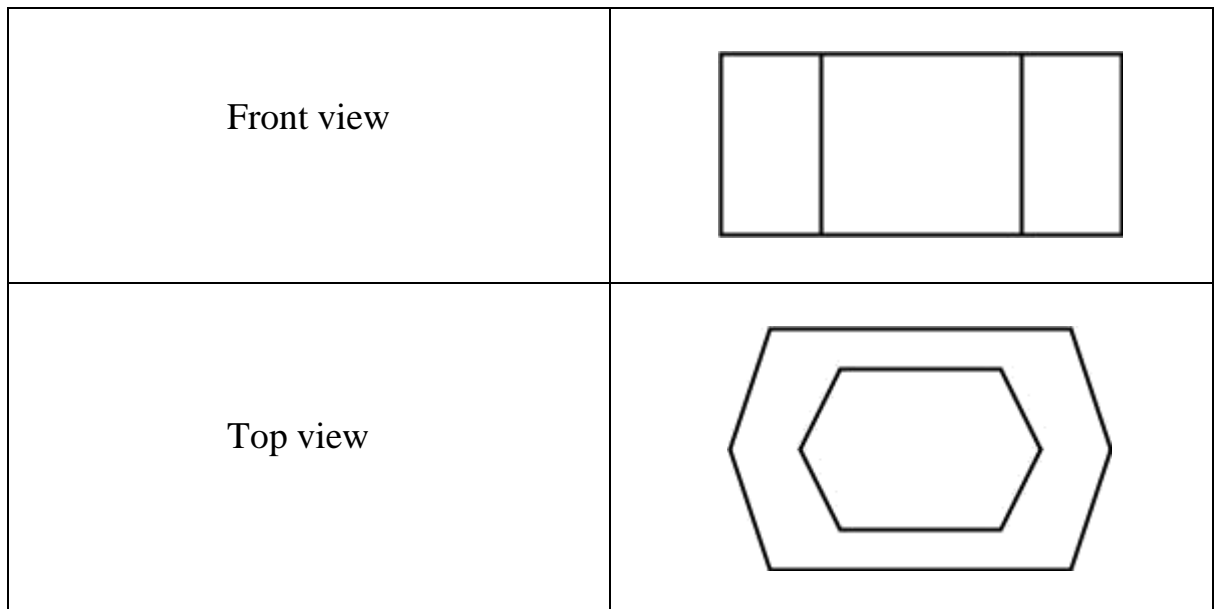
| Front view | |
| Top view | |
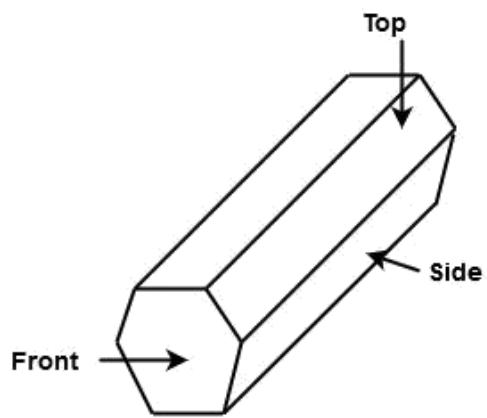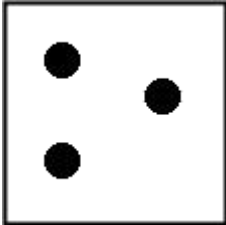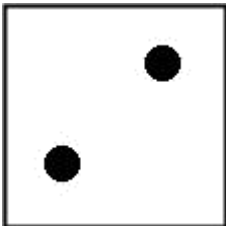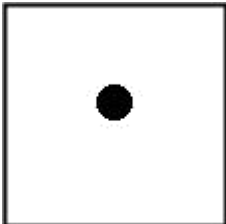
Side view	

(d) A hexagonal block

Front view	

Top view	
Side view	
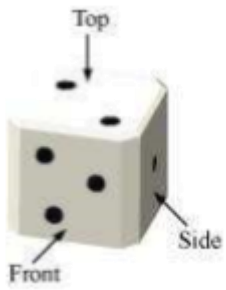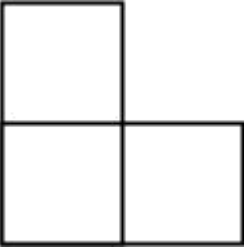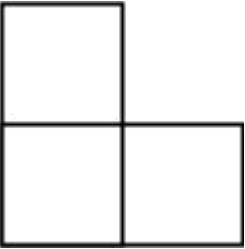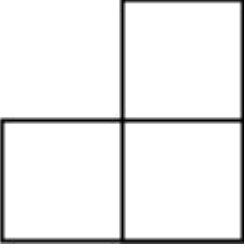
(d) A dice

Front view	
Top view	
Side view	
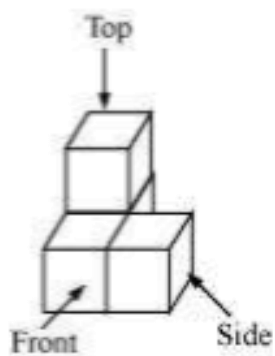
(f) A solid

Front view	
Top view	
Side view	

Exercise 10.2
1. Look at the given map of a city.
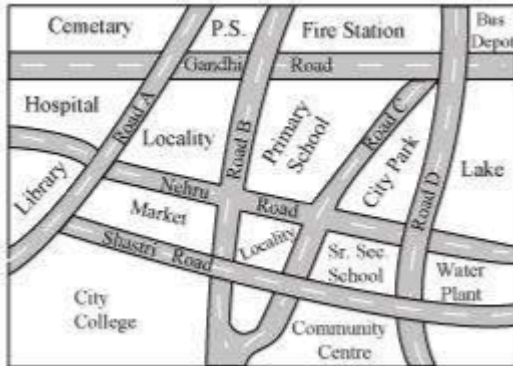
Answer the following.
(a) Colour the map as follows: Blue − water plant, red − fire station, orange − library, yellow − schools, green − park, pink − college, purple − hospital, brown − cemetery.
(b) Mark a green 'X' at the intersection of Road 'C' and Nehru Road, Green 'Y' at the intersection of Gandhi Road and Road A.
(c) In red, draw a short street route from the library to the bus depot.
(d) Which is further east, the city park or the market?
(e) Which is further south, the Primary School or the Sr. Secondary School?
Ans: (a)The following is the given map, coloured in the desired manner.
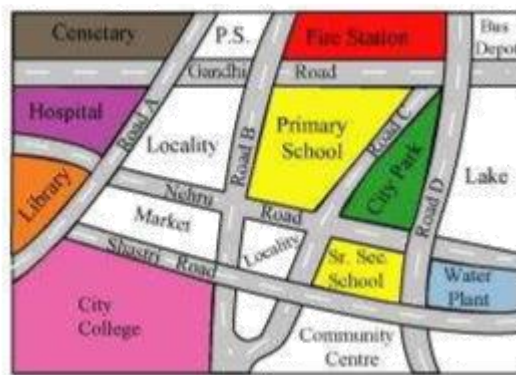
(b)Marks can be placed at the following locations.

(c)The red colour represents the shortest route from the library to the bus depot.
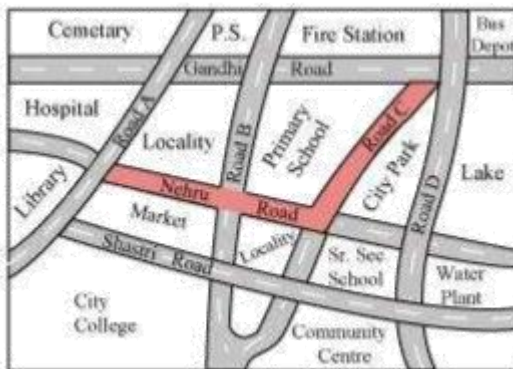
(d)Between the Market and the City Park, the City Park is further east

(e)The Sr. Secondary School located further south between the Primary School and the Sr. Secondary School.

Exercise 10.3

1. Can a polyhedron have for its faces

(i) 3 triangles? (ii) 4triangles?

(iii) a square and four triangles?

Ans

(i) No, such a polyhedron doesn't exist. A polyhedron has at least four faces.

(ii)A triangular pyramid does have four triangular faces.
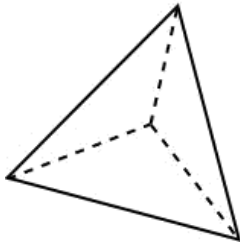
(iii) Yes, A square pyramid does, in fact, have a square face as well as four triangular faces.

2. Is it possible to have a polyhedron with any given number of faces? (Hint: Think of a pyramid).

Ans: A polyhedron has at least four faces.

3: Which are prisms among the following?

(a)   A nail

Ans: (a) Because it has a curved surface, it is not a polyhedron. As a result, it will not be a prism.
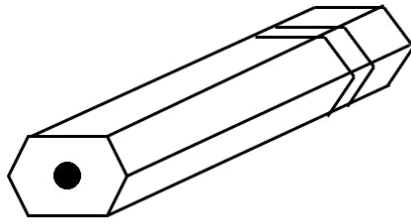
(b)   Unsharpened pencil

Ans: (b) Yes, It is a prism
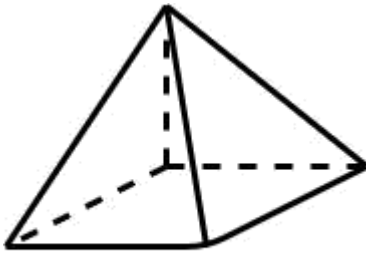
(c)   A table weight

And: (c) It is a pyramid,it is not a prism.
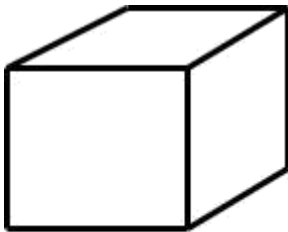
(d)   A box

Ans: (d) Yes, It is a prism

4. (i) How are prisms and cylinders alike?
Ans: (i)A cylinder can be compared to a circular prism that is prism which has
        a circle as its base.

(ii) How are pyramids and cones alike?

(ii)A cone can be compared to a circular pyramid, that is, a pyramid with a circle as its base.

5. Is a square prism the same as a cube? Explain

Ans: The base of a square prism is a square. Its height, on the other hand, is not always the same as one of the square's sides. As a result, a square prism can also be a cuboid.

6. Verify Euler's formula for these solids.

(i)
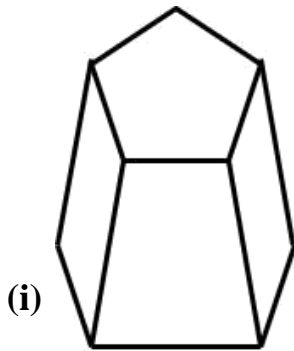
Ans

(i)Here, Number of faces = F = **7**

Number of vertices = V = 10
Number of edges = E = 15
We have, F + V − E
= 7+10−15
=17−15
= 2
Hence, Euler's formula is verified.

(ii)

(ii)Here, Number of faces = F = 9

Number of vertices = V = 9

Number of edges = E = 16

We have, F + V − E

= 9+9−16

=18−16

= 2

Hence, Euler's formula is verified.

7. Using Euler's formula, find the unknown.

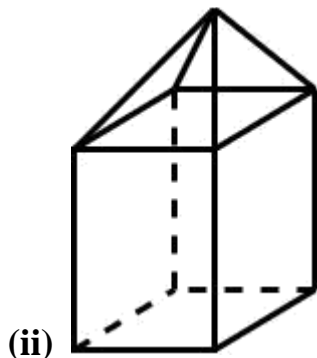| Faces	?	5	20
Vertices	6	?	12
Edges	12	9	?

Ans: Here,

By Euler's formula, we have

$F+V-E=3$

(i) $F+6-12=2$

$F-6=3$

$F=8$

(ii) $5+V-9=2$

$V-4=2$

$V=6$

(iii) $20+12-E=2$

$32-E=2$

$E=30$

So, the completed table as follows:

Faces	8	5	20
Vertices	6	6	12
Edges	12	9	30

8. Can a polyhedron have 10 faces, 20 edges and 15 vertices?

Ans: Number of faces $=$ F$=10$

Number of edges $=$ E$=20$

Number of vertices $=$ V$=15$

Any polyhedron satisfies Euler's Formula, according to which, $F+V-E=2$

For the given polygon,

$F+V-E$

$=10+15-20$

$= 25-20$

$=5 \neq 2$

Here, Euler's formula is not satisfied, So a polyhedron is not possible.