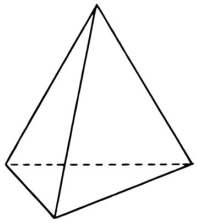
CBSE NCERT Solutions for Class 8 mathematics Chapter 10

Exercise

Q.1. Can a polyhedron have for its faces 3 triangles?

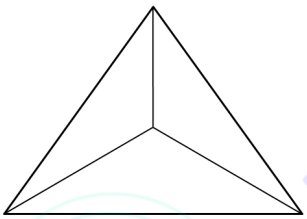
Solution: Let us take the example of a Polyhedron which has three triangular faces:



We can see that, this Polyhedron will compulsorily have a fourth face, which is also a Triangle. Also, it is impossible to make a Polyhedron with any lesser number of triangles. Therefore, a polyhedron with only three triangles is not possible.

Q.2. Can a polyhedron have for its faces 4 triangles?

Solution: Yes. A polyhedron with four triangles is possible.

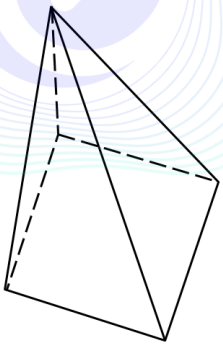


According to the above image of a polyhedron, The minimum number of triangular faces that a polyhedron can have is four. Therefore, a polyhedron can have for its faces 4 triangles.

Q.3. Can a polyhedron have for its faces a square and four triangles?

Solution: Yes, a polyhedron with a square and four triangles is possible.

It is as shown below:



A polyhedron with a square and four triangles is called a square pyramid.

Thus, a polyhedron can have for its faces a square and four triangles.

Q.4. Is it possible to have a polyhedron with any given number of faces?

Solution: No, it is not possible to have a polyhedron with any given number of faces.

It is so because the minimum number of faces a polyhedron can have is four.

It is therefore not possible to have a polyhedron with less than four faces.

Q.5. Which are prisms among the following?

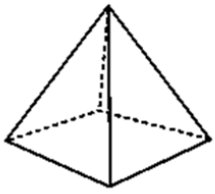
A nail

Unsharpened pencil

Solution: We know that a prism is a polyhedron, two of whose faces are congruent polygons in parallel planes and whose other faces are parallelogram

An unsharpened pencil has its base and top surfaces congruent and other lateral faces parallelograms.

Therefore, it is a prism. Also. a box has its base and top surfaces congruent and other lateral faces parallelograms. Therefore, it is a prism.



A table weight

A box

Solution: We know that a prism is a polyhedron, two of whose faces are congruent polygons in parallel planes and whose other faces are parallelograms.

An unsharpened pencil has its base and top surfaces congruent and other lateral faces parallelograms.

Therefore, it is a prism. Also, a box has its base and top surfaces congruent and other lateral faces parallelograms. Therefore, it is a prism.

Q.6. How are prisms and cylinders alike?

Solution: A prism is a polyhedron which has a regular polygon for its base and top, and parallelograms for its lateral sides.

If the number of lateral sides are increased, the figure turns out to resemble a cylinder.

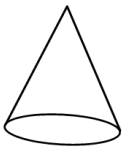
Hence, a cylinder can be visualised as a prism with infinite number of faces or lateral sides.

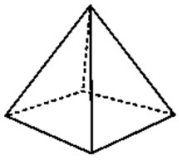
Q.7. How are pyramids and cones alike?

Solution: A pyramid is a polyhedron whose base is a polygon and lateral faces are triangles.

If the number of lateral sides is increased, the figure turns out to resemble a cone.

Hence, a cone can be visualised as a pyramid with an infinite number of faces or lateral sides.



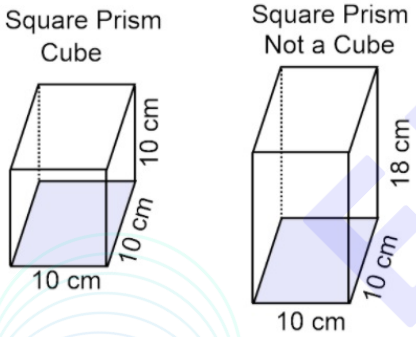


Cone Pyramid

Q.8. Is a square prism same as a cube? Explain.

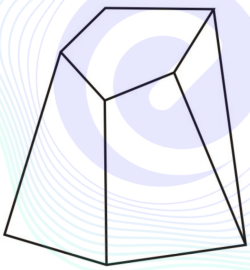
Solution: No, a square prism need not be a cube.

A square prism has a square for its base, but the lateral sides may or may not be squares, that is, the height of the sides can be different from the length of the side of the base.



Hence, a square prism is not the same as a cube.

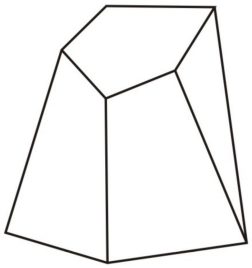
Q.9. Verify Euler's formula for this solid.



Solution: The Euler's formula is stated as follows:

F+V-E=2

Where, F is the number of faces. V is the number of vertices E is the number of edges of a polyhedron.



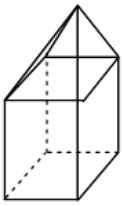
Here, number of faces = F=7 Number of vertices =V=10 Number of edges =E=15

Substituting these values in Euler's formula:

F+V-E=2

LHS =F+V-E =7+10-15 =2 Therefore, LHS = RHS Therefore, the Euler's formula is verified.

Q.10. Verify Euler's formula for this solid.



Solution:

Here, number of faces =F=9

Number of vertices =V=9 Number of edges =E=16 Euler's formula is given by F+V-E=2 LHS =F+V-E LHS =9+9-16=2 LHS = RHS Therefore, the Euler's formula is verified.

Q.11. Using Euler's formula find the unknown.

Faces	?
Vertices	6
Edges	12

8

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

Here, F is the number of faces, V is the number of vertices and E is the number of edges of a polyhedron.

Given, number of vertices =6 Number of edges =12 Substituting these values in the Euler's formula ⇒F+6-12=2 ⇒F=2-6+12 ⇒F=8 Therefore, the number of faces =8

Q.12. Using Euler's formula, find the unknown.

Faces	5
Vertices	?
Edges	9

6

Solution: Given,

Number of faces =5

Number of edges =9 According to Euler's formula F+V-E=2 Here, F is the number of faces, V is the number of vertices and E is the number of edges of a polyhedron. ⇒5+V-9=2 ⇒V=2-5+9 ⇒V=6 Therefore, number of vertices =6.

Q.13. Using Euler's formula and find the unknown.

Faces	20
Vertices	12
Edges	?

30

Solution: Given,

Number of faces =20

Number of vertices =12 Euler's formula is the relation between the faces, vertices and edges of a convex polyhedron. F+V-E=2 Substitute these values in the Euler's formula. ⇒20+12-E=2 ⇒E=20+12-2 ⇒E=30 ∴ The number of edges =30.

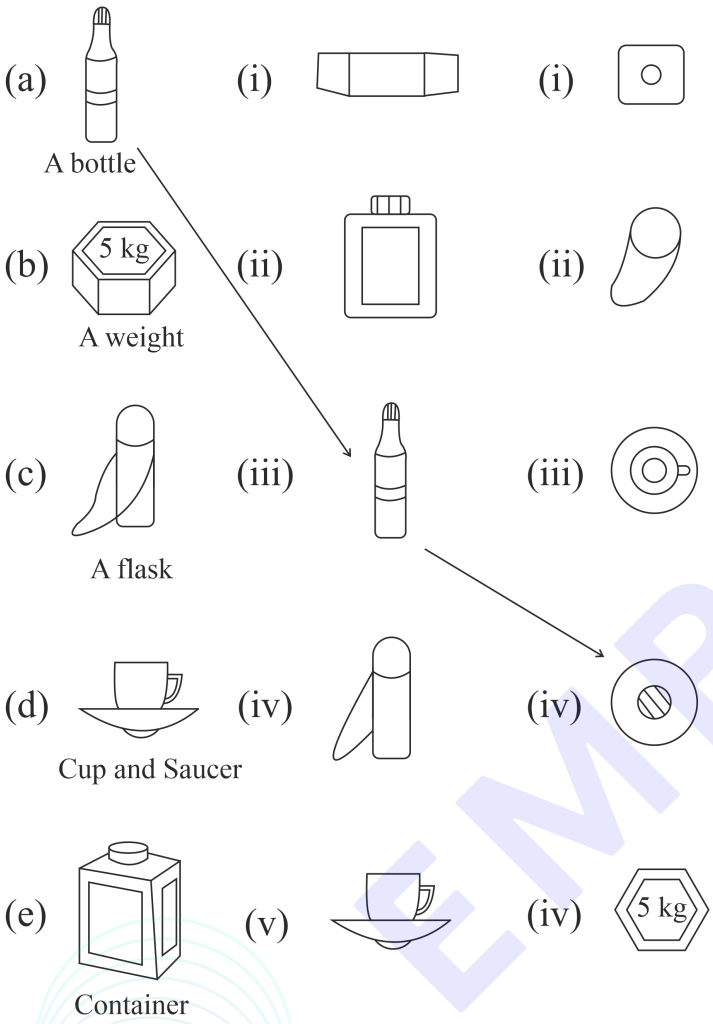
Q.14. Can a polyhedron have 10 faces, 20 edges and 15 vertices?

Solution: Given,

Number of faces =F=10

Number of edges =E=20 Number of vertices =V=15 Substituting these values in Euler's formula: F+V-E=2 LHS=10+15-20 =25-20=5 Clearly, LHS≠RHS Hence, a polyhedron with the given number of faces, vertices and edges cannot exist.

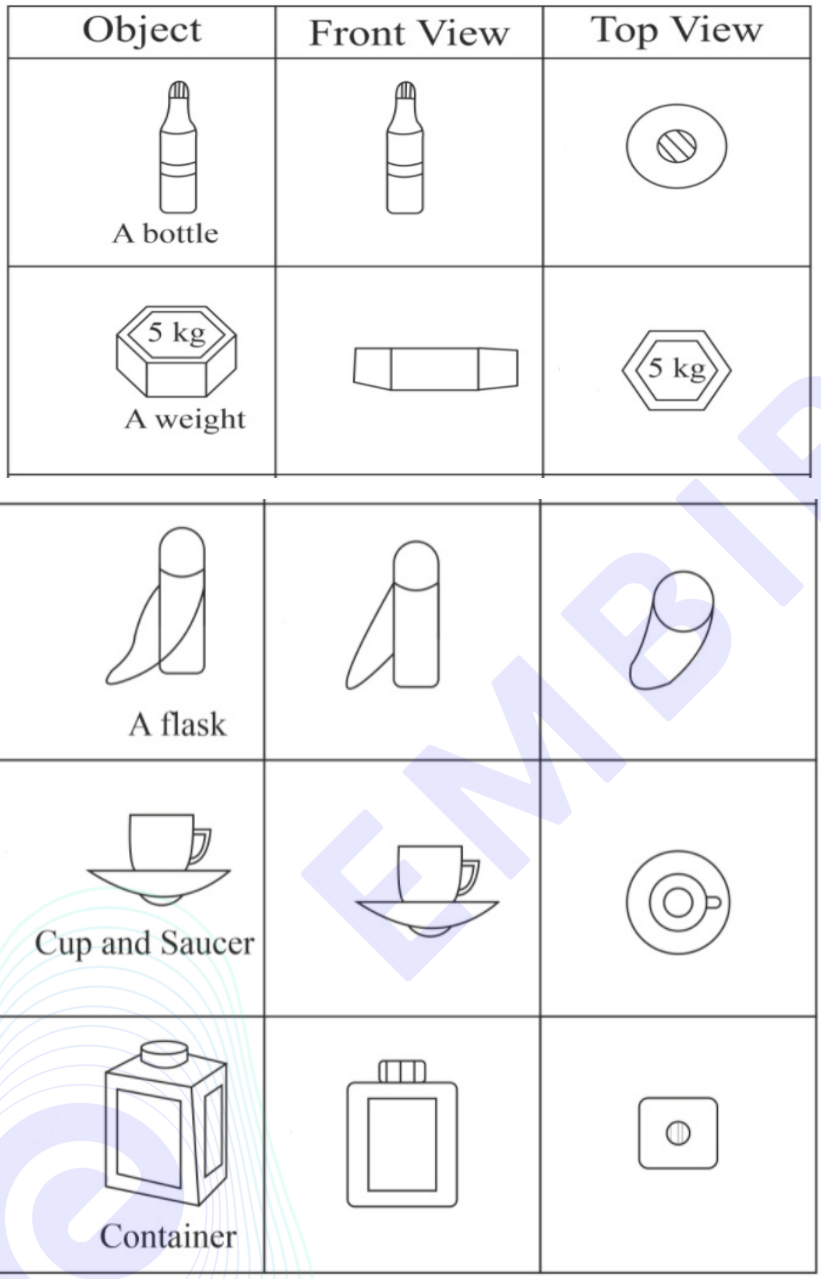
Q.15. For each of the given solid, the two views are given. Match for each solid the corresponding top and front views. The first one is done for you.



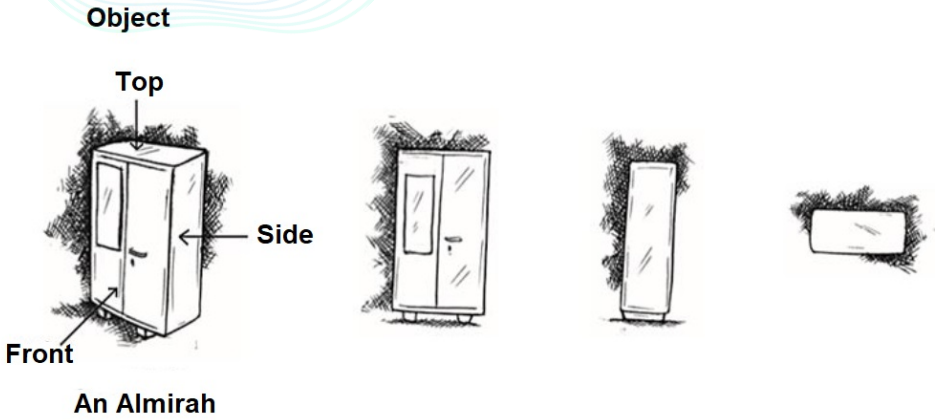
Solution: Top view: When you look at something from directly above.

Side view: A view of something at or from the side.

Front view: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection. The following figures show the objects matched with their top and front views:



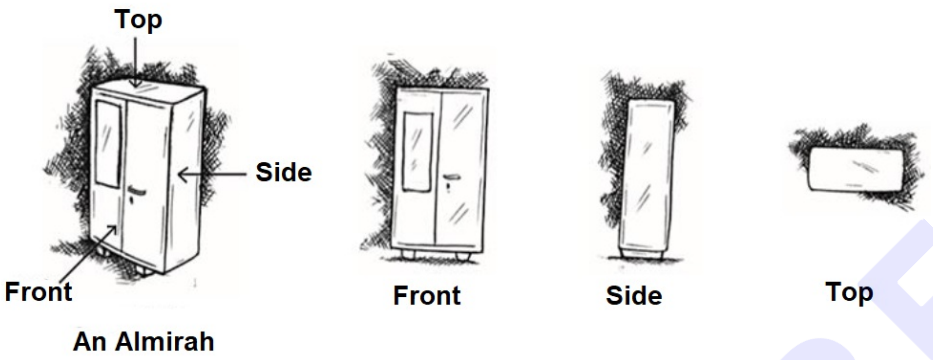
Q.16. For the given solid, the three views are given. Identify for the solid the corresponding top, front and side views.



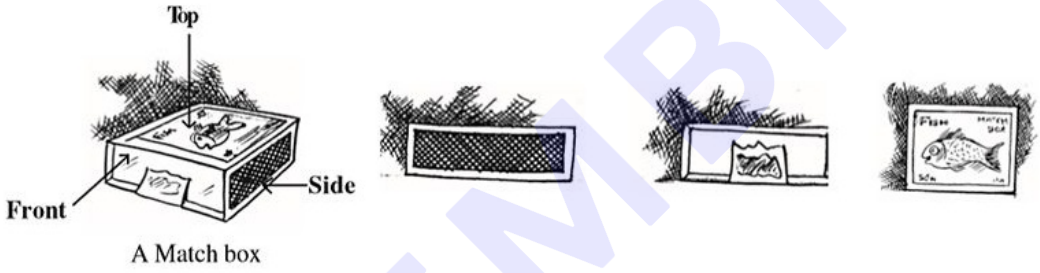
Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

What you see when you look at something from directly above is called top view.

A view of a person or object presenting a side instead of a front towards the observer is called side view. The front, top and side views of the object are as shown below:



Q.17. For each the given solid, the three views are given. Identify for the solid the corresponding top, front and side views.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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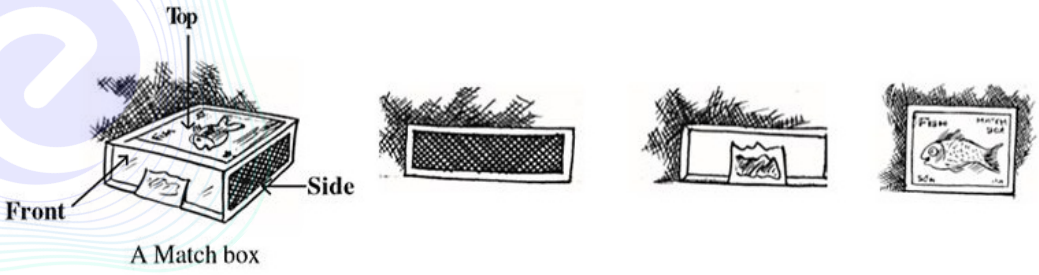
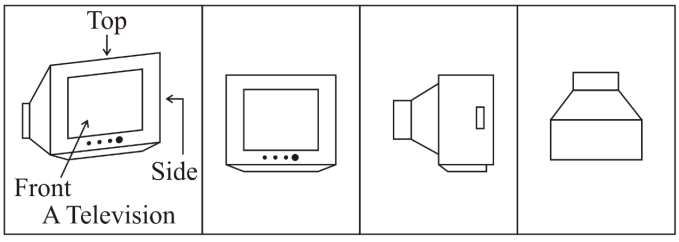


Q.18. For the given solid, the three views are given. Identify for the solid the corresponding top, front and side views.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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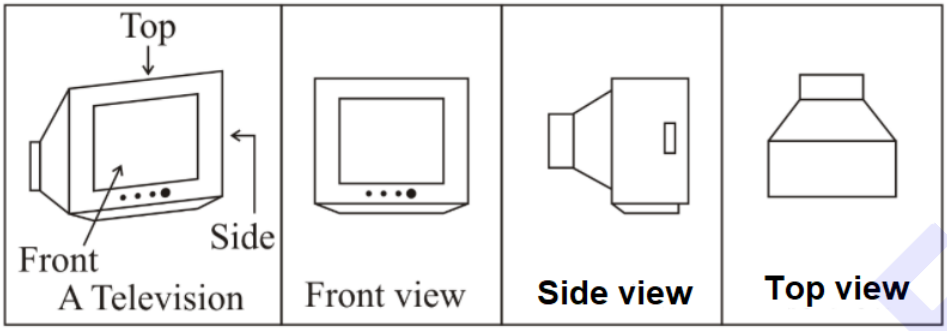
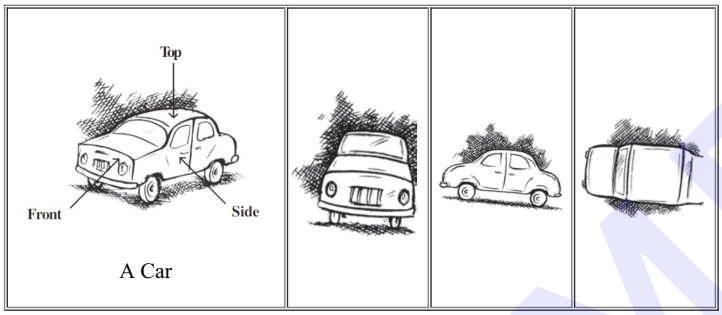
A view of a person or object presenting a side instead of a front towards the observer is called side view. The front, top and side views of the object are as shown below:



Q.19. For the given solid, the three views are given. Identify for the solid the corresponding top, front and side views.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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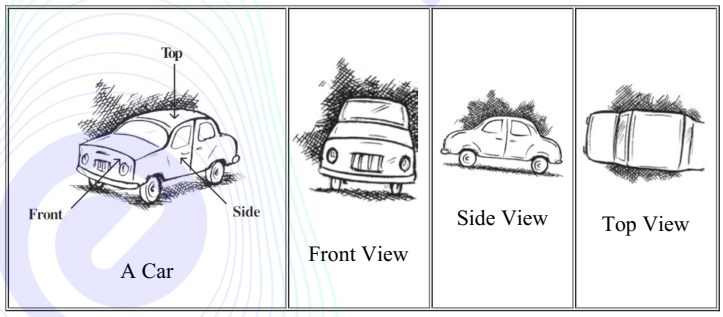
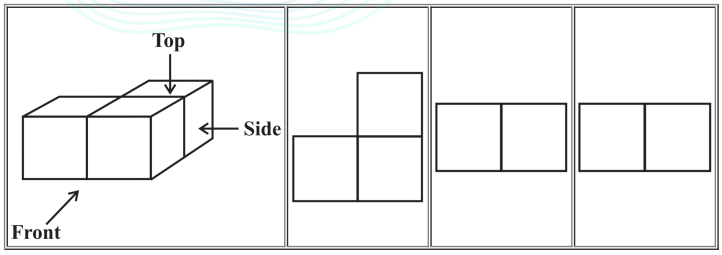


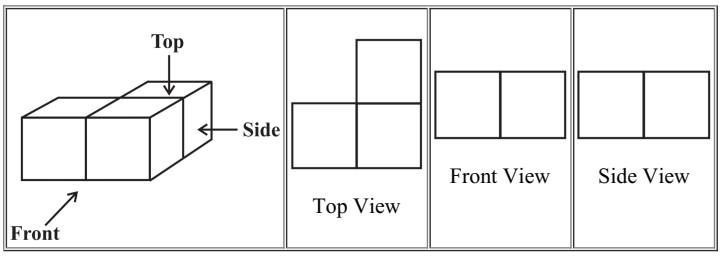
Q.20. For the given solid, identify the top view, front view and side view.



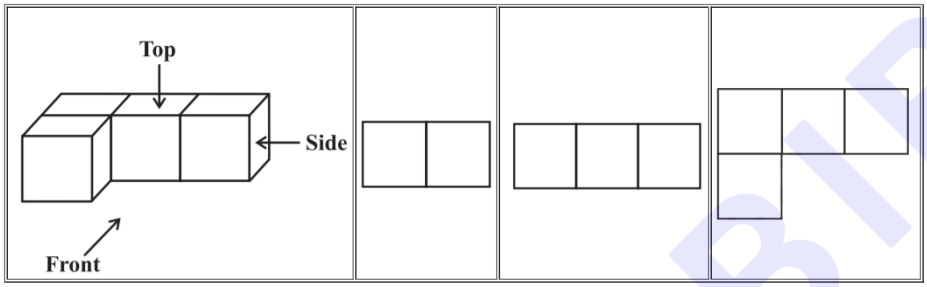
Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

What you see when you look at something from directly above is called top view.

A view of a person or object presenting a side instead of a front towards the observer is called side view. The objects and their labelled side, top and front views are as shown below:



Q.21. For the given solid, identify the top view, front view and side view.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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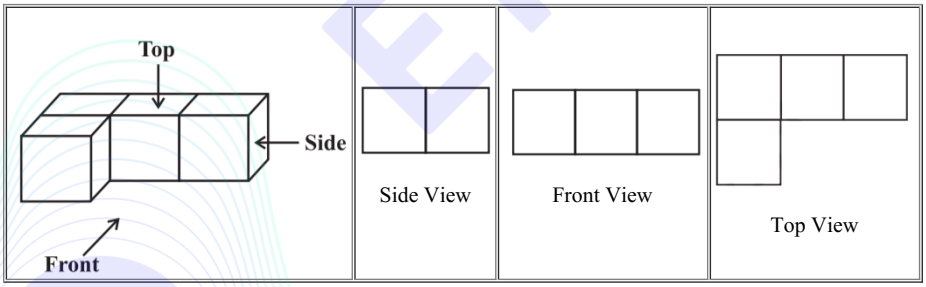
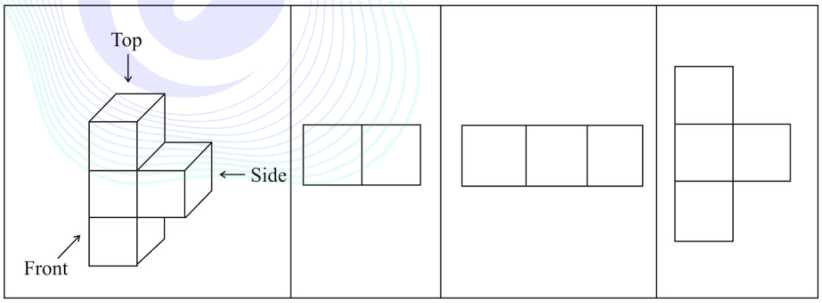


Q.22. For the given solid, identify the top view, front view and side view.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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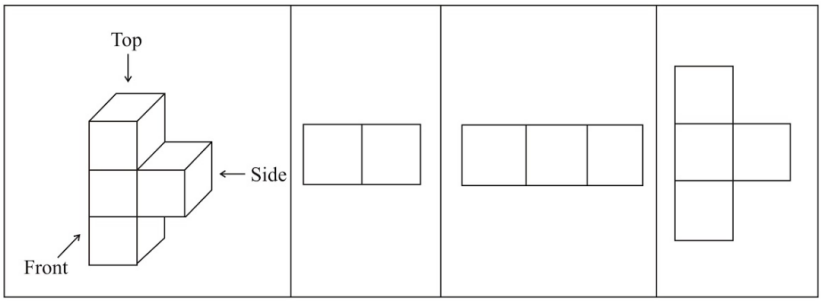
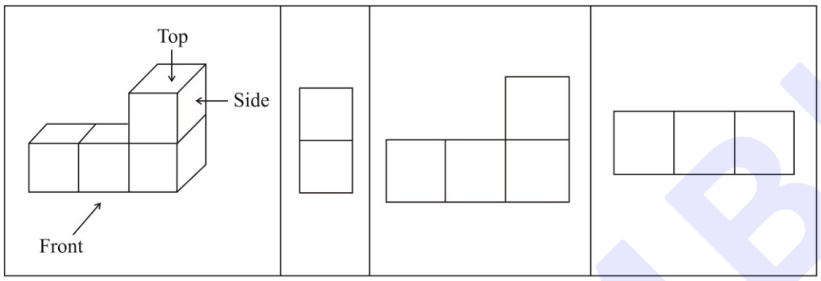


Q.23. For the given solid, identify the top view, front view and the side view.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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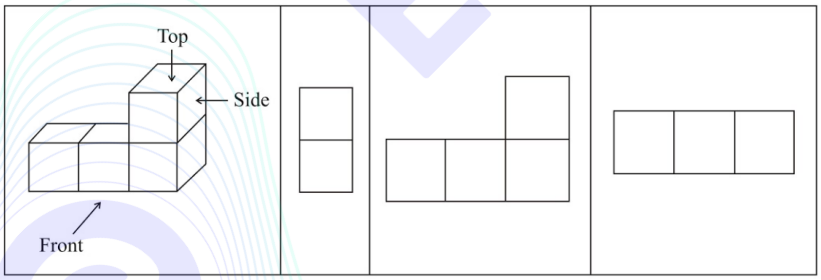
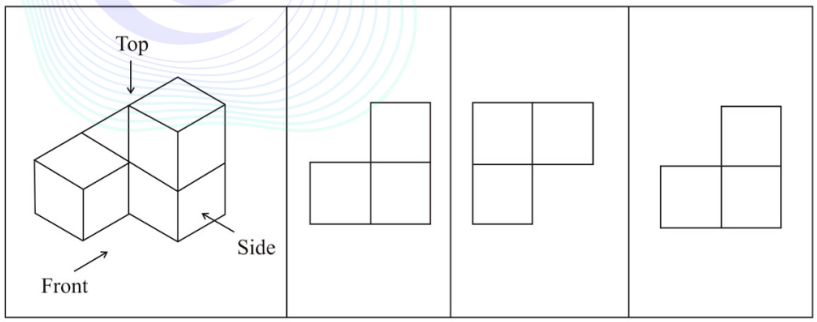
A view of a person or object presenting a side instead of a front towards the observer is called side view. The objects and their labelled side, top, front and side views are as shown below:



Q.24. For the given solid, identify the top view, front view and the side view.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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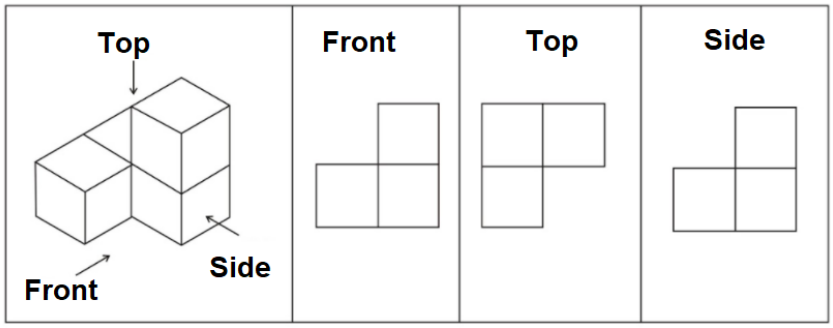
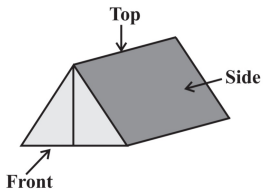


Q.25. Draw the front view, side view and top view of a military tent.



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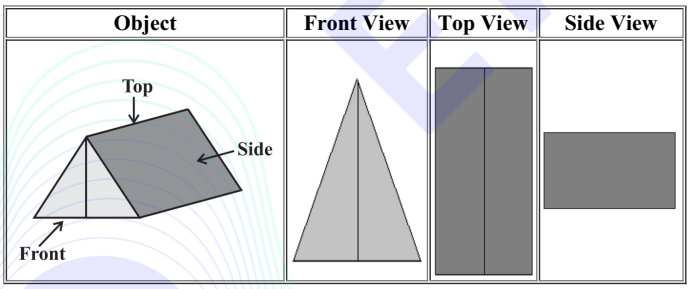
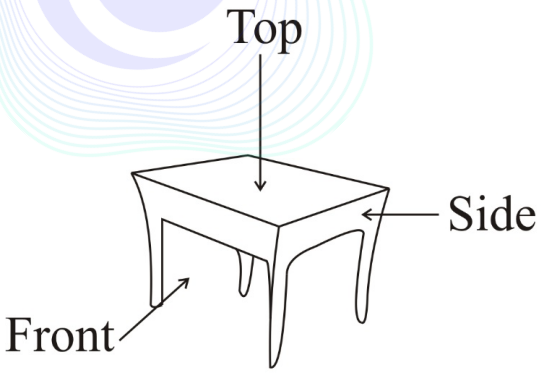


Q.26. Draw the front view, side view and top view of a table.



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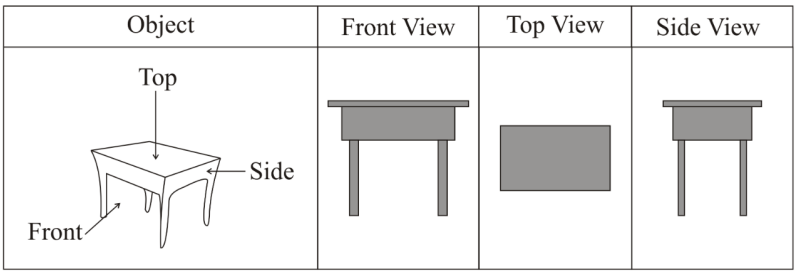
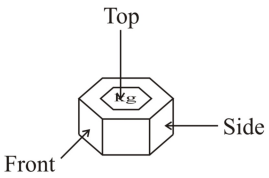


Q.27. Draw the front view, side view and top view of a nut.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

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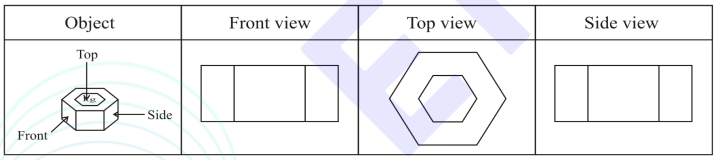
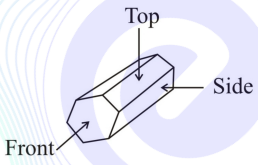


Q.28. Draw the front view, side view and top view of a hexagonal block.



Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

What you see when you look at something from directly above is called top view.

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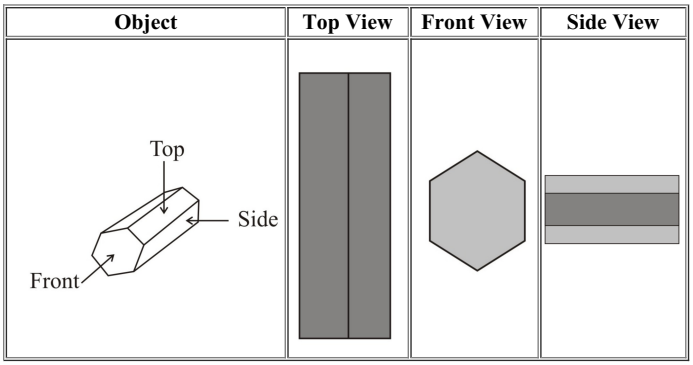
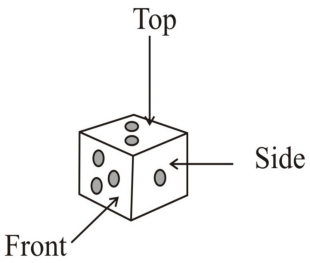


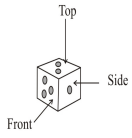
Q.29. Draw the front view, side view and top view of a dice.



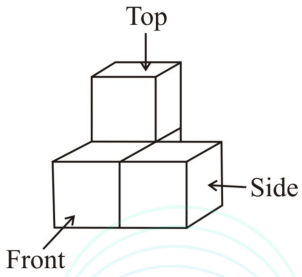
Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

What you see when you look at something from directly above is called top view.

A view of a person or object presenting a side instead of a front towards the observer is called side view.

Object	Front View	Top View	Side View
			

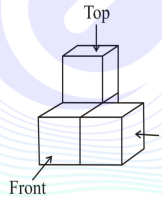
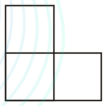
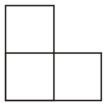
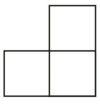
Q.30. Draw the front view, side view and top view of a solid.



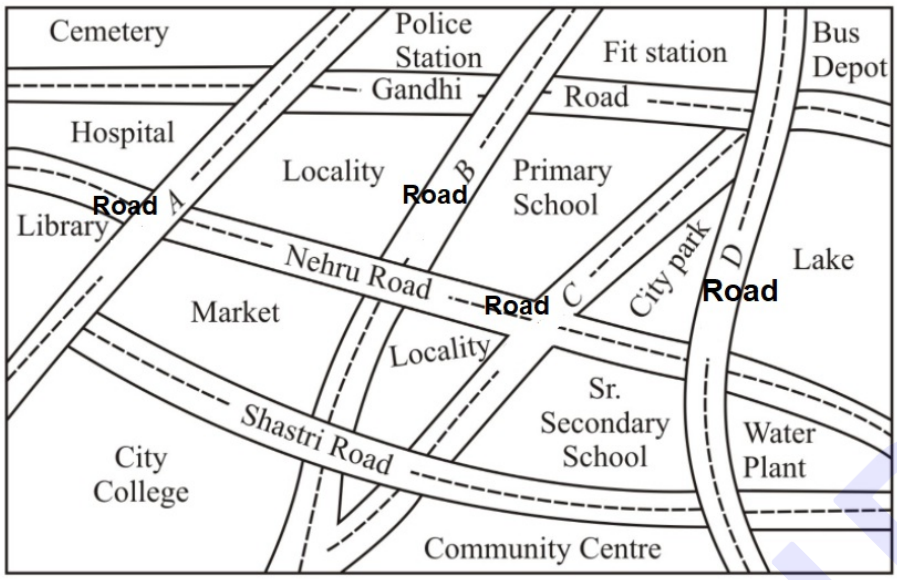
Solution: A front view is a projection view obtained by drawing perpendiculars from all points on the edges of the part to the plane of projection.

What you see when you look at something from directly above is called top view.

A view of a person or object presenting a side instead of a front towards the observer is called side view.

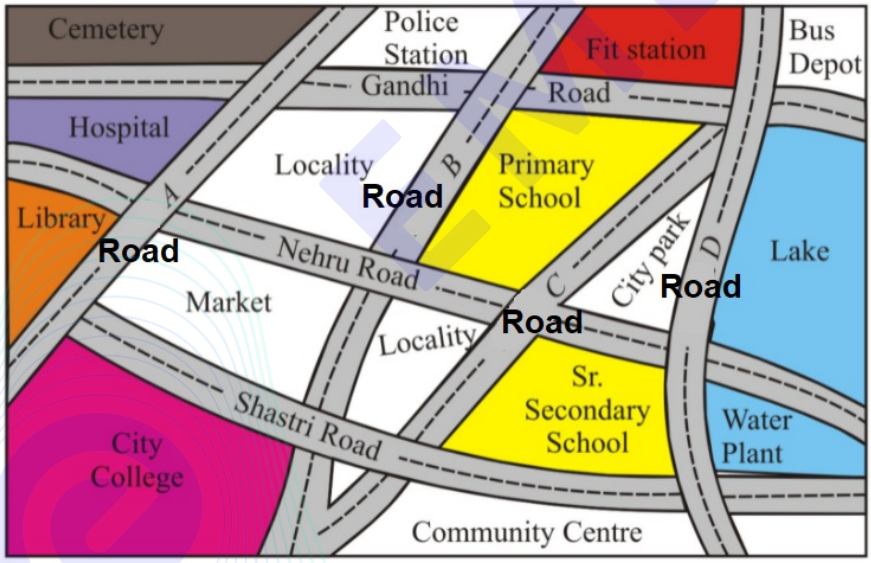
Object	Front View	Top View	Side View
			

Q.31. Look at the given map of a city. Colour the map as follows: Blue — water, Red — fire station, Orange — Library, Yellow — schools, Green — Park, Pink — College, Purple —Hospital, Brown — Cemetery.

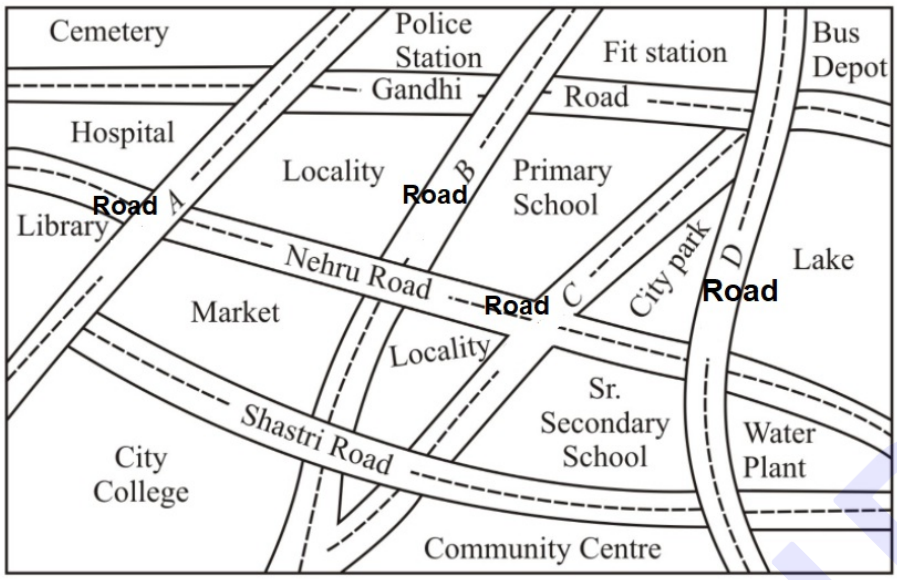


Solution: We need to colour the map as follows: Blue-water, red-fire station, orange-library, yellow - schools, Green - park, Pink - College, Purple - Hospital, Brown - Cemetery.

Hence, the coloured map will be as shown below:



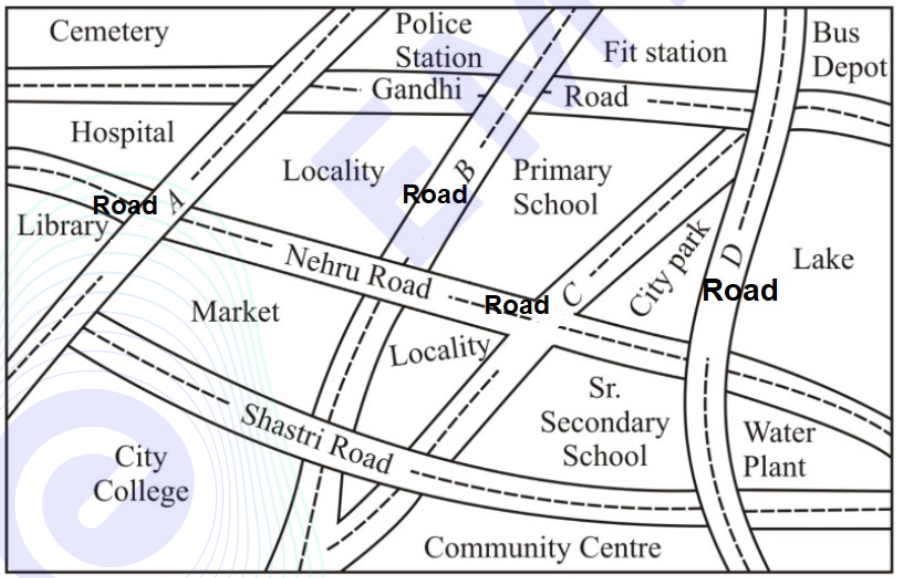
Q.32. Look at the given map of a city. Mark a green 'X' at the intersection of Road 'C' and Nehru Road, Green 'Y' at the intersection of Gandhi Road and Road A.



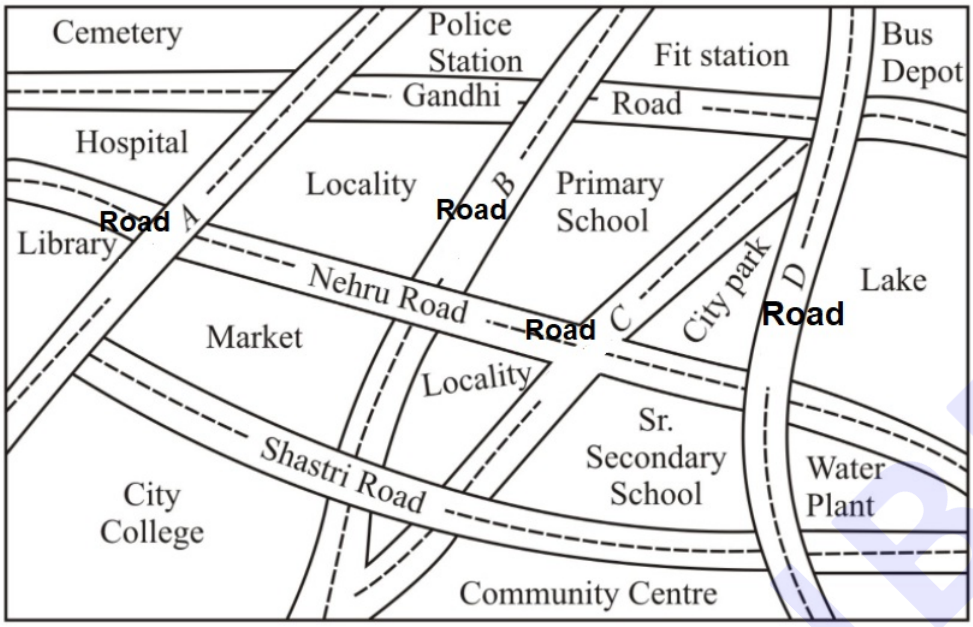
Solution: According to the question,

We need to mark a green 'X' at the intersection of Road 'C' and Nehru Road, Green 'Y' at the intersection of Gandhi Road and Road A.

The marks X and Y at the required intersections are as shown:



Q.33. Look at the given map of a city.

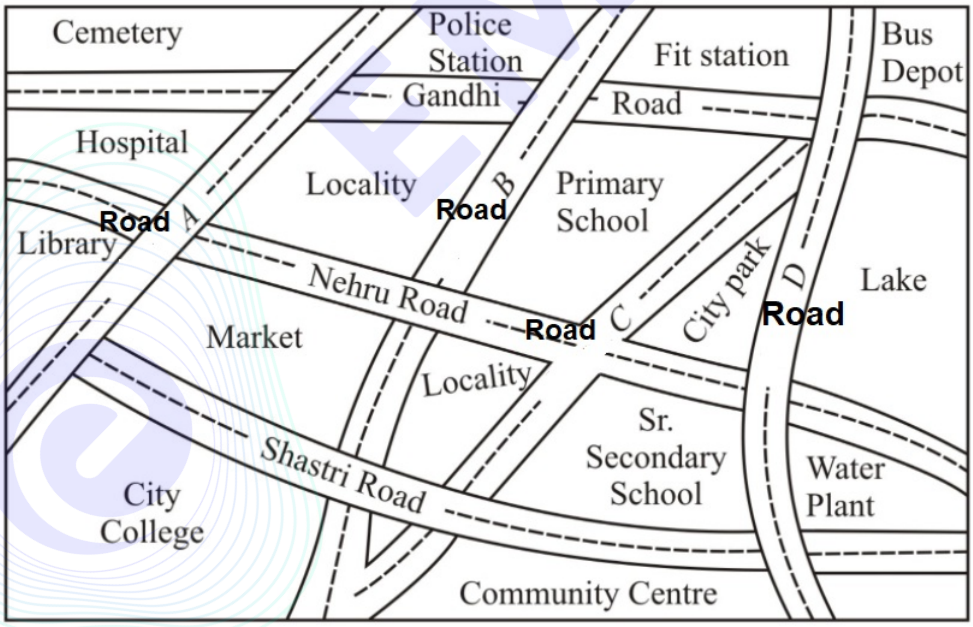


Draw a short street route from Library to the bus depot.

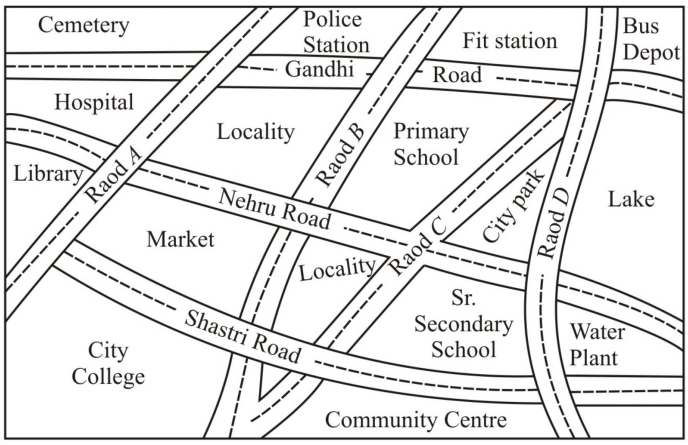
Solution: We need to draw a short street route from Library to the bus depot.

The shortest route from Library to the bus depot is from the Nehru road to the Road C.

The shortest route between the required places is as shown:



Q.34. Look at the given map of a city.

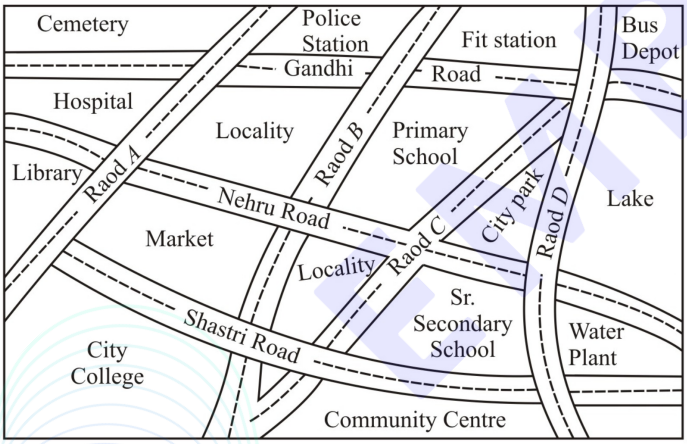


Answer the following: Which is further East, the city park or the market?

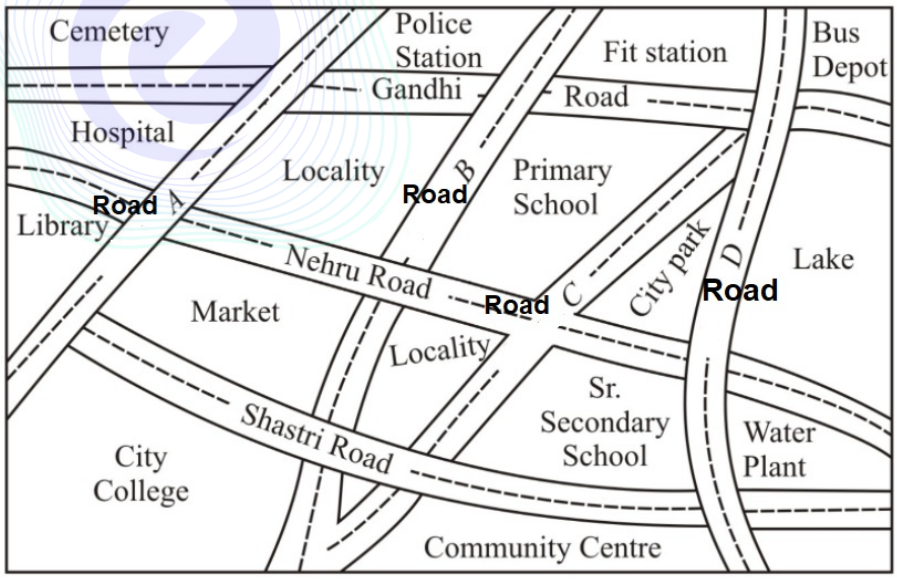
Solution: According to the given map of a city,

We find that between the city park and the market, the city park is further East.

It is so because city park lies farther to the right than the market, as shown in the map below :



Q.35. Look at the given map of a city.

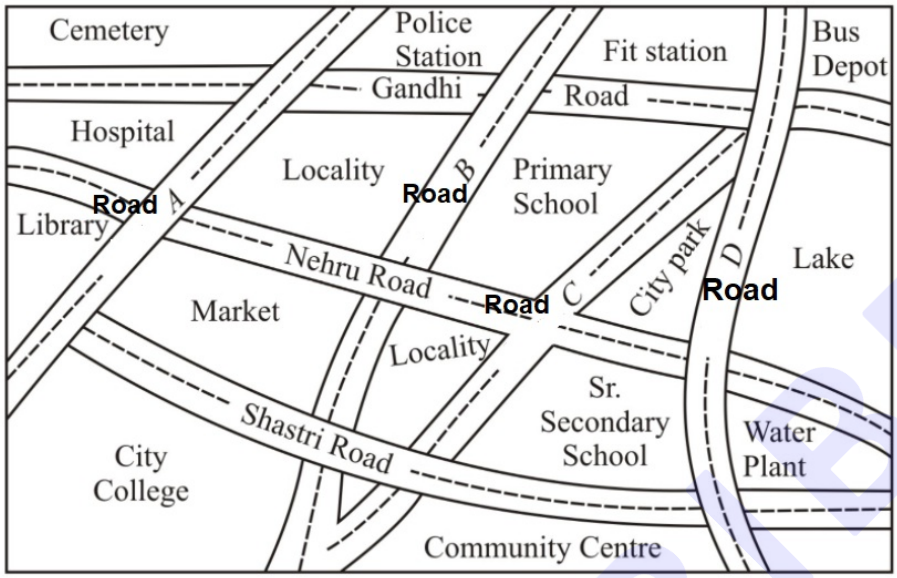


Answer the following. Which is further South, the primary school or the Sr. Secondary School?

Solution: According to the given map of a city,

We find that between the primary school and the Sr. Secondary School, the Sr. Secondary School is further South.

It is so because the Sr. Secondary School lies towards left of the primary school which is in south direction as shown in the map below :



Hence, between the Primary School and the Sr. Secondary School, the Sr. Secondary School is further South.

Do these

Q.1. Match the following pictures (objects) with their shapes:

	Picture (object)		Shape
a	An agricultural field 	p	Two rectangular cross paths inside a rectangular park
b	A groove 	q	A circular path around a circular ground
c	A toy 	r	A triangular field adjoining a square field
d	A circular park 	s	A cone taken out of cylinder
e	A cross path 	t	A hemisphere surmounted on a cone

[["a","b","c","d","e"],["p","q","r","s","t"]];;a-r;b-s;c-t;d-q;e-p;

Solution: The pictures are given in the box.

In the given picture of an agricultural field.

The field is square at the base and triangular at the up. So, an agricultural field is a triangular field adjoining a square field.

Also, in the given picture of a groove,

We can see, there are two shapes, cone and cylinder and the cone is taken out from the cylinder.

In the picture of a toy,

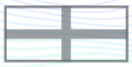
There are two shapes, cone and hemisphere. If we joined both we will get the shape of toy. So, shape of toy is a hemisphere surmounted on cone.

Also, in the picture of a circular park.

There are two circles. One circle is surrounded by another circle. So, in the circular park there is circular path around circular ground.

Now, in the shape of a cross path.

There are three rectangles. Two rectangles are crossed each other, and they are inside third rectangle. So, the shape of cross path is two rectangular cross paths inside a rectangular park. Hence, the correct table is as below:

	Picture (object)		Shape
a	An agricultural field 	r	A triangular field adjoining a square field
b	A groove 	s	A cone taken out of cylinder
c	A toy 	t	A hemisphere surmounted on a cone
d	A circular park 	q	A circular path around a circular ground
e	A cross path 	p	Two rectangular cross paths inside a rectangular park