Question 1.

Draw a line segment $\overline{PQ}$ =5.6 cm. Draw a perpendicular to it from a point A outside $\overline{PQ}$ by using ruler and compass.

Solution:

Given: A–Line segment PQ = 5.6 cm and a point A outside the line.

Required: To draw a 1 ar to PQ from point A.

Steps of construction :

(i) With A as centre and any suitable radius,

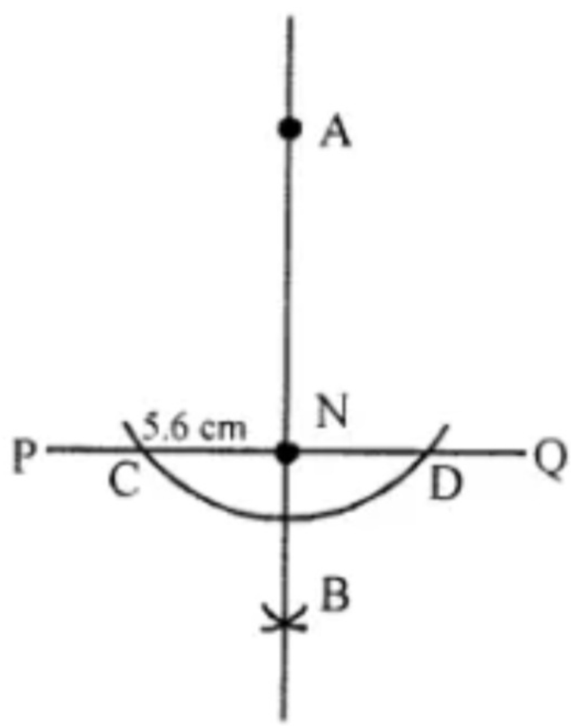
drawn an arc to cut the line PQ at points C and D.

(ii) With C and D as centres, drawn two arcs of equal radius $(> \frac{1}{2}CD)$

cutting each other at B on the other side of PQ.

(iii) Join A and B to meet the line PQ at N,

then AN is the required perpendicular from the point A to the line PQ.



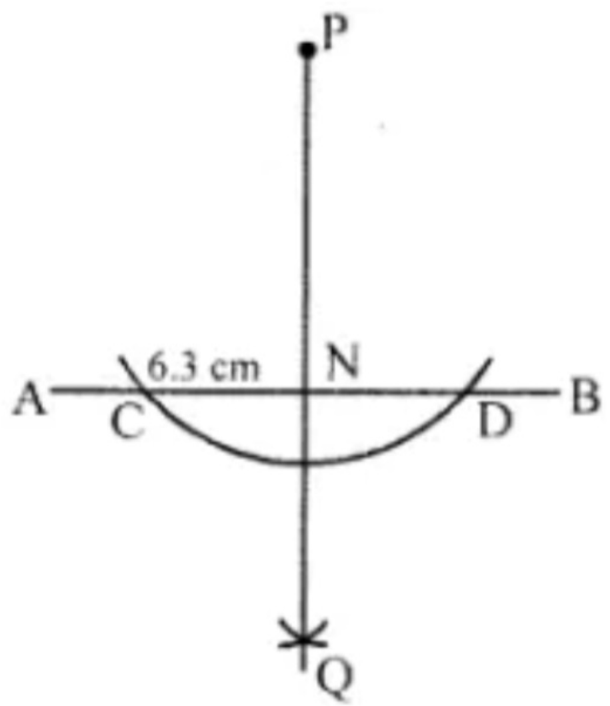
Question 2.

Draw a line segment $\overline{AB}$ = 6.2 cm. Draw a perpendicular to it at a point M on $\overline{AB}$ by using ruler and compass.

Solution:

Given: A line AB = 6.2 cm and a point P on it.

Required: To draw an ⊥ arc to AB at point P.



Step of Construction :

(i) With P as centre and any suitable radius,

draw an arc to cut the line AB at points C and D.

(ii) With C and D as centres,

draw two arcs of equal radius $(> \frac{1}{2}CD)$ cutting each other at Q.

(iii) Join P and Q.

then QP is the required perpendicular to the line AB at the point P.

Question 3.

Draw a line l and take a point P on it. Through P, draw a line segment $\overline{PQ}$ perpendicular to l. Now draw a perpendicular to $\overline{PQ}$ at Q (use ruler and compass).

Solution:

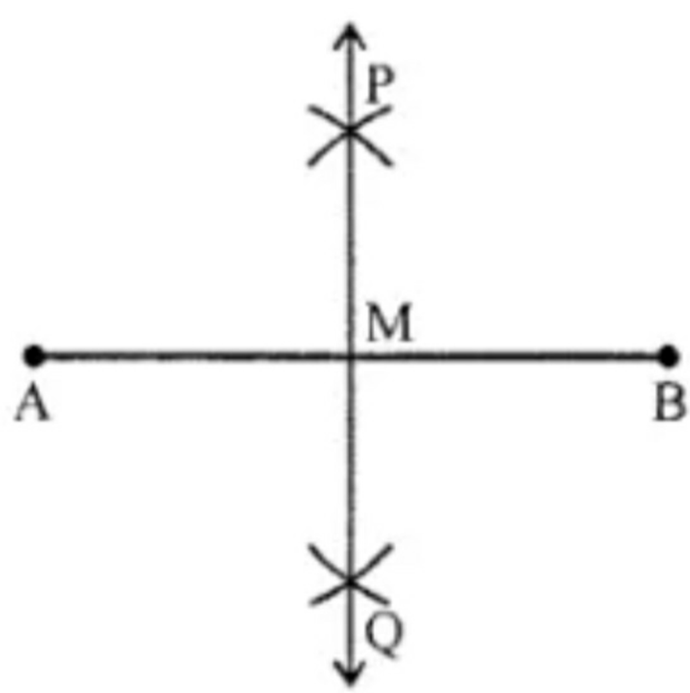
Steps of construction :

(i) Let AB be the given line segment.

(ii) With A as centre and any suitable radius $\left(> \frac{1}{2}\mathrm{CD}\right)$ draw arcs on each side of AB.

(iii) With B as centre and same radius [as in step (i)], draw arcs on each side of AB to cut the previous arcs at P and Q.

(iv) Draw a line passing through points P and Q, then the lines $\overline{PQ}$ is the required perpendicular bisector of AB and line l.



Question 4.

Draw a line segment $\overline{AB}$ of length 6.4 cm and construct its axis of symmetry (use ruler and compass).

Solution:

Steps of construction :

(i) Draw a line segment $\overline{AB}$ of length 6.4 cm.

(ii) With A as centre, using a compass, draw a circle. The radius of this circle should be more than half of the length of AB.

(iii) With the same radius and with B as centre, draw another circle using a compass.

Let it cut the previous circle at C and D.

(iv) Join $\overline{CD}$. Then, $\overline{CD}$ is the axis of symmetry of $\overline{AB}$

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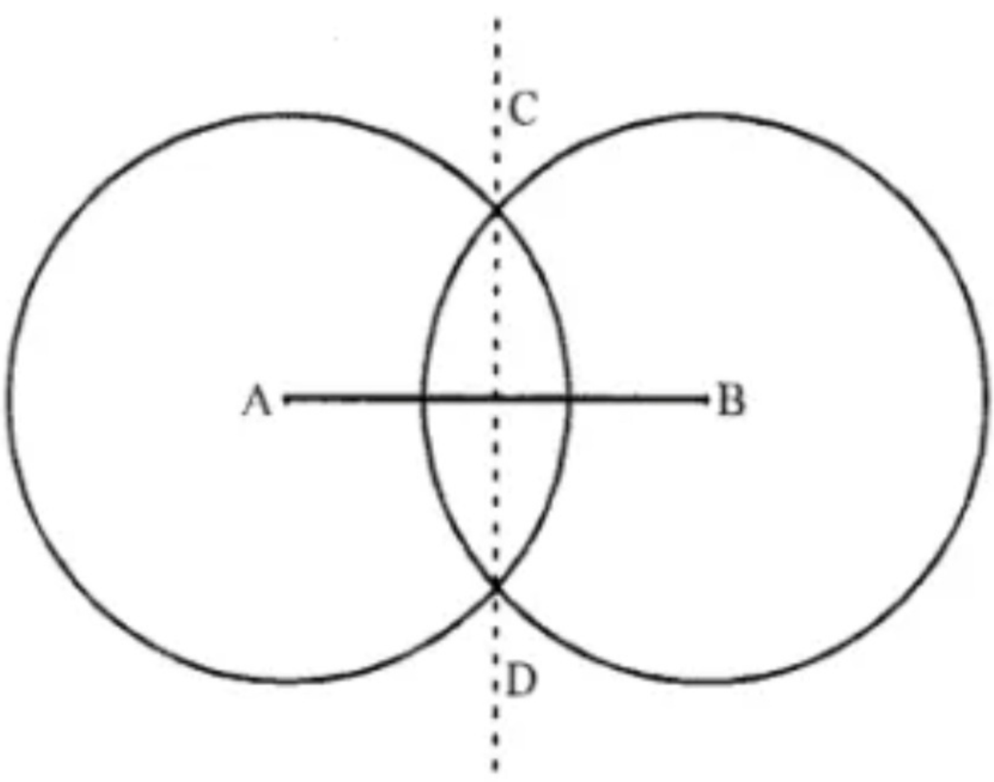


Question 5.

Draw the perpendicular bisector of $\overline{XY}$ whose length is 8.3 cm.

(i) Take any point P on the bisector drawn. Examine whether PX = PY.

(ii) If M is the mid–point of $\overline{XY}$, what can you say about the lengths MX and MY?

Solution:

Steps of construction :

(i) Draw a line segment $\overline{XY}$ of length 8.3 cm.

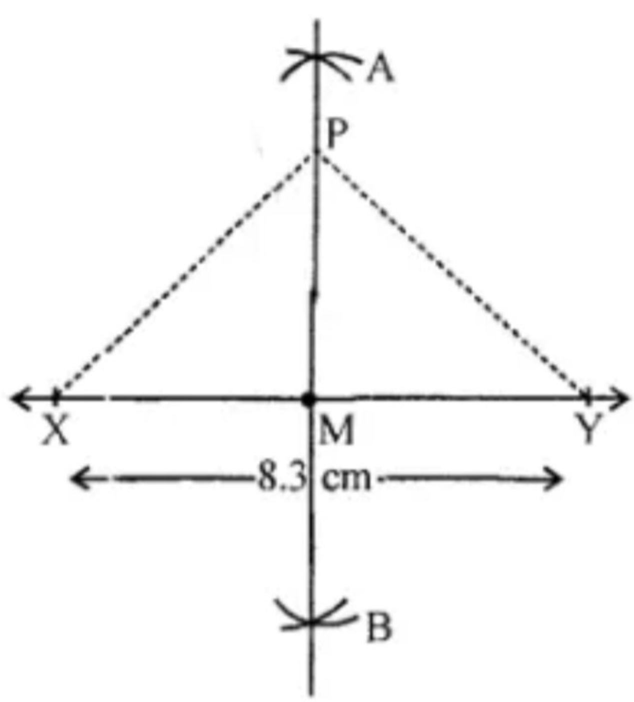
(ii) With X as centre, using compass, draw a circle. The radius of this circle should be more than half of the length of $\overline{XY}$.

(iii) With the same radius and with Y as centre, draw another circle using a compass.

Let it cut the previous circle at A and B.

(iv) Join AB.

Then, $\overline{AB}$ is the perpendicular bisector of the line segment $\overline{XY}$.

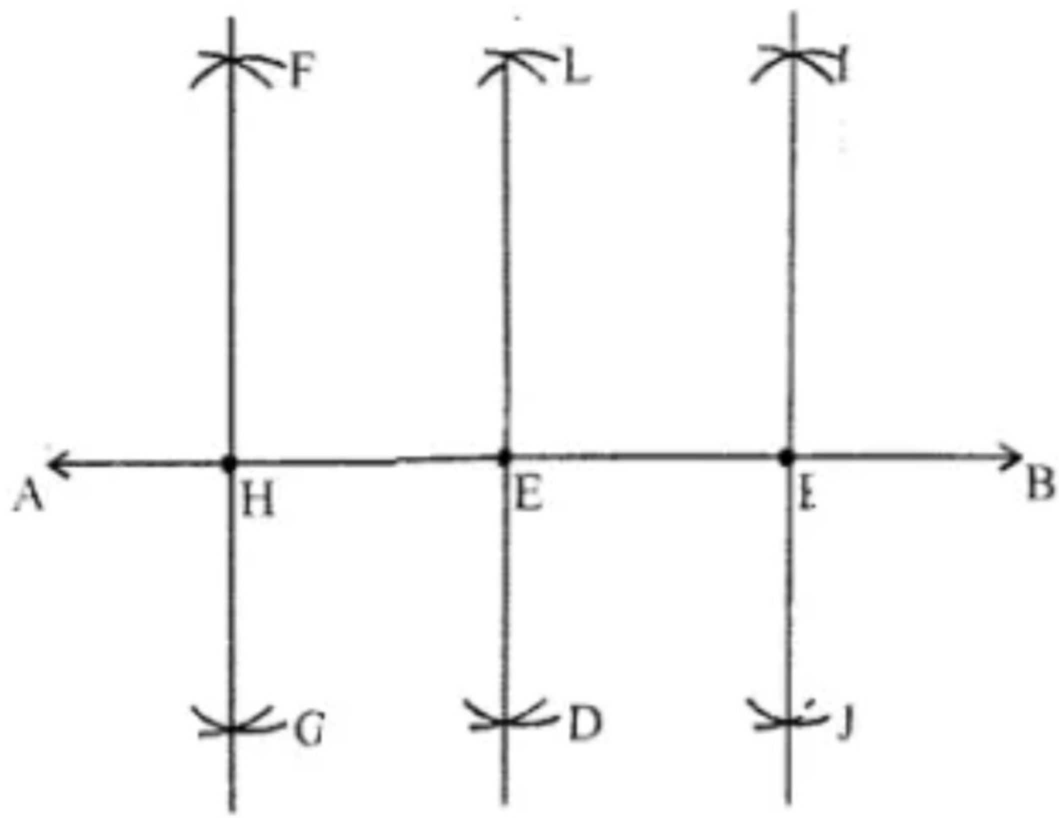


(a) On examination, we find the PX = PY.
(b) We can say that the length of MX is Equal to the length of MY.

Question 6.
Draw a line segment of length 8.8 cm. Using ruler and compass, divide it into four equal parts. Verify by actual measurement.
Solution:
Steps of construction :
(i) Draw a line segment $\overline{AB}$ of length 8.8 cm.
(ii) With A as centre, using compass,
draw two arcs on either side of AB.
The radius of this arc should be more than half of the length of $\overline{AB}$.
(iii) With the same radius and with B as ctntre,
draw another arc using compass.
Let it cut the previous arc at C and D.
(iv) Join $\overline{CD}$.
It cuts $\overline{AB}$ at E.
Then $\overline{CD}$ is the perpendicular bisector of the line segment $\overline{AB}$.
(v) With A as centre, using compass, draw a circle.
The radius of this circle stould be more than half of the length of Ac.
(vi) With the same radius and with E as ceitre,
draw another circle using compass.
Let it cut the previous circle at F ana G.
(vii) Join $\overline{FG}$. It cuts $\overline{AE}$ at H.
Then $\overline{FG}$ is the perpendicular bisector of the line segment $\overline{AE}$.

(viii) With E as centre, using eompass, draw a circle. The radius of thii circle slould be more than half of the length of EB.

(ix) With the same radius md with B is centre, draw another circle using compss. Let it cut the previous cirde at I and J.



(x) Join $\overline{IJ}$. It cuts $\overline{EB}$ at K. Then $\overline{IJ}$ is the perpendicuir bisector of the lhe segment $\overline{EB}$.

Now, the points H, E and K divide AB into four equal parts. i. e.,

$\overline{AH} = \overline{HE} = \overline{EK} = \overline{KB}$

By measurement,

$\overline{AH} = \overline{HE} = \overline{EK} = \overline{KB}$ = 2.2 cm

Question 7.

With $\overline{PQ}$ of length 5.6 cm as diameter, draw a circle.

Solution:

Steps of construction :

(i) Draw a line segment $\overline{PQ}$ of length 5.6 cm.

(ii) With P as centre, using compass, draw a circle.

The radius of this circle should be more than half of the length of $\overline{PQ}$.

(iii) With the same radius and with Q as centre, draw another circle using compass.

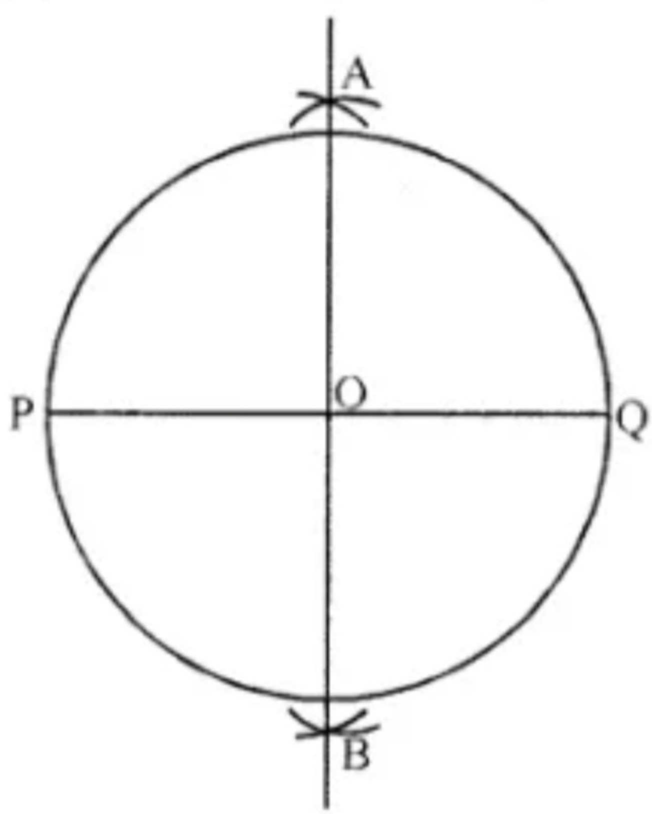
Let it cut the previous circle at A and B.

(iv) Join $\overline{AB}$. It cuts $\overline{PQ}$ at C.

Then AB is the perpendicular bisector of the line segment $\overline{PQ}$.

(v) Place the pointer of the compass at C and open the pencil up to P.

(vi) Turn the compass slowly to draw the circle.



Question 8.

Draw a circle with centre C and radius 4.2 cm. Draw any chord AB. Construct the perpendicular bisector of AB and examine if it passes through C.

Solution:

Steps of construction :

(i) Draw a point with a sharp pencil aid mark it as C.

(ii) Open the compass for the required radius of 4.2 cm,

by putting the pointer on 0 and opening the pencil up to 4.2 cm.

(iii) Place the pointer of the compass at C.

(iv) Turn the compass slowly to draw the circle.

(v) Draw any chord $\overline{\mathrm{AB}}$ of this circle.

(vi) With A as centre, using compass, draw a circle.

The radius of this circle should be more than half of the length of $\overline{\mathrm{AB}}$.

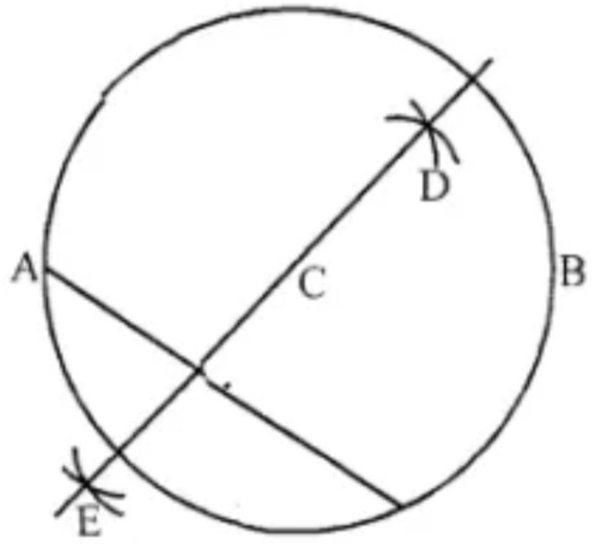
(vii) With the same radius and with B as centre, draw another circle using compass.

Let it cut the previous circle at D and E.

(viii) Join $\overline{\mathrm{DE}}$.

Then $\overline{\mathrm{DE}}$ is the perpendicular bisector of the line segment $\overline{\mathrm{AB}}$.

On examination, we find that it passes through C.



Question 9.

Draw a circle of radius 3.5 cm. Draw any two of its (non–parallel) chords. Construct the perpendicular bisectors of these chords. Where do they meet?

Solution:

Steps of construction :

(i) Draw a point with a sharp pencil and mark it as O.

(ii) Open the compasses for the required radius 3.5 cm,

by putting the pointer on 0 and opening the pencil upto 3.5 cm.

(iii) Place the pointer of the compass at O.

(iv) Turn the compass slowly to draw the circle.

(v) Draw any two chords $\overline{AB}$B and $\overline{CD}$ of this circle.

(vi) With A as centre, using compass, draw two arcs on either side of AB.

The radius of this arc should be more than half of the length of $\overline{AB}$.

(vii) With the same radius and with B as centre, draw another two arcs using compass.

Let it cut the previous circle at E and F.

(viii) Join $\overline{EF}$.

Then $\overline{EF}$ is the perpendicular bisector of the chord $\overline{AB}$.

(ix) With C as centre, using compass,

draw two arcs on either side of CD.

The radius of this arc should be more than half of the length of $\overline{CD}$.

(x) With the same radius and with D as centre,

draw another two arcs using a compass.

Let it cut the previous circle at G and H.

(xi) Join $\overline{GH}$.

Then $\overline{GH}$ is the perpendicular bisector of the chord $\overline{CD}$.

We find that perpendicular bisectots $\overline{EF}$ and $\overline{GH}$ meet at O,

the centre of the circle.