Geometrical Constructions

Exercise 12A

Question 1:

Steps of Construction:

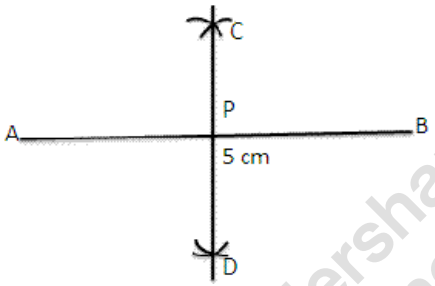
(i) Draw a line segment AB = 5 cm

(ii) With A as centre and radius equal to more than half of AB, draw two arcs, one above AB and the other below AB.

(iii) With B as a centre and the same radius draw two arcs which cuts the previously drawn arcs at C and D.

(iv) Join CD , intersecting AB at point P.

∴ CD is the perpendicular bisector of AB at the point P.



Question 2:

Step of Construction:

(i) Draw a line segment OA.

(ii) AT A, draw ∠AOE=90 , using ruler and compass.

(iii) With B as centre and radius more than half of BD, draw an arc.

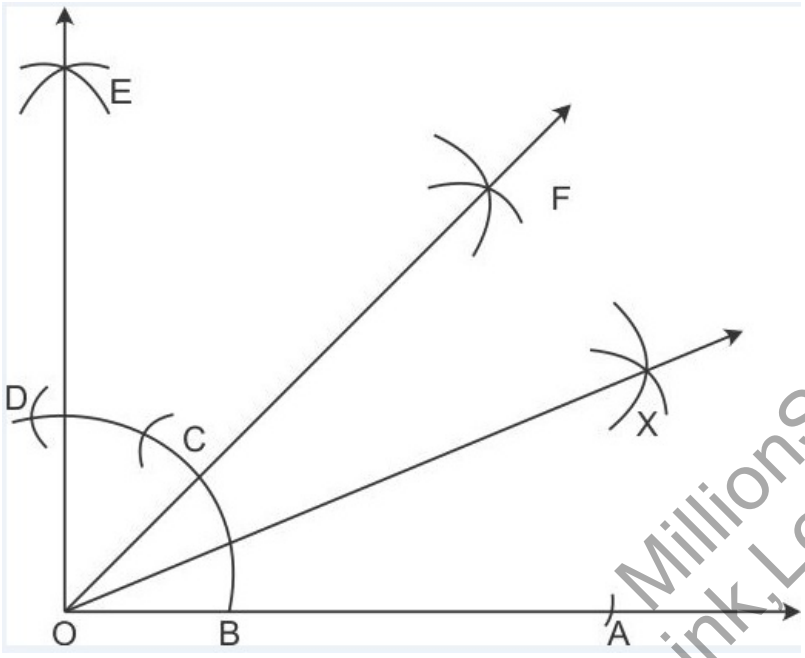
(iv) With D as centre and same radius draw another arc which cuts the previous arc at F.

(v) Join OF. ∴ ∠AOF=45 .

(vi) Now with centre B and radius more than half of BC, draw an arc.

(vii) With centre C and same radius draw another arc which cuts the previously drawn arc at X.

(viii) Join OX. ∴ OX is the bisector of ∠AOF.



Question 3:

Step of Construction:

(i) Draw a line segment OA.

(ii) With O as centre and any suitable radius draw an arc, cutting OA at B.

(iii) With B as centre and the same radius cut the previously drawn arc at C.

(iv) With C as centre and the same radius cut the arc at D.

(v) With C as centre and the radius more than half CD draw an arc.

(vi) With D as centre and the same radius draw another arc which cuts the previous arc at E.

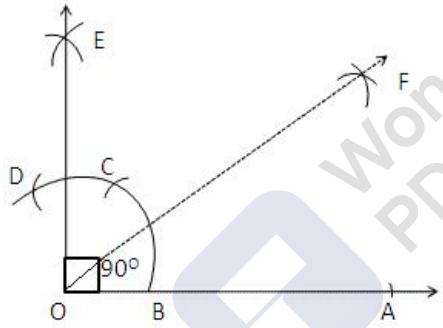
(vii) Join E Now, $\angle AOE = 90^0$

(viii) Now with B as centre and radius more than half of CB draw an arc.

(iv) With C as centre and same radius draw an arc which cuts the previous at F.

(x) Join OF.

(xi) $\therefore$ F is the bisector of right $\angle AOE$.



Question 4:

Step of construction:

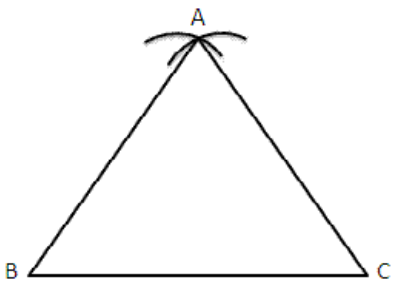
(i) Draw a line segment BC=5cm.

(ii) With B as centre and radius equal to BC draw an arc.

(iii) With C as centre and the same radius draw another arc which cuts the previous arc at A.

(iv) Join AB and AC.

Then ΔABC is the required equilateral triangle.

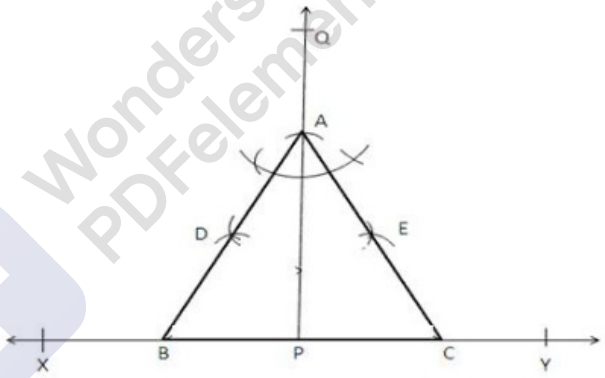


Question 5:

(i) Draw a line XY.

(ii) Mark any point P on it.
(iii) From P, draw PQ ⊥ XY.
(iv) From P, set off PA=5.4 cm cutting PQ at A.
(v) Construct ∠PAB =30⁰ and ∠PAC =30⁰, meeting XY at B and C respectively.

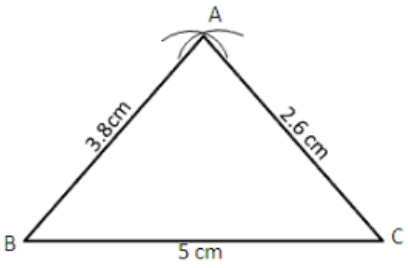
∴ △ ABC is required equilateral triangle.



Question 6:

Steps of construction:

(i) Draw a line segment BC = 5 cm.
(ii) With centre B and radius equal to 3.8 cm draw an arc.
(iii) With centre C and radius equal to 2.6 cm draw another arc which cuts the previous drawn arc at A.
(iv) Join AB and AC. ∴ △ ABC is required equilateral triangle.



Question 7:

Steps of Construction:

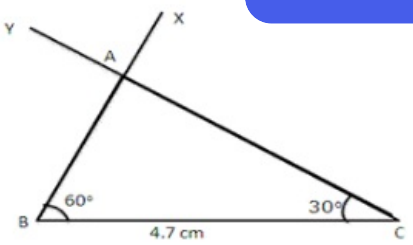
(i) Draw a line segments BC =4.7 cm.

(ii) At B draw $\angle XBC = 60^0$

(iii) AT C draw $\angle YCB = 30^0$.

Let XB and YC intersect at A.

$\therefore \Delta ABC$ is the required triangle.



Question 8:

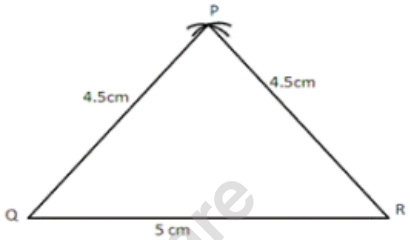
Steps of Construction :

(i) Draw a line of segment QR =5cm which is the base.

(ii) With centre Q and radius equal to 4.5 cm, draw an arc.

(iii) With centre P and same radius draw another arc which cuts the previous arc at P.

(iv) Join PQ and PR. $\therefore \triangle PQR$ is the required isosceles triangle.



Question 9:

Steps of Construction :

(i) Draw a line segment BC=4.8 cm.

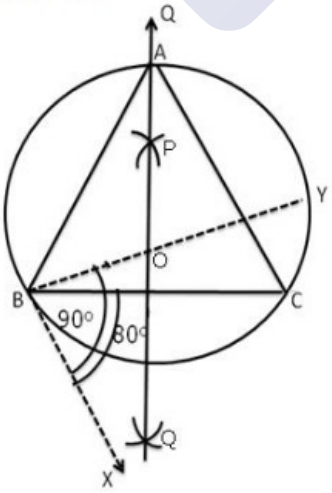
(ii) Make $\angle CBX = 80^0$, below the line segment BC.

(iii) Make $\angle XBY = 90^0$.

(iv) Draw the right bisector PQ of BC, intersecting BY at O.

(v) With O as centre and radius OB, draw a circle intersecting PQ at A.

(vi) Join AB and AC. $\therefore \triangle ABC$ is the required isosceles triangle in which AB =AC.



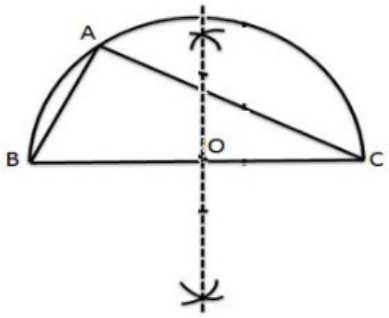
Question 10:

Steps of construction :
(i) Draw a line segment BC=5.3cm.
(ii) Find the mid-point O of BC.

(iii) With O as a centre and radius OB, draw a semicircle on BC.

(iv) With B as centre and radius equal to 4.5 cm draw an arc cutting the semicircle at A.

(v) Join AB and AC, $\therefore$ $\triangle$ABC is the required triangle.



Question 11:

Steps of Construction :

(i) Draw any line XY.

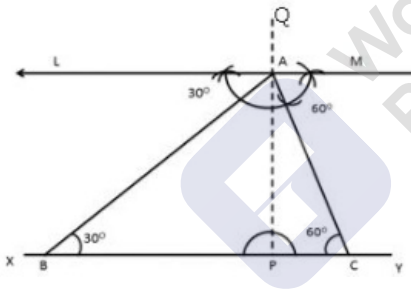
(ii) Take any point P on XY and draw PQ $\perp$XY.

(iii) Along PQ, set off PA=4.8 cm.

(iv) Through A, draw LM || XY.

(v) Construct $\angle LAB = 30^0$ and $\angle MAC = 60^0$ meeting XY at B and C respectively .

$\therefore$ $\triangle$ABC is the required triangle.



Question 12:

Steps of Construction :

(i) Draw a line segment AB=12 cm.

(ii) Draw a ray AX, making an acute angle with AB and drawn in the downward direction.

(iii) From A set off (3+2+4) = 9 equal distances along AX.

(iv) Mark points L, M, N on AX such as that AL =3 units, LM =2 units and MN =4 units.

(v) Join NB.

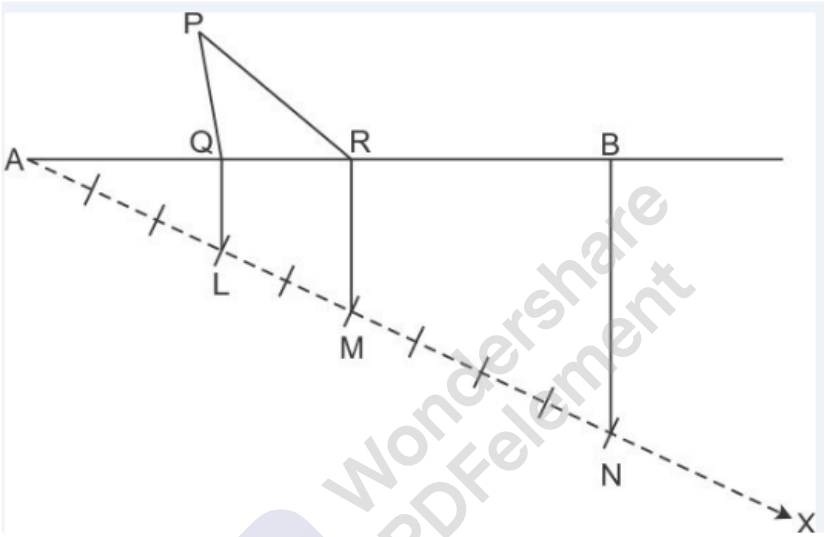
(vi) Through L and M, draw LQ || NB and MR || NB cutting AB at Q and R respectively.

(vii) With Q as centre and radius AQ, draw an arc.

(viii) With R as centre and radius RB, draw another arc, cutting the previous arc at P.

(ix) Join PQ and PR.

∴ △PQR is the required triangle.



Question 13:

Steps of Construction:

(i) Draw BC = 4.5 cm.

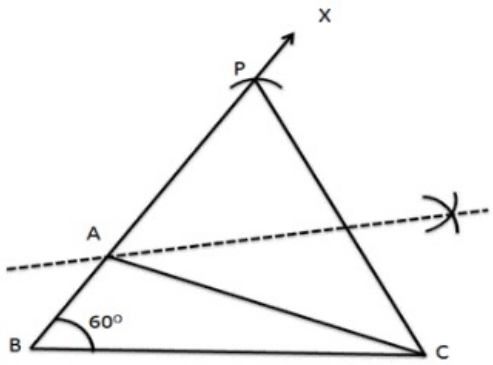
(ii) Construct ∠CBX = 60^0

(iii) Along BX set off BP =8cm.

(iv) Join CP.

(v) Draw the perpendicular bisector of CP to intersecting BP at A.

(vi) Join AC. ∴ ΔABC is the required triangle.



Question 14:

Steps of Construction:

(i) Draw BC = 5.2 cm.

(ii) Construct ∠CBX = 30^0

(iii) Set off BP = 3.5 cm.

(iv) Join PC.

(v) Draw the right bisector of PC, meeting BP produced at A.

(vi) Join AC. ∴ ΔABC is the required triangle.