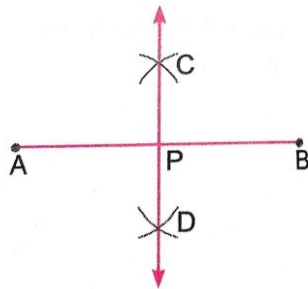# Short Answer Type Questions – II

[3 marks]

Que 1. Draw a line segment 5.8 cm long draw its perpendicular bisector.

Sol. Steps of construction
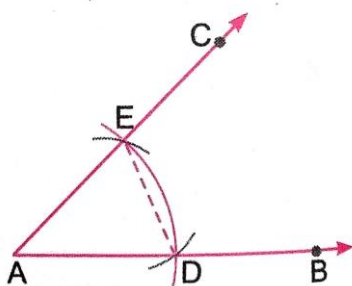

Fig. 11.1

(i) Draw a line segment AB = 5.8 cm.

(ii) Talking A as centre and radius more $\frac{1}{2}$ AB, draw two arcs, one on either side of AB.

(iii) Taking B as centre and the same radius draw two arcs, cutting the previously drawn arcs at points C and D respectively.

(iv) Join CD, intersecting AB at point P. Then, line CPD is the required perpendicular bisector of AB.

Que 2. Construct an angle of 60°

Sol. Steps of construction

Fig. 11.2

(i) Draw a ray AB.

(ii) Taking A as centre and any convenient radius, draw an arc intersecting ray AB at point D.

(iii) Taking D as centre and same radius, draw an arc intersecting the previous arc at E.

(iv) Draw the ray AC passing through E. Then, ∠CAB is the required angle of 60°.

Justification

Join DE

In Δ ADE, we have

      AD = DE = EA   (Arcs of the same radii)

⇒   ΔADE is an equilateral triangle

⇒   ∠BAC = 60°

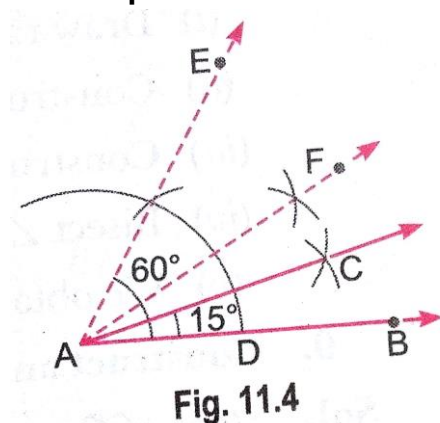**Que 3. Construct an angle of 30°.**

Sol. Steps of construction

Fig. 11.3
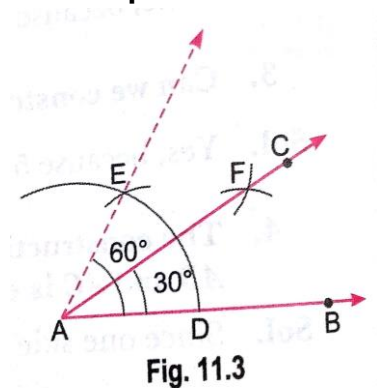
(i) Draw a ray AB

(ii) Taking A as centre and any convenient radius, draw an arc intersecting AB at D.

(iii) With the same radius and D as centre, draw an intersecting the previous arc at E.

(iv) Taking E and D as centre and convenient radius (more than $\frac{1}{2}$ ED), draw two arcs intersecting each other at F.

(v) Draw the ray AC passing through F. Then ∠CAB is the required angle of 30°.

Que 4. Construct an angle of 15°.

Sol. Steps of construction

Fig. 11.4

(i) Construct an ∠EAB = 60°.

(ii) Bisect ∠EAB, so that ∠EAF = ∠FAB = 30°.

(iii) Bisect ∠FAB, so that ∠CAB = ∠FAC = 15°.

    Hence ∠CAB = 15°.

Que 5. Construct an angle of 90° at the initial point of a given ray and give the justification.

Sol. Steps of Construction

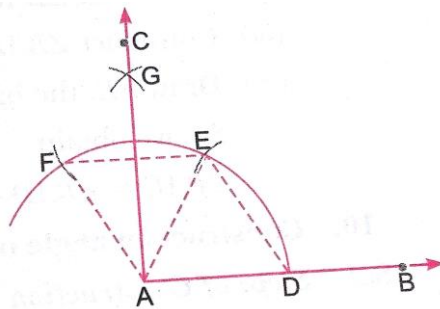
Fig. 11.5

(i) Draw a ray AB.
(ii) Taking A as centre and some convenient radius draw an arc which intersect AB, say at point D.
(iii) Taking D as centre and with the same radius as before draw an arc intersecting the previously drawn arc, say at point E.
(iv) Taking E as centre and with the same radius draw an arc intersecting the drawn arc, say at point F.
(v) With E and F as centres, and some convenient radius (more than $\frac{1}{2}$ EF), draw two arcs intersecting each other at G.
(vi) Draw ray AC passing through G. Then ∠CAB is the required angle of 90°.

Justification

By construction

$$AD = DE = EA$$

∴ ΔEAD is an equilateral triangle. So ∠EAD = 60°
Again   AE = ED = FA.
∴ ΔFAE is equilateral triangle. So ∠FAE = 60°
As AG bisects ∠FAE, So ∠GAE = 30°
Now,   ∠CAB = ∠GAE + ∠EAD = 30° + 60° = 90°
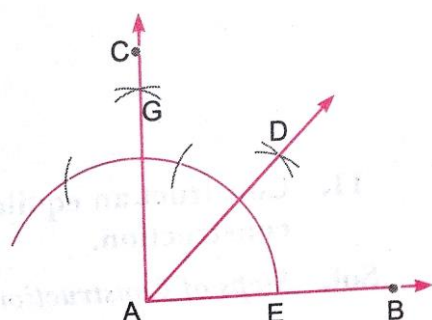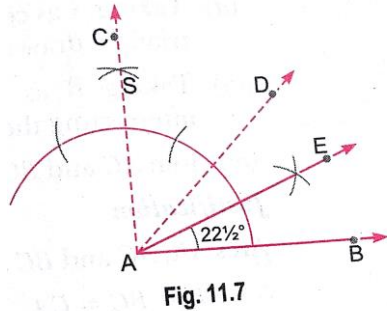
Que 6. Construct an angle of 45°.

Sol. Steps of Construction

Fig. 11.6

(i) Draw a ray AB.
(ii) Construct ∠CAB = 90° as given in previous problem.
(iii) Draw DA the bisector of ∠CAB. Then ∠DAB = 45°

Que 7. Construct an angle of $22\frac{1}{2}^{\circ}$.

Sol. Steps of Construction
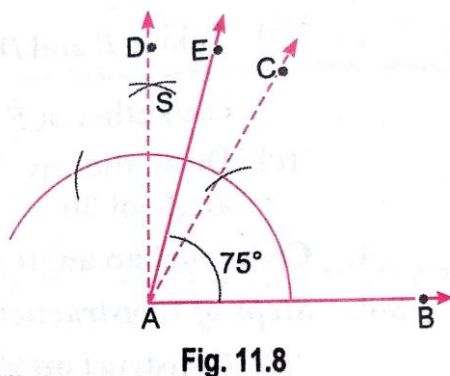

Fig. 11.7

(i) Draw ∠BAC = 90°.
(ii) Draw AD, the bisector of ∠BAC, then ∠BAD = 45°.
(iii) Draw AE, the bisector of ∠DAB, then ∠EAB = $22\frac{1}{2}^{\circ}$

Que 8. Construct an angle of 75°.

Sol. Steps of Construction

Fig. 11.8

(i) Draw ray AB.
(ii) Construct ∠BAC = 60°.

(iii) Construct ∠BAD = 90°.
(iv) Bisect ∠CAD, so that ∠CAE = ∠EAD = 15°.
(v) We obtain ∠BAE = ∠BAC + ∠CAE = 60° + 15° = 75°.

Que 9. Construct an angle of 105°.

Sol. Steps of Construction

Fig. 11.9
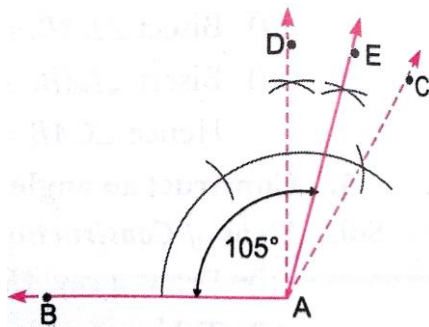
(i) Draw ray AB.
(ii) Construct ∠BAC = 120°.
(iii) Construct ∠BAD = 90°.
(iv) Draw AE, the bisector of ∠CAD, then ∠DAE = 15°.
So, we obtain
∠BAE = ∠BAD + ∠DAE = 90° + 15° = 105°.

Que 10. Construct an angle of 123°.

Sol. Steps of Construction

Fig. 11.10
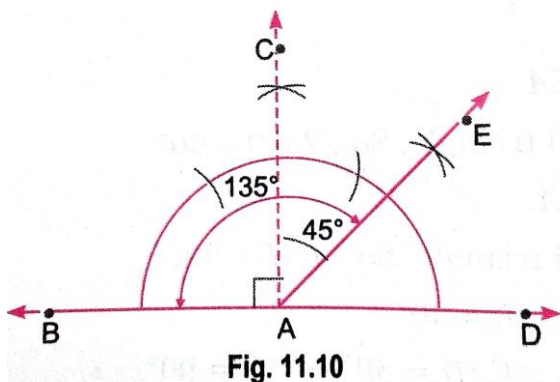
(i) Construct ∠BAC = 90°, Then ∠CAD = 90°.
(ii) Draw AE, the bisector of ∠CAD, then ∠CAE = 45°.
So, we obtain
∠BAE = ∠BAC + ∠CAE = 90° + 45° = 135°.

Que 11. Construct an equilateral triangle, gives its side any justify the construction.

Sol. Steps of Construction

Fig. 11.11
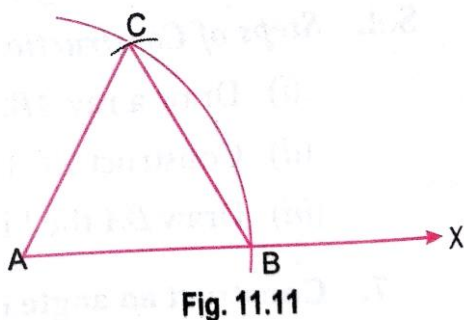
(i) Draw a ray AX with initial point A.
(ii) Taking A as centre and radius equal to length of side of the triangle draw an arc intersecting the ray AX at B.
(iii) Taking B as centre and the same radius draw an arc intersecting the arc drawn in step (ii) at C.
(iv) Join AC and BC to obtain the required triangle.

Justification

Arcs AB, AC and BC are of the same radii
∴   AB = BC = CA