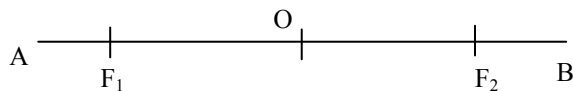**Q)**   The **major axis of ellipse** is **120** mm and the **foci** are **90** mm apart. Find the **minor axis** and draw the **ellipse** by **concentric circles** method. Also draw tangent and normal to the ellipse at a point 20 mm above the major axis.
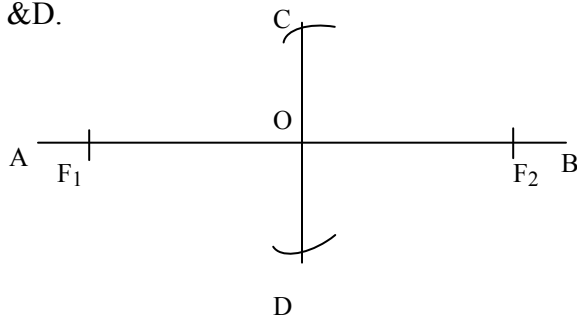
Ans)   The minor axis of ellipse can be found by using the relation $OA=CF_1=CF_2$.

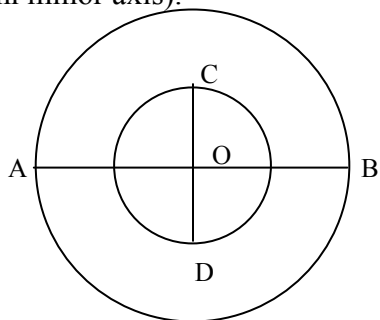**Foci (F_1F_2)** = 90;   **Major axis (AB)** = 120.

1) Draw AB = 120, F_1F_2 = 90 with mid point as O.
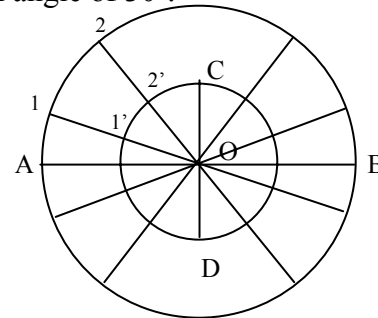

2)   Using $OA=CF_1$, centre as F and radius=OA, cut arcs on $\perp$ to AB to get minor axis C &D.

3)   Draw 2 circles with O as centre and radius = OA and OC (semi major axis and semi minor axis).

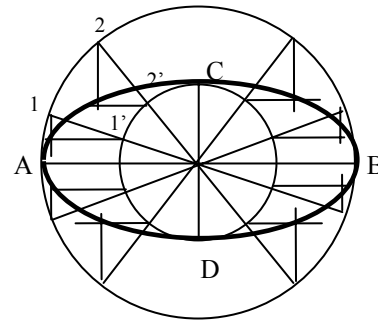**4)** Divide the circles into 12 equal parts with angle of 30^0.

Label the points 1, 2, 3 … and 1',2',3'…. on outer and inner circles.

5) On 1 draw vertical line and on 1' draw horizontal line to meet at P1.

Similarly get the other points with 2-2', 3-3', etc and join them to get the required ellipse.

6) For normal, join MF_1 & MF_2 & find angle between them. Half of the angle is the normal NN' & $\perp$ to NN' is Tangent TT'. Normal is the angular bisector.