2.3.5 To Draw an Arc of Radius R and Tangent to a Given Straight Line and a Given Circle (or a Circular Arc)

(a) Outside to the Given Circle

- Draw given straight line AB. Mark a point O_1 at a given distance from the given line and draw a given circle with O_1 as center and R_1 as radius. *(Figure 2.30(a))*
- Draw a straight line CD parallel to the line AB and at a distance of R from it. *(Figure 2.30(b))*
- With O_1 as center and $R + R_1$ as radius draw an arc intersecting the line CD at point O, which is the center of the required arc. *(Figure 2.30(c))*
- Join O and O_1 to get point of tangency E on the given circle and drop perpendicular from O to line AB to get the point of tangency F on the given line. *(Figure 2.30(d))*
- With O as center and OE (= OF = R) as radius, draw the required arc. *(Figure 2.30(e))*

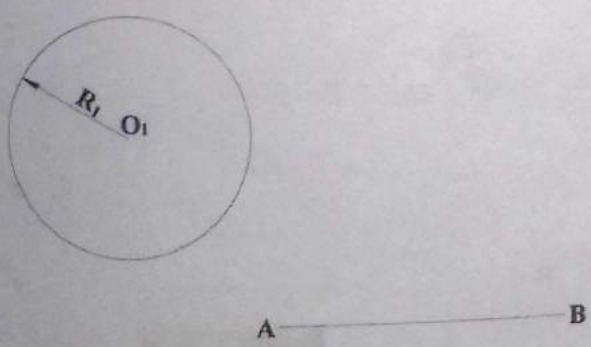

Figure 2.30(a)

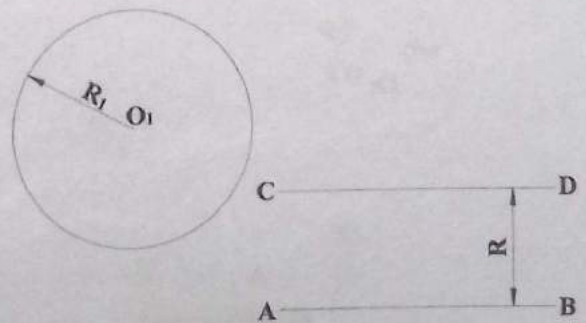

Figure 2.30(b)

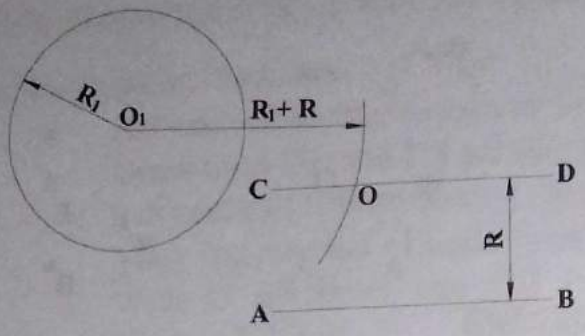

Figure 2.30(c)

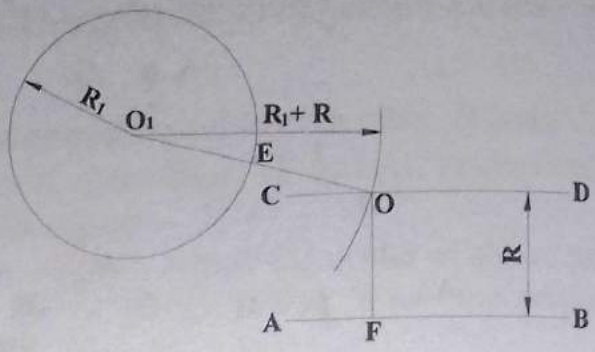

Figure 2.30(d)

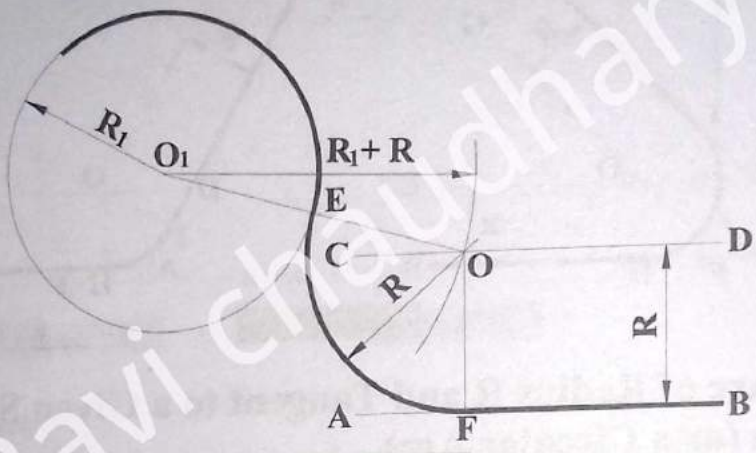

Figure 2.30(e)

(b) Including the Given Circle

- Draw given straight line AB. Mark a point O_1 at a given distance from the given line and draw a given circle with O_1 as center and R_1 as radius. *(Figure 2.31(a))*
- Draw a straight line CD parallel to the line AB and at a distance of R from it. *(Figure 2.31(b))*
- With O_1 as center and R - R_1 as radius draw an arc intersecting the line CD at point O, which is the center of the required arc. *(Figure 2.31(c))*
- Join O and O_1 and extend to get point of tangency E on the given circle and drop perpendicular from O to line AB to get the point of tangency F on the given line. *(Figure 2.31(d))*
- With O as center and OE (= OF = R) as radius, draw the required arc. *(Figure 2.31(e))*

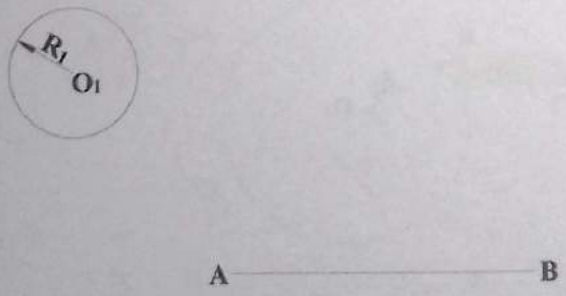

Figure 2.31(a)

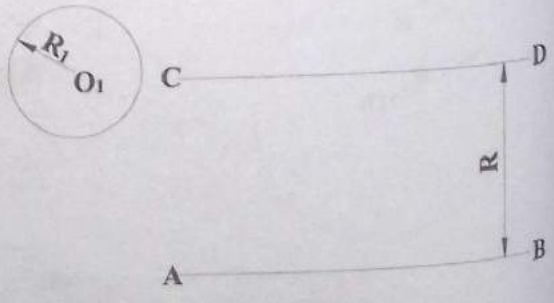

Figure 2.31(b)

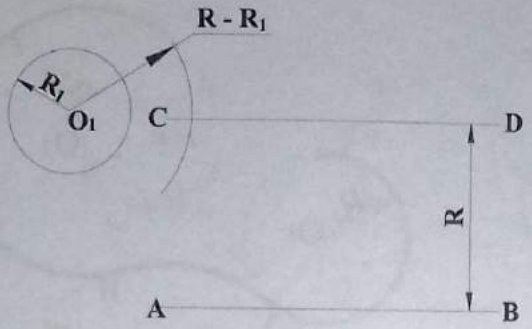

Figure 2.31(c)

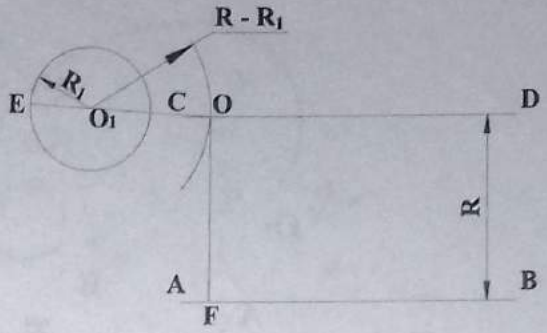

Figure 2.31(d)

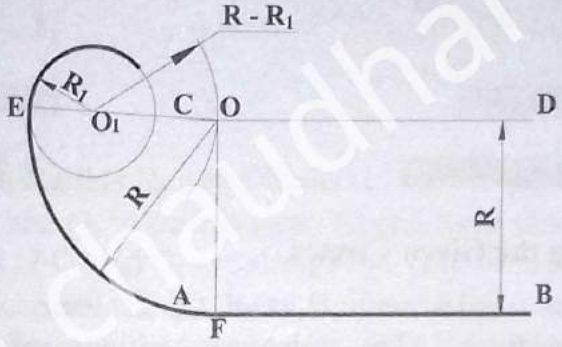

Figure 2.31(e)