I CONSTRUCTION OF CYCLOID BY ECCENTRICITY METHOD

EXAMPLE 1

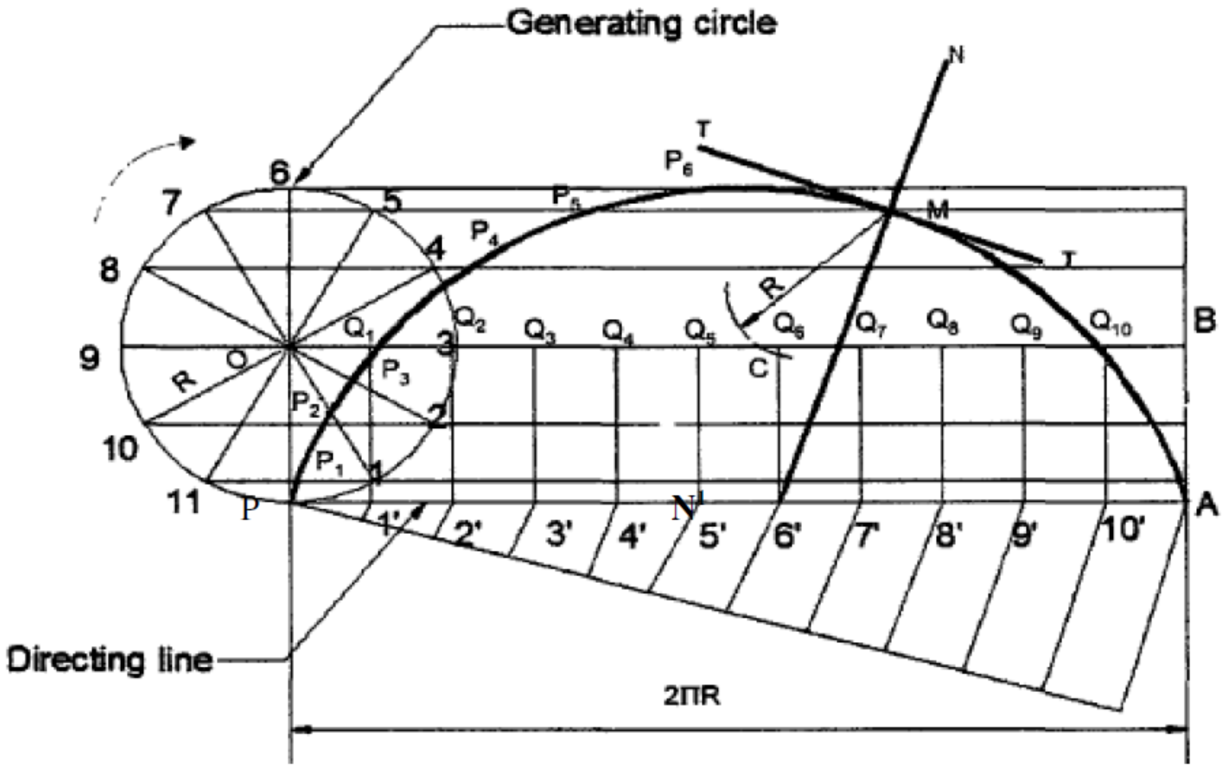
To draw a cycloid, given the radius R of the generating circle

Construction:

1. With centre O and radius R, draw the given generating circle.
2. Assuming point P to be the initial position of the generating point, draw a line PA, tangential And equal to the circumference of the circle.
3. Divide the line PA and the circle into the same number of equal parts and number the points.
4. Draw the line OB, parallel and equal to PA. OB is the locus of the centre of the generating Circle.
5. Errect perpendiculars at 1', 2', 3', etc., meeting OB at Q1, Q2,Q3 etc.
6. Through the points 1, 2, 3 etc., draw lines parallel to PA.
7. With centre O, and radius R, draw an arc intersecting the line through 1 at P1, P1 is the position of the generating point, when the centre of the generating circle moves to Q1.
8. Similarly locate the points P2, P3 etc.
9. A smooth curve passing through the points P, P1, P2, P3 etc., is the required cycloid.

To draw a normal and tangent to a cycloid

10. Mark a point M on the cycloid at a given distance from the directing line.
11. With M as a centre and the radius R, cut the centre line at point C.
12. Through point C, draw a line perpendicular to PA, Which meets PA at Point Nl.
13. Join NlM and extend it to N. The line NNl is the required normal.
14. Through Point M, draw a line TTl Perpendicular to NNl. The line TTl is the required tangent.


Generating circle
N
T
P6
6
7
5
P5
M
4
P4
8
T
R
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
B
9
O
3
R
P3
C
P2
2
10
P1
1
11
P
N'
A
1'
2'
3'
4'
5'
6'
7'
8'
9'
10'
Directing line
2ΠR