

1) Cycloidal Curves :-

These curves are generated by a fixed point on the circumference of a circle, which rolls without slipping along a fixed straight line on a circle. The rolling circle is called generating circle & the fixed straight line on circle is termed directing line or circle.

* Cycloidal curves are used in tooth profile of gears of a dial gauge.

2) Epi cycloidal Curves :-

These curves are generated by a point ~~on~~ on the circumference of a circle without slipping another circle outside is called epicycloidal curves.

3) Hypocycloid :- It is the wave generated by the fixed point on the circumference of a rolling/generating circle which rolls without slipping along the inside of a base or directing circle.

4) Involute :- The involute is defined as the path of a point on a straight line which ~~falls~~ rolls without slipping along the circumference of a cylinder.

5) Asthenedian Spiral :- It is a curve traced out by a point moving in such a way that its movement towards or away from the pole is uniform with the increase of the vectorial angle from the pole straight line.

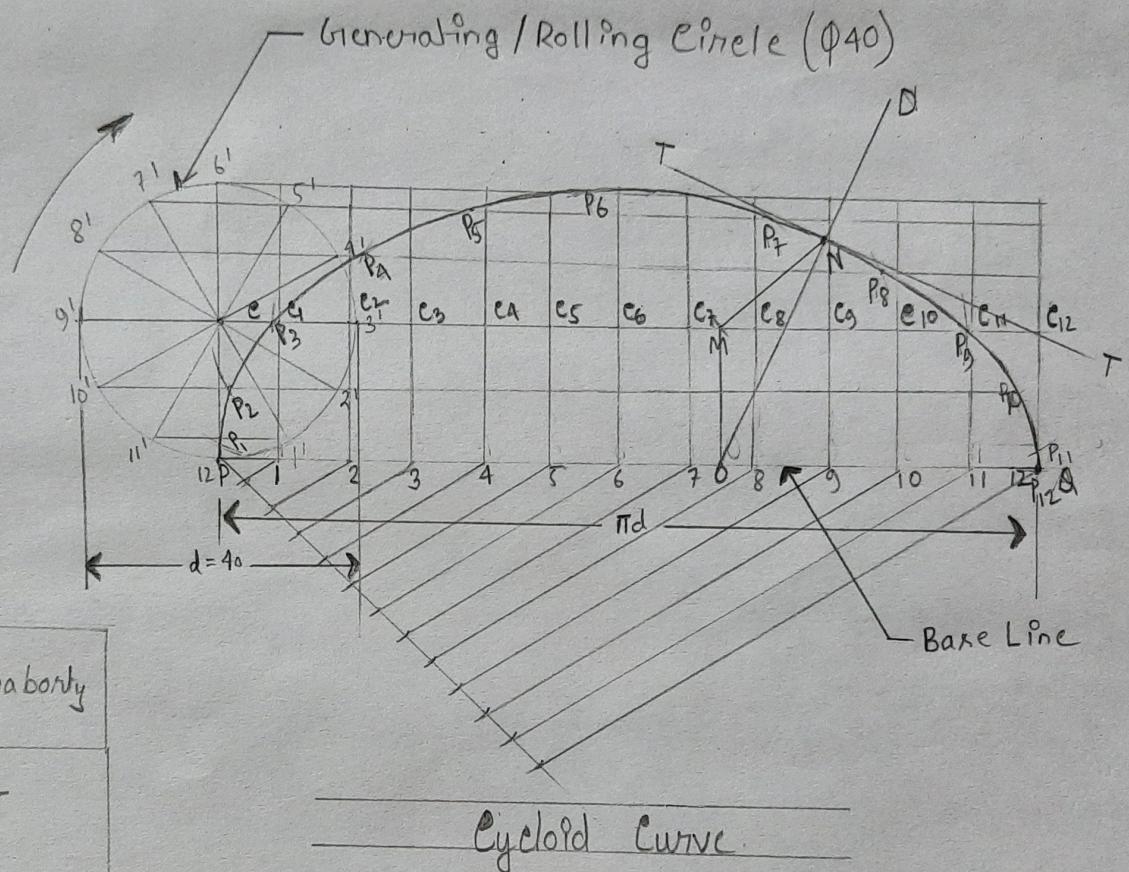
The use of this curves is made in teeth profiles of helical gears.

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Special Curves Notes

a) To construct a cycloid of given diameter of generating circle is 40 mm. Draw tangent and normal at any point P on the curve.



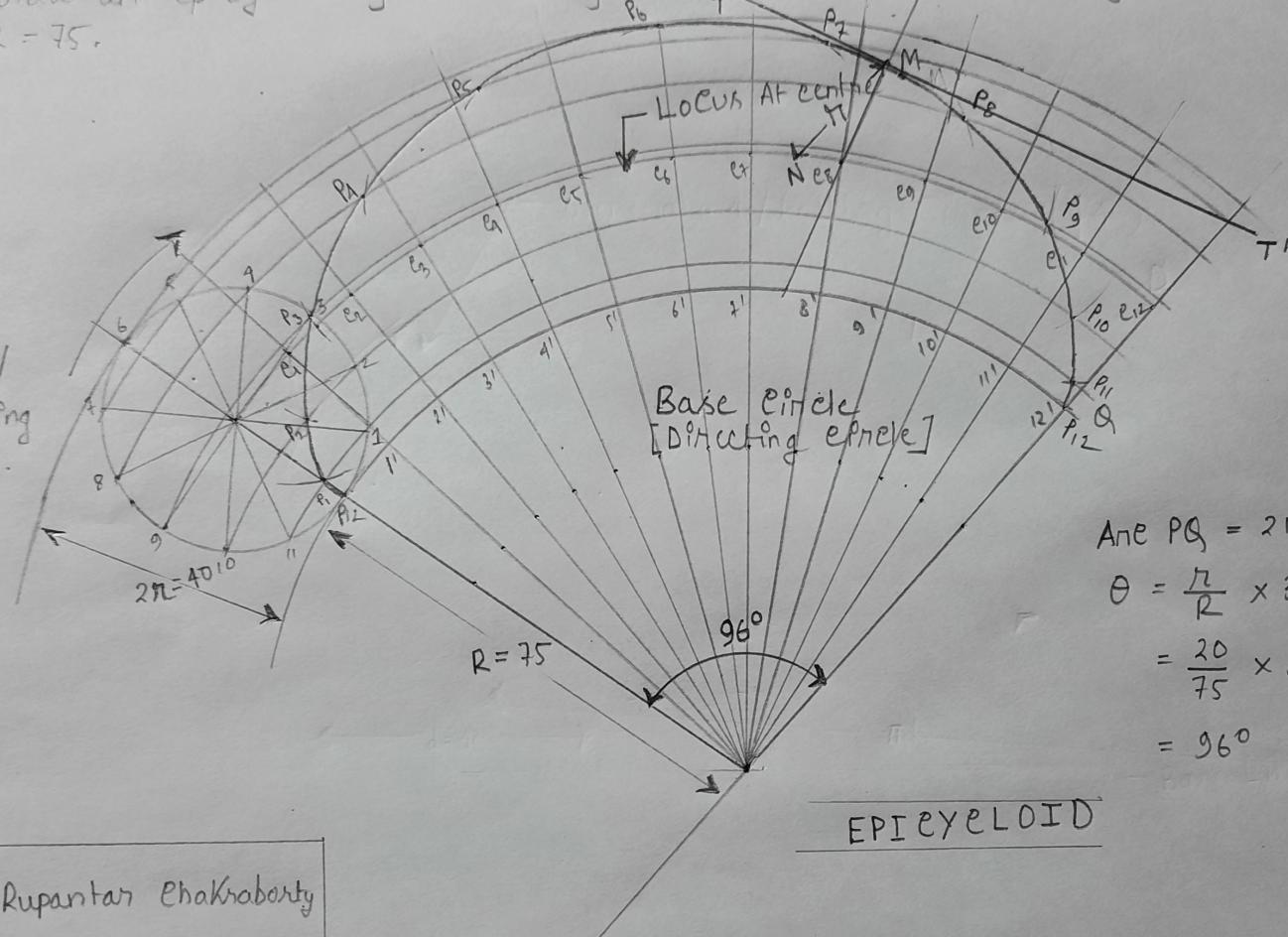
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Topic :- Special Curves.

Q) To draw an epicycloid given the generating and the directing circle of radius $r = 20$ and $R = 75$.

Rolling/
generating
circle.



$$\text{Ans } PQ = 2\pi r$$

$$\theta = \frac{r}{R} \times 360^\circ$$

$$= \frac{20}{75} \times 360^\circ$$

$$= 96^\circ$$

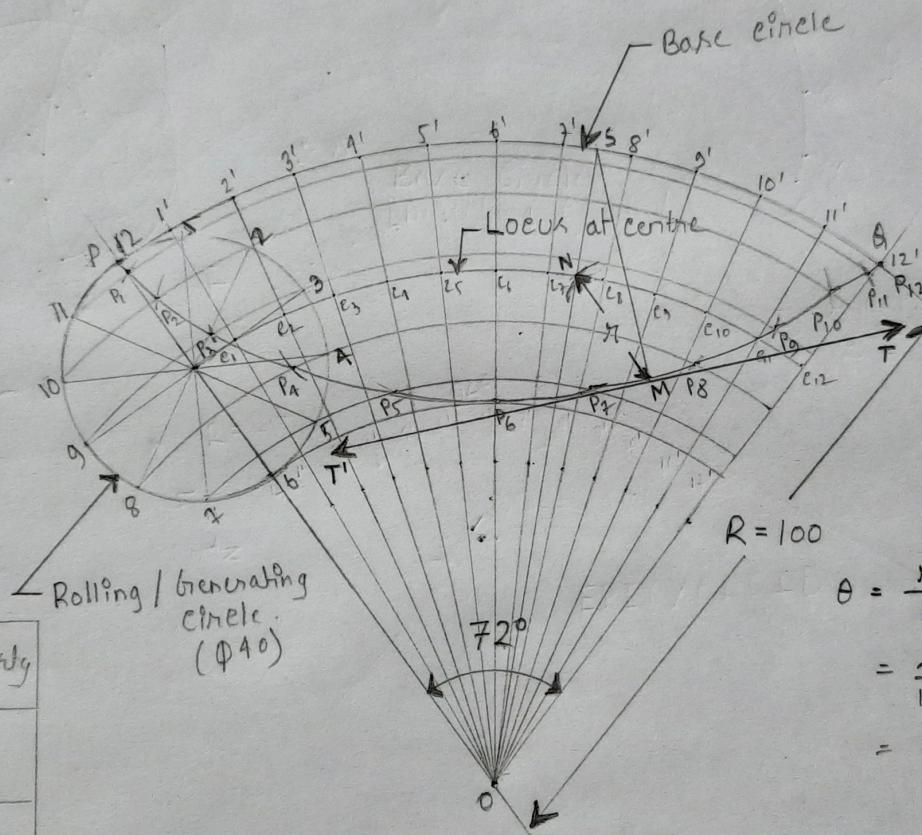
EPI CYCLOID

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Topic :- Special curves.

Q) Draw a hypocycloid given the generating and directing circle of radius $r = 20$ &
 $R = 100$



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$$\begin{aligned}\theta &= \frac{\pi}{R} \times 360^\circ \\ &= \frac{20}{100} \times 360^\circ \\ &= 72^\circ\end{aligned}$$

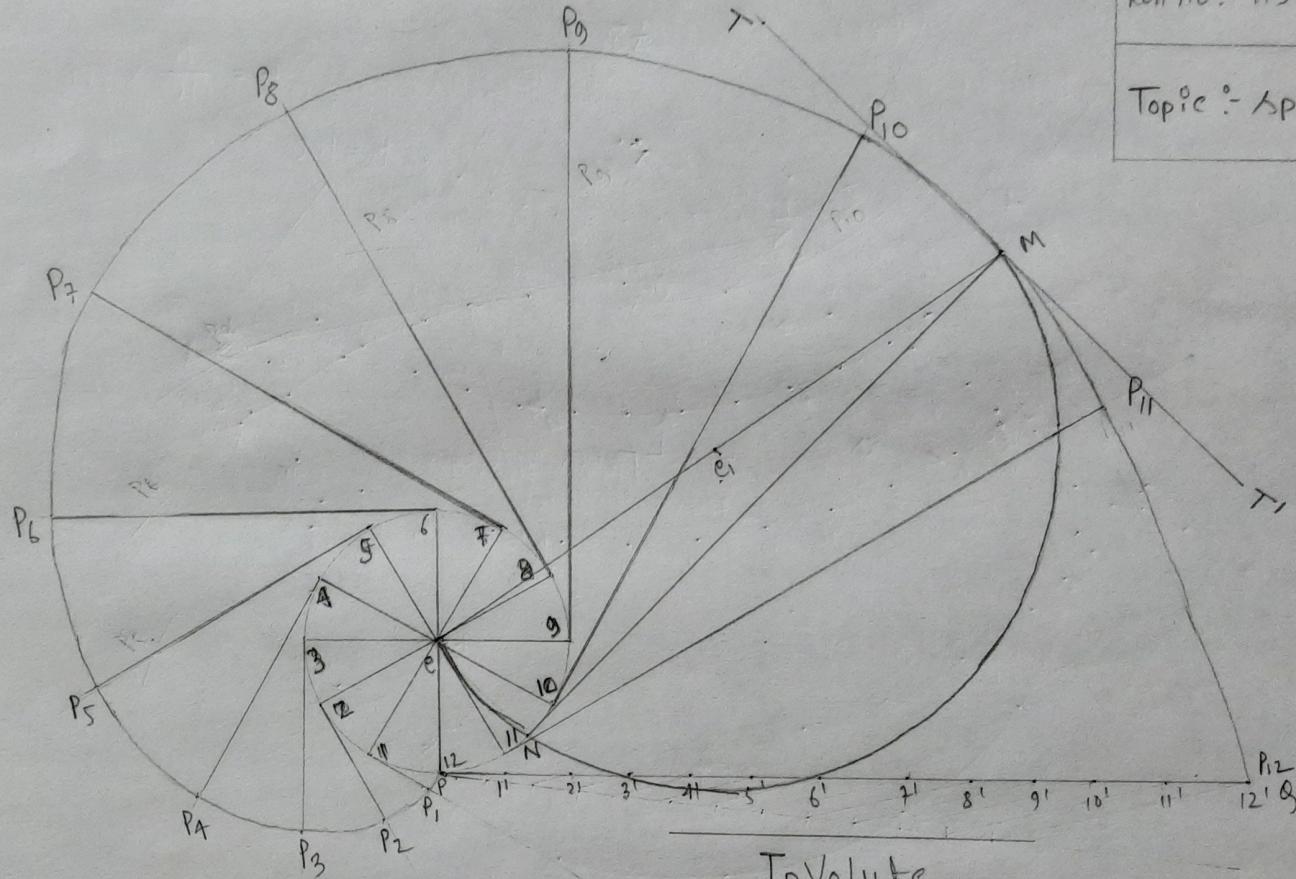
HYPOCYCLOID

Q) To draw a normal tangent and a tangent to the involute of a circle of radius $r=20$

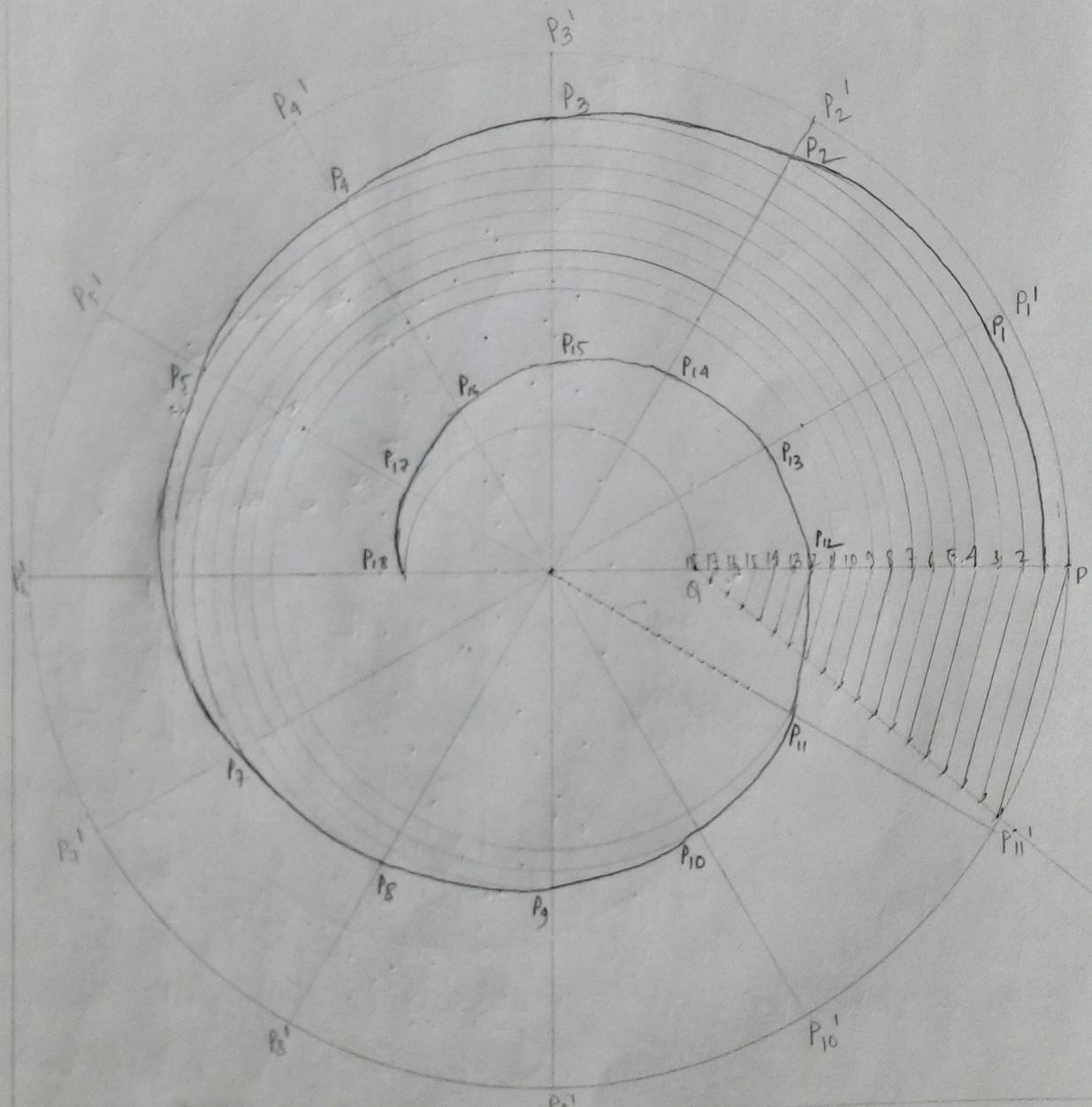
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Q) To construct an archimedean spiral of $1\frac{1}{2}$ continuous convolutions given greatest and shortest radius are 90 and 22.5 ($90 \div 4$) mm respectively.



$$R = 90 \text{ mm}$$

Anhemedian spiral

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