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B.Sc. Part I

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2. Trace the curve $y^2(2a-x) = x^2$

Tracing We have $y^2 = \frac{x^2}{(2a-x)}$

In this case the following points are noteworthy:

i) The curve is symmetrical about x-Axis as the equation of the curve contains only powers of y.

ii) It passes through the origin, as the Equation of the curve is free from the constant term.

iii) To get the equation of the tangent to the curve, equate the lowest degree term that is $2ay^2$ equal to zero.
But $2a \neq 0$ $\therefore y^2 = 0$
Hence we get two tangents which are real and coincident.
Hence the origin is a cusp.

(iv) The Given Equation of the curve is of the third degree. As the equation of the curve is free from the term containing y^3, therefore to get the asymptote equate the co-efficient of y^2 to zero.

i.e. $2a - x = 0$

or. $x = 2a$, which is the only asymptote parallel to the axis of y.

(v.) When x is a negative quantity, then y is imaginary. Hence no portion of the curve will lie on the left side of the origin or of the axis of y.

Also when $x > 2a$, then y^2 is again negative and so y is imaginary. Hence no portion of the curve will lie on the right of the line $x = 2a$.

Thus the curve lies in between the y-Axis and asymptote $x = 2a$.

The above points suggest that the shape of the curve is as shown in the adjoining figure.