

Date 26/03/2020 Page 11

Lecture for B.Sc. Part I by Dr. Ram Ansh Yadav
 Assistant Professor, Marwari College
 Dabhanger
 Mobile NO. — 9708834223

Q. Explain Cardon's Method of solving the cubic equation.

Solution: Let the cubic equation be

$$a_0 x^3 + 3a_1 x^2 + 3a_2 x + a_3 = 0 \quad (1)$$

The above equation can be reduced to the form

$$z^3 + 3Hz + G = 0 \quad (2)$$

where $z = a_0 x + a_1$

Now let us assume that $z = u + v$;

Cubing both sides, we get

$$z^3 = u^3 + v^3 + 3uv(u+v)$$

$$\text{or, } z^3 - 3uvz - (u^3 + v^3) = 0 \quad (3)$$

Now, comparing eqn (2) & (3), we get

$$uv = -H$$

$$\text{and } u^3 + v^3 = -G \quad (4)$$

$\therefore u^3 v^3 = -H^3$ and hence u^3 and v^3 are the roots of the quadratic

$$t^2 + Gt - H^3 = 0 \quad (5)$$

$$\therefore u^3 = \frac{-G + \sqrt{G^2 + 4H^3}}{2} \quad \text{and} \quad v^3 = \frac{-G - \sqrt{G^2 + 4H^3}}{2}$$