## CLASS-X

## **ELECTRICITY Electric Potential Difference and Numerical**

## **Electric Potential Difference:**

Consider a charge Q placed at a point P. Let A and B be two other point (B being closer to A) as shown



If a charge q is brought from infinity to A, a work W<sub>A</sub> will be done.

The potential at A will then be,  $V_A = \frac{W_A}{q}$ 

If charge q is brought from infinity to B, the work done will be  $W_B$ .

The potential at B will the be,  $V_B = \frac{W_B}{q}$ 

The quantity V<sub>B</sub> - V<sub>A</sub> is called the potential difference between points A and B in the electric field of charge Q.

Mathematically we have,

$$V_{\rm B} - V_{\rm A} = \frac{W_{\rm B}}{q} - \frac{W_{\rm A}}{q}$$

Electric potential difference is also measured in volt.

## **Example:**

How much work is done in moving a charge of 2 C across two points having a potential difference 12 V? **Solution:** 

The amount of charge Q, that flows between two points at potential difference V (= 12 V) is 2 C.

Thus, the amount of work W, done in moving the charge is

$$W = VQ = 12 V \times 2 C = 24 J.$$