(as $\theta = 0^\circ$), putting the value in equation (1), we get

$$T_B = T_{max} = \frac{mv_B^2}{\ell} + mg \quad \text{.....(2)}$$

Here, V_B = speed of the particle at the lowest point.

Similarly, at the highest point A, $\theta = 180^\circ$ and Cos $\theta = -1$

$$T_A = T_{min} = \frac{mv_A^2}{\ell} - mg \quad \text{.....(3)}$$

V_A = speed of the particle at the lowest point.

At point C, when the sting becomes horizontal, $\theta = 90^\circ$ and Cos $\theta = 0$

By equation (1)

$$T_C = \frac{mv_C^2}{\ell} \quad \text{.....(4)}$$

Critical Velocity:

It is the minimum velocity given to the particle to complete the circle.

At the top tension is given by $T_A = \frac{mv_A^2}{\ell} - mg$ .....(3)

Where v_b = speed of the particle at the top.

Since, the tension in the string cannot be negative, the minimum value of tension at the top most is zero and the corresponding speed of the particle is its minimum value, v_b^{min}.

Putting $T_A = 0$ in equation (3), we get

$$0 = \frac{m(v_A^{min})^2}{\ell} - mg$$

$$\Rightarrow \quad v_A^{min} = \sqrt{gl} \quad \text{.....(5)}$$