

### 3.1 SAG IN OVERHEAD LINES

While erecting an overhead line, it is very important that conductors are under safe tension. If the conductors are too much stretched between supports in a bid to save conductor material, the stress in the conductor may reach unsafe value and in certain cases the conductor may break due to excessive tension. In order to permit safe tension in the conductors, they are not fully stretched but are allowed to have a dip or sag. The difference in level between points of supports and the lowest point on the conductor is called sag. Following Fig. shows a conductor suspended between two equal level supports A and B. The conductor is not fully stretched but is allowed to have a dip. The lowest point on the conductor is O and the sag is S. The following points may be noted



**Figure 3.1 Sag in Overhead lines**

[Source: "Principles of Power System" by V.K.Mehta Page: 187]

- (i) When the conductor is suspended between two supports at the same level, it takes the shape of catenary. However, if the sag is very small compared with the span, then sag-span curve is like a parabola.
- (ii) The tension at any point on the conductor acts tangentially. Thus tension  $T_0$  at the lowest Point O acts horizontally as shown in Fig. (ii).
- (iii) The horizontal component of tension is constant throughout the length of the wire.
- (iv) The tension at supports is approximately equal to the horizontal tension acting at any point on the wire. Thus if T is the tension at the support B, then  $T = T_0$