**Discussion questions**

**1- How do we know that the column has become neutral ?**

**When the downstream solution is detected from the ion exchange column with the methyl-orange, It has an orange or yellow color indicating that it is neutral and the column becomes active**

**2- What will happen to the column after we transfer the solution sample to it and what the type of the groups that the column will be carry ?**

**When the sample solution is passed through the column, cations exchange will occur with the hydrogen ion. If the exchanger is cationic, the downstream solution of the column contains hydrogen ions, but if the anionic exchanger is an exchange between the anions with the hydroxide ion in the exchanger, The downstream solution contains hydroxide ions**

**3-What is the type of resins in the both of the cationic and anionic ion exchange columns ?**

**The cationic resins tow type as**

**a- sulfonic acid groups (SO3-H) strong acid**

**b- carboxylic groups (COOH ) weak acid**

**and the resins anionic**

**a- (Quaternary ammonium groups) nRN+R3 OH- are very strong base**

**b- the Amine groups n RNH3 OH are a weak base groups.**

**4- Why we can not use litmus paper to check the solution that come down from the column through the activation process ?  
Because the downstream solution of the ion exchanger column is neutral (salt), (no acid no basic), and use litmus paper for determination PH solution.**