ASSIGNMENT-WATER TREATMENT

Maulana Azad National Institute of Technology (MANIT)- Bhopal

Assignment Problems

Topic- Water

Course Name: Engineering Chemistry **Subject Code: CHY 106**

Section G **B.Tech (First Year)- Semester-I 2024**

Q1- Sample I was found to contain 178 mg of magnesium carbonate per litre. Sample II was found to contain 820 mg of calcium nitrate and 2 mg of silica per litre and sample III was found to contain 15 g of potassium nitrate and 3.5 g of calcium carbonate per 250 ml. Determine the hardness in all the above samples in ppm in grains per gallon.

Q2- Calculate the temporary hardness and permanent hardness of a sample of water containing:

$Mg(HCO_3)_2$ =9.3mg/L; $Ca(HCO_3)_2$ =20.2mg/L; $MgCl_2$ =8.2 mg/L; $CaSO_4$ =15.6mg/L.

Q3- Calculate the amount of lime required for softening 80,000 litre of hard water containing: $CaCO_3$= 45 ppm, $MgCO_3$= 144 ppm, $CaCl_2$ =100ppm, $MgCl_2$= 105 ppm, Na_2SO_4=15ppm, Fe_2O_3 =25ppm.

Q4- Calculate the quantity of lime and soda required for softening 50,000 litres of water containing the following salts per litre: $Ca(HCO_3)_2$ = 10 mg; $Mg(HCO_3)_2$ =9.5mg ; $CaSO_4$= 12mg ; $MgSO_4$ = 2.0mg; NaCl= 4.7mg.

Q5- A water sample contains the following impurities: Ca^{2+}=20ppm, Mg^{2+}= 18ppm, HCO_3^-= 183ppm and SO_4^{2-} = 24ppm. Calculate the amount of lime and soda needed for softening.

Q6- How many grams of $FeSO_4$ dissolved per litre gives 210.5 ppm of hardness?

Q7 How demineralization process helps to soften the water by writing clearly all the chemical equations involved in the process?

Q8. 200 ml of water sample required 12ml of N/100 H_2SO_4 for neutralization to phenolpthelein indicator. Additionally, 12 ml of the same acid was further required for titration to methyl orange end point. Calculate the amount of alkalinity and comment upon its type.