

MID TERM EXAMINATION-February 2024

Engineering Chemistry

Time: 01Hr

Maximum marks: 20

Note: Attempt questions as per Instructions

SECTION-A (Attempt any two questions, Each of 03 Marks)

- Q.1. Distinguish between hot and cold lime soda process. (3)
- Q.2. A water sample contains $\text{Ca}^{2+}=40$ ppm, $\text{Mg}^{2+}=24$ ppm and $\text{HCO}_3^- = 61$ ppm. Calculate the amount of Lime and Soda required to purify 500 lts of water. (3)
- Q.3. Draw the structure of ion exchange resin specifying the functional groups in the two types of resins. How can the resin be regenerated? (3)

SECTION-B (Attempt any One question, Each of 6 Marks)

- Q.4. a) Why is buffer solution added in determination of hardness of water by EDTA titration? What is the type of buffer used? Draw the structure of EDTA.
- b) 2 gm of CaCO_3 was dissolved in dil HCl and solution diluted to one litre. 50 ml of this solution required 45 ml of EDTA solution, while 100 ml of sample water required 18 ml of EDTA solution. On the other hand, 100 ml of boiled sample water when titrated against EDTA consumed 7 ml of solution. Calculate temporary hardness in ppm. (3+3)
- Q.5. a) State Dulong's formula for calculation of High calorific value. Why is the term $(\text{H}-\text{O}/8)$ used in the formula? Why is the multiplication factor of 9 used in calculation of LCV?
- b) 1.6g coal sample was treated in a bomb's calorimeter. The weight of water taken was 2000 g and the water equivalent was 250 g. The rise in temperature was observed as 2.2 °C. Cooling correction was found to be 0.05 °C, acid correction 10 cal and fuse wire correction as 15 cal. Calculate GCV and NCV. (3+3)

SECTION-C (Compulsory, 8 Marks)

- Q.6.
- a) What is caustic embrittlement? What is its effect? How can it be prevented? (3)
- b) What is disinfection and how is it different from sterilization? Discuss bleaching powder as a disinfectant with its advantages and disadvantages. (5)