Total No. of Questions:-4
Class Roll No .. ....

Total No. of printed pages:-1
Enrollment No .....

BT-101

Mid-Semester Examination-I (Nov 2023)

B.Tech. I Semester (CSE)

Engineering Chemistry& Life Science

Duration: 1hr 30min **Max. Marks: 20**

Note: *Attempt all questions.*

Q1.a) (i) Define Carbonate and Non-Carbonate Hardness of water. Discuss any 4 units of hardness and relationship between them.

(ii) Interpret the type and extent of hardness in degree French if1.5 gms of $CaCO_3$ dissolved in dil HCl and volume make up to 1L.100 ml of this sample require 30ml of EDTA and 50 ml of sample water require 20 ml of same EDTA before boiling and 15 ml after boiling. **[CO-1 / 5 Marks]**

Or

c) Water sample has OH^-, HCO_3, CO_3^{--} ions, how it can be determined with phenolphthalein and methyl orange indicators.

d) If a water sample is softened by Lime Soda process, discuss the type of boiler trouble with its causes, effects and removal. **[CO-1 / 5 Marks]**

Q2.a) Explain hot lime soda process with chemical reactions and diagram.

b) The hardness of 10,000 litres of a water sample was completely removed by a Zeolite softener. The exhausted softener required 585 litres of NaCl solution, containing 100g/litre of NaCl for regeneration. Calculate Hardness of water in ppm. **[CO-1 / 5 Marks]**

Or

b) A water sample on analysis gave following data: Free acid = 1.5ppm, $CaSO_4$ = 90 ppm, $MgCl_2$ = 42 ppm, $NaHCO_3$= 396.5 ppm, $FeSO_4.7H_2O$ = 14 ppm. Calculate amount of lime (91% pure) and soda (97.2% pure) needed for treating one million litres of water. **[CO-1 / 5 Marks]**

Q3.a) What is Flash and Fire point. Describe the determination of Flash and Fire point using Abel's Apparatus (with diagram). **[CO-2 / 5 Marks]**

Or

a) Discuss Lubricants and their functions.

b) A sewing machine is not working properly, Interpret the type of lubrication applied with its mechanism. **[CO-2 / 5 Marks]**

Q4.a) Define Viscosity Index. What are the steps involved in determination of viscosity index of an an oil by Redwood Viscometer No I. **[CO-2 / 5 Marks]**

Or

c) A machine undergoes heavy load and low speed, interpret the type of lubrication and explain its mechanism.

d) An oil sample under test has a saybolt Universal Viscosity same as that of Standard Gulf oil and Pennsyivanian oil at 210^0F. Their Saybolt Universal Viscosity at 100^0F are 61, 758 and 420 seconds respectively. Calculate viscosity-index of the sample oil. **[CO-2 / 5 Marks]**