R22 Regulation *Subject code:4H1AH*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech I Semester Regular Examinations, March/April 2023

ENGINEERING CHEMISTRY

(Common to CSE, CSE(AI&ML) and CSE(DS))

Maximum Marks: 60 Date:10.04.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x1M=10 Marks)

1. a What are the differences between atomic and molecular orbitals?
   b Define the bond order.
   c What is the interrelation of units of hardness?
   d Write two balanced equations to describe when hard water is heated.
   e Write the basic requirement for commercial batteries.
   f Write the Principle involved in pitting corrosion?
   g Why a small quantity of ethylene di bromide is added to petrol along with anti-knocking agent TEL?
   h Write the relation between HCV and LCV.
   i Why PVC is soft and Bakelite is hard?
   j What are thermoplastics? Give two examples.

Part-B

Answer All the following questions. (5X10M=50Marks)

2 a) Explain the band structure of solids. 5M
b) Give the molecular orbital Energy level diagrams of O2. 5M

OR

3 a) What do you understand by linear combination of atomic orbitals? 5M
b) Draw neatly the molecular orbital diagram of Butadiene. 5M

4 a) Calgon Treatment prevents scale formation in Boilers. Give reasons. 5M
b) What you understand by Reverse osmosis. 5M

OR

5 a) How is potable water disinfected by Break point Chlorination. 5M
b) Explain Ion exchange process for the softening of water. 5M

6 Explain the construction, working and applications of Zn-air battery. 10M

OR

7 What is a fuel cell? Construct Methanol -Oxygen fuel cell. What are the advantages and applications of this cell. 10M

8 a) Explain ultimate analysis of coal. 5M
b) What is Dulong's formula write its significance. Write the relation between HCV and LCV. 5M

OR

9 a) Explain about moving bed catalytic cracking. 5M
b) Give an account of synthesis of Gasoline from crude oil. 5M

10 Discuss the preparation, properties and applications of the following polymers.
a)Teflon b) Bakelite (5M+5M)

OR

11 a) Write the structure of natural rubber. Explain its vulcanization and its advantages. 5M
b) Explain the preparation, properties and applications of Buna-s and Butyl rubber. 5M