R20 Regulation *Subject code: 3B2AJ*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Regular/Supplementary Examinations, October 2022

ENGINEERING CHEMISTRY

(Mechanical Engineering)

Maximum Marks: 70 Date:13.10.2022 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 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 (10x2M=20 Marks)

1 What do you understand by linear combination of atomic orbitals?
2 Define atomic and molecular orbitals? Give one example.
3 Write the specifications of portable water.
4 Define term sludge and scale with Example.
5 What is the role of salt bridge in an electrolytic cell?
6 What is standard electrode potential? Give its units.
7 What is the reason for pitting corrosion to occur?
8 Why galvanized sheets are not advised in making utensils?
9 What is calorific value?
10 Give composition of LPG and CNG.

Part-B

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

11 a) Explain the band structure of solids with their conducting behavior 5M
b) Draw the molecular orbital diagram O_2 molecule and predict the magnetic behavior of it? 5M

OR

12 a) Draw neatly, the molecular orbital diagrams of Butadiene. 5M
b) Give the crystal field splitting of d orbitals in tetrahedral geometry. 5M

13 a) Explain the process of reverse osmosis. How is it useful in softening of water? 5M
b) Discuss the Ion exchange process of softening hard water. 5M

OR

14 a) Explain Calgon conditioning. Write the chemical reaction involved. 5M
b) Discuss the principle involved in the estimation of hardness of water by complexometric titration using EDTA. 5M

15 a) Derive Nernst Equation. 5M
b) What is a fuel cell and mention its applications? Describe construction and working principle of Hydrogen-Oxygen fuel cell. 5M

OR

16 a) Write a short note on calomel electrode. 5M

b) What is a battery? Explain the functioning of Li ion battery. 5M

17 a) Explain electrochemical theory of corrosion by taking rusting of iron as an example. 5M
b) What is cathodic protection? Explain sacrificial anodic method? 5M

OR

18 a) What do you understanding by Hot dipping? Discuss Galvanizing. 5M
b) Explain the factors effecting the rate of corrosion. 5M

19 a) Explain the determination of calorific value by Junker's Gas calorimeter. 5M
b) Define terms knocking, cetane Number,Octane Number. 5M

OR

20 a) Explain the proximate analysis of coal. 5M
b) Discuss Fischer –Tropsch process for synthetic petrol with neat sketch. 5M