R20 Regulation *Subject code: 3B2AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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

MATERIAL CHEMISTRY

(Civil 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 is the bond order for N_2, O_2?
2 What is HOMO and LUMO.
3 Explain disinfection by chlorination?
4 What are the various units of hardness giving the relationship between them?
5 Differentiate between primary and secondary cells.
6 What is standard electrode potential? Give its units.
7 Write the composition of Portland cement
8 Explain preparation, properties, applications of PVC.
9 What is Beer's Lamberts law?
10 What are Auxochromes and Chromophores? Explain with suitable examples.

Part-B

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

11 Discuss the Crystal field splitting of d orbitals in octahedral and tetrahedral fields. 10M

OR

12 a) Draw the molecular orbital diagram O_2 molecule and predict the magnetic behavior of it? 5M
b) What is the role of doping in band structure. 5M

13 a) Summarize the steps involved in the treatment of potable water. 5M
b) Write a short note each on Calgon and Phosphate conditioning of boiler feed water. 5M

OR

14 a) Discuss the Ion exchange process of softening hard water. 5M
b) Differentiate between scales and sludges. 5M

15 a) Explain the principle and working of lead acid storage battery. 5M
b) What is Daniel cell? Give its cell notation, construction and cell reactions. 5M

OR

16 What is a fuel cell and mention its applications? Describe construction and working principle of Hydrogen-Oxygen fuel cell. 10M

17 Write preparation and applications of
a) BUNA-S b) Butyl rubber c) Thiokol rubber (3+3+4)M

OR

18 a) Differentiate between thermoset and thermoplastic resins. 5M
b) Formulate Bakelite and explain uses and properties. 5M

19 Write the basic principle of IR spectroscopy? Give various molecular vibrations in the technique. 10M

OR

20 a) What is electronic spectroscopy? Explain about different types of electronic excitations? 6M
b) Explain (NMR) chemical shifts? 4M