



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 3B2AB

B.Tech II Semester Regular Examinations, September 2021
MATERIAL CHEMISTRY

(CE)

Maximum Marks: 70

Date: 11.09.2021 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 Give an account of LCAO.
- 2 What is the bond order for N_2 , F_2 ?
- 3 Why do you express hardness of water in $CaCO_3$ equivalence?
- 4 What are the various units of hardness give the relationship between them?
- 5 What is standard electrode potential? Give its units.
- 6 Differentiate between primary and secondary cells.
- 7 What is polymer Give any two examples.
- 8 Write the reaction, properties of Nylon 6,6.
- 9 What are Auxochromes and Chromophores? Explain with suitable examples.
- 10 What is Beer's Lambert's law?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) Discuss the Crystal field splitting of d orbitals in octahedral and tetrahedral fields. 5M
b) Draw the molecular orbital diagram O_2 molecule and predict the magnetic behavior of it. 5M
- OR
- 12 a) Explain the band structure of solids. Discuss how the doping influence the conductance of them. 5M
b) Explain the salient features of CFT. 5M
- 13 a) Discuss the Ion exchange process of softening hard water. 5M
b) Write a note on disinfection of water. 5M
- OR
- 14 a) Describe various steps involved in domestic water treatment. 5M
b) Write a short note each on Calgon and Phosphate conditioning of boiler feed water. 5M
- 15 a) What is an Electrochemical cell? Explain the construction and reactions of calomel electrode. 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) Explain the construction, charging and discharging reactions of lithium-ion cell. 5M
b) How pH of a solution is determined by Glass electrode? 5M
- 17 a) Write preparation and applications of
i)–BUNA-S ii) Butyl rubber iii)) Thiokol rubber 5M
- b) Differentiate between thermoset and thermoplastic resins. 5M
- OR
- 18 a) Formulate Bakelite and explain uses and properties. 5M
b) Explain preparation, properties, applications of PVC and TEFLON. 5M
- 19 a) What are various electronic transitions? Give a brief note with suitable example. 5M
b) Explain NMR chemical shifts? 5M
- OR
- 20 a) Write the basic principle of IR spectroscopy? Give various molecular vibrations in the technique. 5M
b) Explain the applications of IR spectroscopy. 5M