



R20 Regulation

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

Subject code: 3B2AJ

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

(ME)

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 the reasons for crystal field splitting of d-orbital's.
- 2 What is meant by bond order? What is the bond order for N₂.
- 3 Which salts are responsible for temporary and permanent hardness of water.
- 4 What is Calgon? Write the reaction involved in Calgon conditioning?
- 5 What is the role of salt bridge in an electrochemical cell?
- 6 What is standard electrode potential? Give its units.
- 7 Why coating of Zn on (iron) Fe is called sacrificial anode, explain.
- 8 Write the Principle involved in pitting corrosion?
- 9 Give composition of LPG and CNG.
- 10 What is calorific value? write Dulong's formula.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) Explain the crystal field splitting of d-orbitals by the ligands in octahedral complex with coordination number 6. 5M
b) Draw neatly, the molecular orbital diagrams of Butadiene and Benzene. 5M
- OR
- 12 a) Draw the molecular orbital diagram O₂ molecule and predict the magnetic behavior of it? 5M
b) Explain the band structure of solids with their conducting behavior. 5M
- 13 a) Discuss the principle involved in the estimation of hardness of water by complexometric titration using EDTA. 5M
b) Discuss the Ion exchange process of softening hard water. 5M
- OR
- 14 a) Explain the process of reverse osmosis. How is it useful in softening of water? 5M
b) Define scales and sludge's. What are the causes, effects and preventive method of these? 5M

- 15 a) What is a fuel cell and mention its applications? Describe construction and working principle of Hydrogen-Oxygen fuel cell. 5M
b) With neat diagram explain the principle, construction and applications of Glass electrode. 5M
- OR
- 16 a) What is a battery? Explain the functioning of Li ion battery. 5M
b) Derive Nernst Equation. 5M
- 17 Explain electrochemical theory of corrosion by taking rusting of iron as an example. 10M
- OR
- 18 Explain the factors effecting the rate of corrosion. 10M
- 19 a) Explain the proximate analysis of coal. 5M
b) Discuss Fischer –Tropsch process for synthetic petrol with neat sketch. 5M
- OR
- 20 a) Explain the determination of calorific value by Junker's Gas calorimeter. 5M
b) Define terms knocking, cetane Number and Octane Number. 5M