



Regulation R20

Subject code:3B2AB

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech IISemester Supplementary Examinations, January 2024

### Material Chemistry

(Civil Engineering)

Maximum Marks: 70

Date:23.01.2024 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=20Marks)		CO	Bloom Tx
1	What is the magnetic nature of 'N <sub>2</sub> ' molecule?	CO4	Level 2
2	What is meant by Doping in case of Semiconductors?	CO4	Level 1
3	What is calgon conditioning?	CO4	Level 3
4	Write the boiling reactions in the removal of temporary hardness?	CO4	Level 4
5	How do you differentiate a Cell from Battery?	CO3	Level 2
6	Define half wave potential.	CO3	Level 1
7	Write any three advantages of Vulcanized rubber.	CO3	Level 3
8	Define Lubricants.	CO3	Level 3
9	What is selection rule in IR spectroscopy?	CO5	Level 3
10	Write any two applications of UV spectroscopy?	CO5	Level 4

#### Part-B

Answer All the following questions. (10M X5=50Marks)				
11	Explain the postulates of Molecular Orbital theory?	10M	CO4	Level2
OR				
12	A. Write the Energy level diagrams of O <sub>2</sub> and HF?	5M	CO3	Level2
	B. Explain the salient features of Crystal field theory.	5M	CO2	
13	A. Explain the ion exchange process in the softening of water?	5M	CO4	Level 3
	B. Define carbonate and non-carbonate hardness of water?	5M		
OR				
14	A. Explain the reasons for scale and sludge formation and write their disadvantages in boilers?	5M	CO4 CO4	Level 2
	B. Write about phosphate conditioning and Calgon conditioning?	5M		

15	A. Explain the construction and working of the calomel electrode?	5M	CO3	Level3
	B. What is electro chemical series? Write its significance and applications?	5M		Level2
OR				
16	A. What are Secondary Batteries? Explain their working with Suitable example?	5M	CO3	Level3
	B. Explain are fuel cells? Mention their applications?	5M	CO3	Level2
17	Describe the preparation, properties and engineering applications of PVC. polymer.	10M	CO4	Level4
OR				
18	A. What are the applications of Refractory materials.	5M	CO2	Level2
	B. What is composition of Portland cement	5M	CO2	Level3
19	A. Explain the molecular vibrations in IR Spectroscopy molecules	5M	CO5	Level4
	B. Explain the NMR application of magnetic resonance imaging (MRI).	5M	CO5	Level3
OR				
20	A. Explain the principle of NMR spectroscopy	5M	CO5	Level4
	B. Write the application UV-visible spectroscopy	5M	CO5	Level3