

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF CHEMISTRY

COURSE: B.Tech SEMESTER-II

SECTIONS - A, B, C, D, E

Total Marks: 60

End Term Exam JUNE-2022

Time: 3 hours

Subject: ENGINEERING CHEMISTRY

Subject Code: CHY-106

IMPORTANT INSTRUCTIONS: Answer all five Units. All Units carry equal marks.

Ques	UNIT 1	Marks
1.	A sample of water contains following impurities: $Mg(HCO_3)_2 = 36.5 \text{ mg/l}$; $CaCl_2 = 55.5 \text{ mg/l}$; $MgSO_4 = 30 \text{ mg/l}$; $CaSO_4 = 68 \text{ mg/l}$. Calculate the quantity of lime and soda (both 90% pure) needed for softening of 10,000 litres of water. [Molecular Weights of $Mg(HCO_3)_2 = 146$; $CaCl_2 = 111$; $MgSO_4 = 120$; $CaSO_4 = 136$]	1 × 03
2.	Write short notes on any two: a. Break Point Chlorination b. Priming and Foaming c. Zeolite Process	2 × 02
3.	What are specifications of drinking water? Which consecutive steps are used to obtain municipal water from raw water (Give name only)? Describe role of Sodium Aluminate and Potash Alum in water purification. OR a. What are specifications of a good disinfectant? b. Write name and chemical formula of any five disinfectants? c. Explain causes and ill effects of Priming and Foaming.	1 × 05
UNIT 2		
1.	A coal sample contains 93% carbon, 6% hydrogen and 1% ash. Data obtained after testing it in Bomb Calorimeter is: Weight of coal burnt = 0.92g Weight of water taken = 550g Water equivalent of bomb and calorimeter = 2200g Rise in temperature = 2.42 °C Fuse wire correction = 10.0 cal Acid correction = 50.0 cal Calculate gross and net calorific value of the coal, assuming the latent heat of condensation of steam as 580 cal/g.	1 × 03
2.	Write short notes on any two: a. Catalytic Cracking b. Difference between Higher and lower calorific value c. Advantages of liquid fuel over solid fuel	2 × 02
3.	Describe the estimation of HCV and LCV in Bomb Calorimeter, its construction, working and calculations with a properly labeled diagram. OR Explain the process of ultimate analysis of coal, determining Carbon, Hydrogen, Nitrogen, Sulphur, Ash and Oxygen.	1 × 05

UNIT 3		
1.	Explain the importance of Consistency for Grease. How it can be determined experimentally?	1 × 03
2.	Write short notes on any two: a. Aniline Point b. Lubricating Emulsions c. Determination of Emulsification Number	2 × 02
3. ✓	Differentiate (point-wise) between Thick and Thin layer mechanisms of Lubricating oils. OR Give detailed classification of liquid lubricants (oils), with suitable examples, advantages and disadvantages.	1 × 05
UNIT 4		
1.	What is meant by fabrication of plastics? Discuss two methods in detail.	1 × 03
2.	Write short notes on any two: a. Why Bakelite is stronger than Polystyrene, Polyvinyl chloride and Polythene. b. Kevlar and Silicon Resin. c. Role of Gypsum in Cement	2 × 02
3.	Describe the method of preparation (with equations) of Portland cement with the labeled diagram of Rotary kiln. OR Discuss the mechanism of free radical, cationic and coordination polymerization.	1 × 05
UNIT 5		
1. ✓	What is the effect of nature of oxide film on metal during corrosion?	1 × 03
2. ✓	Write short notes on any two: a. Mechanism of wet corrosion by oxygen absorption b. Pitting corrosion c. Sacrificial anodic protection method	2 × 02
3. ✓	Discuss how the following factors influences corrosion: (i) Nature of metal, (ii) Nature of corroding environment OR a. What are ingredients of paint? Explain their role. b. Define PVC of a paint along with its significance.	1 × 05 1 × 03 1 × 02