

# Maulana Azad National Institute of Technology, Bhopal

## Department of Chemistry

### B.Tech. (2<sup>nd</sup> Semester)

### End-Term Examination

### Engineering Chemistry (CH 122)

**Duration 3 Hours + 15 Minutes Uploading Time, Max. Marks: 50**

**Important Instructions:**

- There are 5 sections in this paper, attempt questions of each section.*
- Answers must be hand written (not typed) on a blank sheet.*
- Write your name, scholar number, roll number and today's date on the top of every page of the uploaded document.*
- The answer sheet(s) must be uploaded as pdf document on the MS Teams portal within the stipulated time (as mentioned above).*
- Please note, after uploading your file on MS Teams, make sure to turn in the uploaded document.*
- 15 minutes are provided to prepare, and merge and upload the pdf document. Answer sheets uploaded after 12:45 PM will be considered as late submission and no answer sheet will be accepted after 1.00 PM.*

Q.No.	SECTION 1	Marks
1.	Name the steps followed to convert raw water into drinking water. Give importance of each step.	3
2.	Explain following: a. Scale and Sludge formation b. Priming and Foaming	3
3.	What is the difference between Disinfection and Sterilization? Explain 'Break-Point Chlorination' with necessary graph. <b>OR</b> Calculate the amount of Lime (90% pure) and Soda (98% pure) for the treatment of 1 million litres of water containing impurities $\text{Ca}(\text{HCO}_3)_2 = 8.1$ ppm, $\text{Mg}(\text{HCO}_3)_2 = 7.3$ ppm, $\text{CaCl}_2 = 11.1$ ppm and $\text{MgCl}_2 = 19$ ppm [Molecular weights of $\text{Ca}(\text{HCO}_3)_2 = 162$ , $\text{Mg}(\text{HCO}_3)_2 = 146$ , $\text{CaCl}_2 = 111$ and $\text{MgCl}_2 = 95$ ppm]	4
SECTION 2		
1.	What are 'Anti-knocking Agents'? Explain their mechanism by taking suitable example.	3
2.	Calculate the 'Gross Calorific Value' and 'Percentage of Hydrogen' in a coal sample having following composition: C = 90%; O = 3 %; N = 0.5%; S = 0.5% and Ash = 2.5%.	3
3.	Why Lower Calorific Value (LCV) is lesser than Higher Calorific Value (HCV)? Describe the estimation of HCV and LCV in Bomb Calorimeter with suitable equations. <b>OR</b> Discuss the concept of cracking and its importance? Also explain, how 'Thermal Cracking' is different than 'Catalytic Cracking'.	4

<b>SECTION 3</b>		
1.	Why should good lubricating oil possess low Steam Emulsification Number (SEN)?	3
2.	What is Grease? What are the conditions in which usage of Grease is preferred over lubricating oils?	3
3.	Differentiate between Thick and Thin layer mechanisms of Lubrication. <b>OR</b> Give detailed classification of liquid lubricants (oils), with suitable examples.	4
<b>SECTION 4</b>		
1.	Write short notes on (i) Silicones resins (ii) Kevlar	3
2.	What is the necessity of vulcanizing the rubber? Explain it by the help of structure of vulcanized rubber.	3
3.	Describe manufacturing of Portland Cement by Wet process in Rotary Kiln with a well-labelled diagram and reactions taking place at various levels. <b>OR</b> Explain the following, with at least two examples of each: (a) Addition polymerization (b) Condensation polymerization (c) Co- polymerization Also provide detailed mechanism of 'Addition Polymerization'.	4
<b>SECTION 5</b>		
1.	During dry corrosion, how the nature of oxide film effects the corrosion? Explain in detail.	3
2.	Why rapid corrosion of iron (Fe) occurs in dilute nitric acid and not in concentrated nitric acid?	3
3.	During wet corrosion which of the following couple will exhibit severe corrosion of Zn: (a) Zn connected with Fe, (b) Zn connected with Cu, (c) Zn connected with Ni and (d) Zn connected with Sn. Give your answer with proper explanation. <b>OR</b> How relative areas of anode and cathode influence the corrosion? Explain sacrificial anodic protection method.	4