

R16

Code No: 131AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year I Semester Examinations, January/February - 2024

ENGINEERING CHEMISTRY

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What are scales? Write the causes and one preventive method. [2]
- b) What is break point chlorination? Mention its advantages. [3]
- c) What is a concentration cell? Write the Nernst equation for Hydrogen Concentration cell. [2]
- d) For a silver- magnesium voltaic cell, calculate the standard emf (E^0 cell)
 $Mg^{2+} + 2e^- \rightarrow Mg(s); E^0 = -2.37 V$
 $Ag^+ (aq) + e^- \rightarrow Ag(s); E^0 = +0.80 V$ [3]
- e) Distinguish between Thermosets and thermoplastics. [2]
- f) What are elastomers? Write the preparation of BUNA-S rubber. [3]
- g) Write the properties of gaseous fuels. Give examples. [2]
- h) How is the quality of coal analyzed by proximate method? [3]
- i) Define cloud and pour point? Write their significance in lubrication. [2]
- j) What are refractors? Write the classification. [3]

PART - B

(50 Marks)

- 2.a) What is Caustic embrittlement ? How can it be prevented?
- b) Write the specification of potable water? Discuss the disinfection of potable water by Ozonation method?
- c) Calculate the temporary and permanent hardness of 1000 litres of water containing the following impurities per litre $MgCl_2 = 26 \text{ mg}$; $MgSO_4 = 46 \text{ Mg}$; $CaCl_2 = 66 \text{ mg}$, $Ca(HCO_3)_2 = 12.4\text{mg}$; $Mg(HCO_3)_2 = 14.6\text{mg}$. [3+3+4]

OR

- 3.a) Discuss the determination of fluoride ion by Ion selective method.
- b) Explain the Ion-exchange process of softening of hard water. Write its advantages and disadvantages. [5+5]
- 4.a) Write the construction , working and applications of Lead -Acid battery.
- b) What is a Fuel cell? Write the working applications of Methanol - oxygen fuel cell. [5+5]

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OR

- 5.a) Describe the working of lithium ion battery. Discuss its various uses.
b) Explain the construction of calomel Electrode. [5+5]
- 6.a) What are Intrinsic conducting polymers? Why are they doped? Write the advantages of doped ICP polymers.
b) What are Fibers? How Fiber reinforced plastics are different from fibers explain? [5+5]

OR

- 7.a) Write the preparation, properties and applications of Bakelite and Thiokol rubber.
b) What is compounding of Plastics? Explain the injection and compression molding methods in detail. [5+5]
- 8.a) Write the Proximate method of coal analysis and mention its significance?
b) What is cracking? Illustrate the moving bed catalytic cracking with a neat diagram.[5+5]

OR

- 9.a) Describe the synthesis of petrol by Fischer-Tropsch's process?
b) The percentage composition of a sample of a coal is found to contain C=76%, H₂=5.2%, O₂=12.8%, N₂=2.7%, S=2.2% and ash =1.6%. Calculate the minimum weight required for the complete combustion of 1kg of coal. [5+5]
10. Explain the thin and thick film lubrication mechanism in detail. [10]

OR

- 11.a) What is Portland cement? Write the reactions involved in setting and hardening of Cement?
b) What is a composite material? Write the classification and applications of it. [5+5]

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