Bachelor of Engineering (IEE) Exam. 2018 **EX/IEBE/Chem/T/123/2018(OLD)**

(1st Year, 2nd Semester)

Chemistry – II (Old Syllabus)

Time : Three hours Full Marks : 100

Part-I (Inorganic Chemistry)

Use separate Answer-Script from each part.

Answer any four Questions 12 x 4

2 Marks for neatness

1. Describe froth flotation method of the concentration of ore. How do you extract Copper from its ore? Write chemical reactions. Estimate Copper in a sample of ore. Give detail reactions.

2. What is corrosion? What is the mechanism of rusting of Iron? How do you prevent corrosion? Give detail procedure.

3. What is steel? How does strength and flexibility of steel change? Determine Fe and Mn in steel. What are the advantages of nonferrous alloy over ferrous alloy?

4. (a) Write the name of ore of Gold. Extract gold from e-waste. Write chemical reactions.
   (b) Write down the differences between Wrought Iron, Pig Iron and Cast Iron. Mention their uses.

5. Write notes on (any three) :

   (a) Magnetic separation process
   (b) Solvent Extraction
   (c) Pyrometallurgy
   (d) Hydrometallurgy

6. (a)How does negative catalyst influence the chemical reaction? Write the role of H_3PO_4 in the preservation of Hydrogen peroxide.
   (b) Write a short note on : Zeigler-Natta Catalysis and Wilkinson Catalysis

JADAVPUR UNIVERSITY

B. E. Inst. & Elec. Engg. 1st year 2nd Semester Examination – 2018(OLD)

Subject: Chemistry – II: Physical (OLD) **Marks – 25**

Part: II Group: A

Use Separate Answer scripts for each group

[Answer any five]

1. What is optical activity? What is the cause behind a molecule to be optically active? On which factors specific rotation of an optically active molecule depends? 2+1+2

2. How can you distinguish between permanent and temporary hardness of water? How can you estimate total hardness of water? 2½+2½

3. What ions do attribute to alkalinity in water? Can those ions coexist all together? – Give reason. Water gas is superior to producer gas - Why? 1+2+2

4. Explain the terms 'binding energy' and 'mass defect'. 5

5. Write notes on nuclear fission and nuclear fusion. Give a comparison between chemical fuel and nuclear fuel. 3+2

6. Define pH of a solution. Calculate the pH of i) 0.01N HCl, ii) 0.01N NaOH and iii) 0.01N AcOH (Given pKa = 4.75). 1+1+1+2

7. What is corrosion? What do you mean by dry and wet metallic corrosion? 2+3

B. INS. & ELEC. ENGG. EXAM, 2018 (OLD)

(1^{ST} Year, 2^{nd} Semester)

Chemistry – II

PART – II

GROUP – B (ORGANIC CHEMISTRY) = 25 MARKS

Answer all questions

1. a) Anisole ($C_6H_5OCH_3$) reacts with a mixture of concentrated nitric acid and concentrated sulphuric acid at low temperature to produce 4-nitroanisole as the major product. Account for this observation with plausible mechanism. 5

   b) Describe the synthesis of sulphanilamide from acetanilide (only mention the steps with reagents, no mechanism is needed). 4

   c) Discuss the chemical steps with mechanism for the conversion of cumene (isopropylbenzene) to phenol. 4

   d) Give a brief account of the cationic polymerization of styrene with proper emphasis to the mechanistic aspects. 5

   e) State with example what you mean by the terms "prepolymer" and "hardening agents" and mention the reaction between them. 2+2+3