

**FACULTY OF ENGINEERING AND INFORMATICS****BE II-Semester (Main & Backlog) Examination, May/June 2018****Subject: Engineering Chemistry-II****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A, & any FIVE Questions from Part-B.****PART-A (10x2=20 Marks)**

1. The Resistance of decinormal solution of a salt occupying a volume between two platinum electrodes 1.80 cm apart and  $5.4 \text{ cm}^2$  in area was found to be 32 ohms. Calculate the equivalent conductance of the solution.
2. Represent Quinhydrone Electrode and Write the electrodic reaction for the reduction process and mention the S.R.P of the electrode.
3. What are main advantages of alkaline battery over dry battery?
4. Explain Photovoltaic Cell.
5. What is Pilling-Bedworth Rule? Explain.
6. Explain hot dipping method of metallic coating.
7. How do you calculate the calorific value of a fuel by Dulong's Formula?
8. Write the composition of CNG and mention its uses.
9. What are the constituents of composites? Give one example of a composite material
10. Give any two examples of clean technology.

**PART-B (5x10=50 Marks)**

11. a) The equivalent conductivities of HCl, NaCl and  $\text{CH}_3\text{COONa}$  at infinite dilutions are 426.16, 126.45 and  $91.0 \text{ S-cm}^2 \text{ eq}^{-1}$  respectively. Calculate the equivalent conductivity of acetic acid at infinite dilution. If the degree of dissociation of 0.1N acetic acid is 0.001, find the equivalent conductance at this concentration of acetic acid.  
b) What are the different types of Potentiometric Titration? Explain their uses.
12. a) Describe the Working of  $\text{CH}_3\text{OH-O}_2$  fuel cell.  
b) Explain why the lead acid storage cell can be recharged.
13. a) Explain (i) Water line Corrosion and (ii) Pitting Corrosion.  
b) What is paint? Explain the constituent of paint and their functions.
14. a) Define the term cracking. Explain Catalytic Cracking by moving bed method.  
b) What are the sources of a bio-diesel? Explain the concept of transesterification.
15. a) Write the applications of Liquid Crystals.  
b) Discuss the principles of green chemistry.
16. a) Explain Kohlrausch Law and discuss any two applications of it.  
b) Discuss in detail about  $\text{H}_2\text{-O}_2$  fuel cell.
17. a) What are corrosion inhibitors? Explain Cathodic inhibitors.  
b) A sample of coal was found to have the following percentage composition:

C=75%; H=5.2%; O=12.1%; N=3.2% and ash=4.5%

Calculate the minimum air required for complete combustion of 1kg of coal.

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**FACULTY OF ENGINEERING**  
**BE I-Semester (Supplementary) Examination, May / June 2018**

**Subject: Engineering Chemistry-I**

**Max. Marks: 70**

**Time: 3 Hours**

**Note: Answer all questions from Part-A, & any FIVE Questions from Part-B.**

**PART-A (20 Marks)**

1. Explain the term State function. Give Examples. [2]
2. Give the Physical Significance of Entropy. [2]
3. What is safety Fuse? What is its purpose? [2]
4. Explain Pattinson's process of Desilverization of Lead. [2]
5. Define the terms (i) Priming (ii) Foaming. [2]
6. Write the specifications of potable water. [2]
7. Give the reaction for the preparation of Nylon 6.6 from its Monomers. [2]
8. What are conducting Polymers? Give examples. [2]
9. Write about Viscosity Index. [2]
10. Explain the property of Thermal Spalling in Refractories. [2]

**PART-B (50 Marks)**

11. (a) State First Law of Thermodynamics in its various forms. Derive the expression for maximum work done in an Isothermal reversible expansion of an ideal gas. [5]  
 (b) A Carnot cycle working between 0°C and 100°C takes up 840 Joules from the high temperature reservoir. Calculate the work done, the heat rejected and efficiency? [5]
12. (a) State Phase rule and explain the terms involved in it [5]  
 (b) Explain the Phase diagram of water system. [5]
13. (a) Write the preparation, properties and uses of (i) Bakelite (ii) Buna-S. [5]  
 (b) Distinguish between Addition and Condensation Polymerization. [5]
14. (a) What is Reverse Osmosis? How is sea water purified by using this technique? [5]  
 (b) 100ml of raw water sample on titration with  $\frac{N}{50} H_2SO_4$  required 12.4ml of acid to Phenolphthalein end point, 15.2ml of acid to methyl orange end point. Describe the type and extent of alkalinity present in the water sample. [5]
15. (a) What are Solid Lubricants? Write short note on Graphite and Molybdenum disulphide. [5]  
 (b) What is refractory material? What are the requirements of good refractory material? [5]
16. (a) Explain the terms free Energy & Work function. Discuss their significance. [5]  
 (b) Illustrate Break Point Chlorination. [5]
17. (a) Write a note extrinsic conducting Polymers. [5]  
 (b) Explain the terms (i) Refractoriness (ii) Hydrodynamic lubrication. [5]

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19.06.2018

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## FACULTY OF ENGINEERING

B.E. I-Year (Backlog) Examination, May / June 2018

Subject: Engineering Chemistry

Max. Marks: 75

Time: 3 Hours

Note: Answer All Questions From Part – A, & any FIVE Questions From Part – B.

### PART-A (25 Marks)

1. Define standard electrode potential. Find the EMF of the following cell:  
 $Zn / Zn^{2+} (1M) // Cu^{2+} (1M) / Cu$  given  $E^0(Zn^{2+} / Zn) = -0.76V$  &  $E^0(Cu^{2+} / Cu) = 0.34V$ . 3
2. Differentiate between primary and secondary batteries 3
3. What is reverse osmosis? 3
4. What is paint? What are the main constituents of paint? 2
5. Differentiate between homopolymer and co – polymer. 2
6. Define a composite material 2
7. Write the applications of conducting polymers. 3
8. Distinguish between Gross and Net calorific Value of a fuel. 2
9. What is trans – esterification? 2
10. State Phase Rule. 2

### PART-B (50 Marks)

11. a) What are reference electrodes? Describe the construction of Calomel electrode. 6  
 b) Describe the Ni-Cd battery with charging and discharging reactions. 4
12. a) What is corrosion? Explain the factors effecting the rate of corrosion. 5  
 b) 50ml of a sample water consumed 15 ml of 0.01M EDTA before boiling and 5 ml. of the same EDTA after boiling. Calculate the total, permanent and temporary hardness. 4
13. a) Distinguish between thermoplastic and thermo- setting polymers. 6  
 b) Describe the method of preparation, properties and applications of the following:  
 (i) Bakelite (ii) Buna - S 6
14. a) Explain the determination of calorific value of gaseous fuel by Junker's calorimeter 6  
 b) Explain the proximate analysis of coal What is its significance? 4
15. a) What is lubrication? Explain the mechanism of hydrodynamic lubrication 5  
 b) Explain Pb-Ag system on the basis of phase-rule. 6
16. a) Write a note on conducto metric titrations. 4  
 b) Explain the principles of green chemistry
17. a) Differentiate between low temperature and high temperature carbonization of coal. 3  
 b) Write a note on  
 (i) Liquid crystals (ii) Lithium ion cells (iii) Acid Value 7

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