

Code No: 111AE**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year Examinations, October/November - 2016****ENGINEERING CHEMISTRY****(Common to all Branches)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART- A**(25 Marks)**

- 1.a) The emf of a concentration cell gradually decreases. Why? [2]
- b) What is the role of salt bridge in an electrolytic cell? [3]
- c) Why do the Galvanised utensils not used for storage of food stuffs? [2]
- d) Why the rubber becomes stiff on stretching? [3]
- e) Write the preparation and properties of Bakelite. [2]
- f) What do you understand by Reverse osmosis? [3]
- g) Define Octane and Cetane numbers. [2]
- h) Give the construction and applications of hydrogen-oxygen fuel cell. [3]
- i) What is Tyndall effect? Explain with suitable example. [2]
- j) What is annealing? Why steel is subjected to annealing? [3]

PART-B**(50 Marks)**

- 2.a) Discuss various factors influencing the rate of corrosion depending on the nature of metal.
- b) Explain the principle involved in electroplating. Discuss the procedure with special reference to copper plating. [5+5]

OR

- 3.a) What is a reference electrode? Explain the construction and working of calomel electrode.
- b) Calculate the emf of the following cell.
 $\text{Zn/Zn}^{+2}_{(0.2\text{M})} // \text{Cu}^{+2}_{(1.5\text{M})} / \text{Cu}$ at 25°C . Given that $E^{\circ}_{\text{Zn}^{+2}/\text{Zn}} = -0.76$ volts and $E^{\circ}_{\text{Cu}^{+2}/\text{Cu}} = 0.34$ volts. [5+5]

- 4.a) What are conducting polymers? Write the structures and applications of polyacetylene and polyaniline.
- b) Discuss the preparation of nano substances by sol-gel and chemical vapour deposition methods. [5+5]

OR

- 5.a) What is a Refractory material? Discuss various characteristics of a good refractory. www.ManaResults.co.in
- b) Write the preparation, properties and applications of Nylon 6:6 and Dacron. [5+5]

- 6.a) Describe the Hot lime-soda process for the softening of hard water with suitable chemical reactions involved.
- b) A water sample has given the following results on analysis. $\text{Ca}^{+2}=80$ mg/lit; $\text{Mg}^{+2}=48$ mg/lit; $\text{CO}_2=48$ mg/lit; $\text{HCO}_3=61$ mg/lit and $\text{HCl}=36.5$ mg/lit. Calculate the quantities of lime (90% pure) and soda (95%) required for softening of 3000 litres of water sample. [5+5]

OR

- 7.a) What is potable water? What are the various parameters for the quality of water? Explain their significance.
- b) What is priming and foaming? How is it caused and how do you prevent it in boilers. [5+5]
- 8.a) What is meant by cracking of petroleum? Explain fixed bed catalytic cracking method for obtaining gasoline.
- b) A coal sample found to have the following composition on analysis. C=80%; H=5%; O=5%; S=2% and N=2% and ash=6%. Calculate the minimum amount of air required for the complete combustion of 1Kg of coal. Also calculate the percentage composition of dry products by weight. [5+5]

OR

- 9.a) Discuss the characteristics and applications of LPG and CNG.
- b) A coal sample that used in a boiler shown the composition as follows: C=70%; H=10%; S=3%, O=5%; N=5% and ash=7%. Calculate the gross and net calorific values for 1 Kg of coal. [5+5]
- 10.a) What is condensed phase rule? Discuss the application of phase rule to the Lead-silver system.
- b) What are the characteristics of colloids? Discuss their industrial applications. [5+5]

OR

- 11.a) What are different terms involved in the phase rule. Explain them with suitable examples.
- b) Discuss with the help of neat sketch, the phase diagram of Fe-C system. [5+5]

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