Code No: 111AE

R13

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 hydrogem-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.
$Zn/Zn^{+2}_{(0.2M)}//Cu^{+2}_{(1.5\ M)}/Cu$ at 25^0C. Given that $E^0_{Zn+2/Zn}$= -0.76 volts and $E^0_{Cu+2/Cu}$=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.

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. Ca^{+2}=80 mg/lit; Mg^{+2}=48 mg/lit; CO_2=48 mg/lit; HCO^-_3=61 mg/lit and 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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