Code No: 111AE

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech I Year Examinations, December-2014/January-2015
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, c as sub questions.

Part- A **(25 Marks)**

1.a)	Define specific conductance and mention its units.	[2m]
b)	Explain Chemical theory of corrosion.	[3m]
c)	Write the preparation and two applications of Thiokol rubber.	[2m]
d)	What are the Characteristics of a good lubricant?	[3m]
e)	What is the inter relation of units of Hardness?	[2m]
f)	Write the specifications of potable water.	[3m]
g)	Why TEL is added to internal combustion engine? Explain.	[2m]
h)	What is CNG and LPG? Write its composition.	[3m]
i)	Identity the number of phases and components involved in the dissociation of calcium carbonate.	[2m]
j)	What is Brownian movement? Explain.	[3m]

Part-B **(50 Marks)**

2.a) What are batteries? Explain the charging and discharging of lead acid battery.
b) Define Corrosion. Discuss the mechanism of Wet corrosion.

OR

3.a) What is electrochemical series? Give its applications.
b) What is organic paint? Write its constituents and functions.

4.a) Write the preparation, properties and engineering applications of Bakelite.
b) Write the chemical reactions involved in setting and hardening of portland cement.

OR

5.a) What is natural rubber? Write its properties and Vulcanisation.
b) What are Conducting polymers? Write its preparation and applications.

6.a) What is the Principle of EDTA method ? Describe the estimation of hardness of water by EDTA method.

b) Calculate the quantity of lime and soda required for softening 60,000 litres of water containing

CO_2 = 20mg/L, $Ca(HCO_3)_2$ = 20mg/L; HCl = 8.4mg/L;
$Mg(HCO_3)_2$ = 25mg/L; $Al_2(SO_4)_3$ = 40mg/L; $MgCl_2$ = 12mg/L

OR

7.a) What is breakpoint chlorination? Explain its significance.

b) Write the chemical reactions involved in lime soda process.

c) A water sample on analysis gives the following data Ca^{+2} = 20ppm, mg^{2+} = 25ppm, CO_2 = 30ppm, HCO_3^- = 150ppm, K^+ 10ppm. Calculate temporary and permanent hardness.

8.a) What is Calorific value? How do you determine Calorific value by Junker's gas Calorimeter?

b) Explain the analysis of flue gas by Orsat's apparatus.

OR

9.a) Explain the Proximate analysis of coal and Write its significance.

b) Calculate Gross and Net Calorific value of a gaseous fuel from the following data. Volume of gaseous fuel burnt at STD is $0.09m^3$. Weight of Water used for cooling 25kg. Temperature of inlet water is 25^0C, temperature of outlet H_2O is 30^0C. Weight of water produced by steam condensation is 0.02kg. Latent heat of steam is 587kcal/kg.

10.a) What is phase rule? Draw and explain phase diagram for one component system.

b) Explain Langmuir adsorption isotherm and write the applications of adsorption.

OR

11.a) Explain the terms hardening, annealing and normalization from iron-Carbon phase diagram.

b) What is Colloid? Explain the classification and industrial applications of Colloids.

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