JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, May - 2016
ENGINEERING CHEMISTRY
(Common to CE, EEE, ME, ECE, CSE, EIE, BME, IT, MCT, MMT, AE, AME, MIE, PTE, CEE, AGE)

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)	Differentiate between primary and secondary cells.	[2]
b)	Define specific conductance, equivalent conductance and mention its units.	[3]
c)	Mention the applications of Nano materials.	[2]
d)	Give the structure of monomeric units of Nylon 6:6.	[3]
e)	Define temporary and permanent hardness of water.	[2]
f)	Discuss the disinfection of water by chlorination.	[3]
g)	Define octane and cetane number of fuel.	[2]
h)	Define calorific value of fuel and give the relation between H.C.V and L.C.V of fuel.	[3]
i)	What are the applications of colloids in industry?	[2]
j)	Give a brief note on 'Micelles'.	[3]

PART-B
                                                              (50 Marks)

2.a)	Derive Nernst equation for single electrode potential.	
b)	What is meant by electrochemical series? Mention its applications.	
c)	Explain the determination of pH of the solution using glass electrode.	[4+2+4]

OR

3.a)	Define Corrosion. Explain the mechanism involved in absorption of oxygen type corrosion.	
b)	Write notes on Methanol-oxygen fuel cell.	
c)	Describe electroplating process.	[4+3+3]

4.a)	Write the preparation, properties and uses of Bakelite.	
b)	Explain the fabrication of plastics by injection moulding method.	
c)	What are the applications of conducting polymers?	[5+3+2]

OR

5.a)	What are the drawbacks of raw rubber? Explain the vulcanization of rubber.	
b)	Define lubricant. Explain extreme pressure lubrication.	
c)	What are the characteristics of good refractory?	[5+3+2]

6.a) Explain the determination of total hardness of water by EDTA method.
  b) Write notes on caustic embrittlement.
  c) What are the specifications of potable water?   [5+3+2]

OR

7.a) Explain Ion exchange process in softening of water.
  b) 50ml of standard hard water containing 1 mg of pure $CaCO_3$ per ml consumed 20ml of EDTA. 50ml of water sample consumed 25ml of same EDTA solution using Eriochrome Black-T indicator. Calculate the total hardness of water sample in ppm and in degree French.   [6+4]

8.a) Explain the determination of calorific value of fuel by Junker's gas calorimeter.
  b) Discuss the synthesis of petrol by Bergius process.   [6+4]

OR

9.a) Describe the analysis of flue gases by ORSAT'S apparatus.
  b) Calculate the quantity of air required for the complete combustion of 1kg of the fuel having the following composition C=74%, H=5%, S=1%, O_2=5%, Moisture=7% and Ash=6%.   [6+4]

10.a) What is Phase rule? Define and explain the various terms involved in phase rule with an example.
  b) Write brief notes on optical properties of colloids.
  c) Give an account of applications of adsorption.   [5+3+2]

OR

11.a) Explain the application of phase rule to one component system in detail.
  b) Write a note on classification of adsorption.
  c) Discuss the electrical properties of colloidal system.   [5+2+3]

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