R13

Code No: 111AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, June - 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) Why efficiency of fuel-cells is greater than other energy devices. [2M]
b) Write the chemical reactions involved in Methanol oxygen cell. [3M]
c) Write a short note on Injection moulding. [2M]
d) Give the classification of refractories. [3M]
e) Write the significance for determination of flash and fire point. [2M]
f) Explain the cause of caustic embrittlement in boilers and suggest a remedy. [3M]
g) Define Knocking and Cracking. [2M]
h) Write characteristics of a good fuel. [3M]
i) Write the limitation of Freundlich Adsorption Isotherm. [2M]
j) Write the advantages of LPG, CNG and Natural gas. [3M]

PART-B **(50 Marks)**

2.a) Explain construction and working of Hydrogen-Oxygen fuel cell.
b) Write a note on Lithium cell. [5+5]

OR

3.a) What is electrochemical corrosion? Discuss the mechanism of this process.
b) What are the different methods employed to control corrosion? Explain Cathodic protection method in detail. [5+5]

4.a) What is condensation polymerization? Write the preparation, properties and application of Nylon-6, 6 and Bakelite.
b) Explain differences between thermoplastics and thermosets. [6+4]

OR

5.a) Write the differences between fluid film and boundary lubrication mechanism.
b) Explain the determination of flash and fire point. [5+5]

6.a) Write a note on Boiler corrosion.
b) Describe Ion exchange process of softening water. [5+5]

OR

7.a) Calculate the quantity of lime (76% pure) and soda (82% pure) required for softening 5000 liters of water containing the following ions.
Ca^{+2} = 80 ppm; Mg^{+2}=72 ppm; HCO_3^-=122 ppm; dissolved CO_2=22 ppm.
b) Explain break point of Chlorination. [6+4]

8.a) What is the significance of the gas analysis? Give reasons why the CO_2 is absorbed first and then O_2 and last CO in the Orsat apparatus.

b) What is Cracking? Describe the process of fixed bed Catalytic cracking. [5+5]

OR

9.a) The percentage composition of coal is C=89%, O=4% N=0.5% S=1%. Calculate HCV and % of Hydrogen of the coal sample.LCV of the coal is 587 K.Cal/Kg.

b) Explain refining of petroleum. [3+7]

10.a) Discuss the applications of colloids.

b) Describe phase diagram of the water system. [5+5]

OR

11.a) Define Hardening, Annealing and condensed phase rule.

b) Describe the electrical and optical properties of colloids with suitable example. [4+6]

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