Code No: 132AG **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May - 2019
ENGINEERING CHEMISTRY
(Common to CE, ME, MCT, MMT, AE, PTM, CEE, MSNT)

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)	What are the permanent hardness causing substances?	[2]
b)	How Caustic embrittlement can be prevented?	[3]
c)	Differentiate Primary and Secondary battery.	[2]
d)	Write anode and cathode reactions of MeOH oxygen cell.	[3]
e)	Differentiate plastic and resin.	[2]
f)	Why natural rubber should be vulcanized?	[3]
g)	What do you understand by cracking?	[2]
h)	What is the significance of proximate analysis?	[3]
i)	How composites are classified? Give examples.	[2]
j)	List characteristics of good refractory material.	[3]

PART-B

(50 Marks)

2.a) Write in detail an account on Scale and Sludge formation in boilers.
b) One litre of water from an underground reservoir in Tirupathi Town in Andhra Pradesh showed the following analysis for its contents:
$Mg(HCO_3)_2$=42mg; $Ca(HCO_3)_2$=146mg; $CaCl_2$=71mg; NaOH=40mg; $MgSO_4$=48mg; organic impurities = 100mg; Calculate temporary, permanent and total hardness of this sample of water in degree French and Clark. [5+5]

OR

3.a) Why is Ion exchange process preferred for the softening of water for use in boilers?
b) Write a note on disinfection of water. [5+5]

4.a) How pH of a solution is determined by Glass electrode? Discuss.
b) Describe the charging and discharging process of Lithium ion cell. [5+5]

OR

5.a) Give a brief account on concentration cell.
b) Describe a Lead acid battery with cell reactions. [5+5]

6.a) Give preparation, properties and applications of Nylon and Buna-s-rubber.
b) Describe the compression moulding process. [5+5]

OR

7.a) Describe the preparation, properties and applications of Polylactic acid and poly vinyl alcohol.
b) Differentiate between thermoplastic polymers and thermosetting polymers. [5+5]

8.a) Give an account on moving bed catalytic cracking.
b) Illustrate composition and uses of Natural gas and LPG. [5+5]

OR

9.a) Explain the analysis of coal by ultimate analysis.
b) A coal sample having the following composition.
C=88%, O=5% S=0.5%, N=0.5% and ash=2.5%.
The net calorific value was found to be 500.5kcal/kg. Calculate percentage of hydrogen and high calorific value of the fuel. [5+5]

10.a) Describe any one mechanism of lubrication.
b) Write the chemical reactions involved in setting and hardening of cement. [5+5]

OR

11.a) What do you understand by refractoriness under load? Explain.
b) Explain Viscosity of lubricants and its determination. [5+5]

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