(Please write your Exam Roll No.) Exam Roll No. 41096202718

END TERM EXAMINATION

FIRST SEMESTER [B.TECH] NOVEMBER-DECEMBER 2018

Paper Code: ETCH 113 **Subject: Applied Chemistry**

Time : 3 Hours **Maximum Marks :75**

Note: Attempt any five questions including Q. No. 1 which is compulsory. Select one question from each unit.

Q1. a) What is a fuel? State the features of a good fuel. **(5x5=25)**

b) Draw the phase diagram of water. Explain the terms-critical point and triple point.

c) What is a catalyst? Describe its characteristics features.

d) Describe what is water softening by internal treatment.

e) Discuss in detail the factors influencing corrosion.

Unit-I

Q2. a) What is cracking? Differentiate between thermal & catalytic cracking. **(6.5)**

b) Explain knocking and anti knocking agents. What is cetane and octane number of a fuel? **(6)**

Q3. a) Draw a Labelled diagram and explain the working of Otto-Hoffmann's by-product oven for the manufacturing of metallurgical coke. **(6.5)**

b) The composition by weight of a coal sample is C=82% , H= 6%, O= 6%, S=1%, N= 2% and ash=3%.
Calculate the minimum air required for complete combustion of 1kg of coal. **(6)**

Unit-II

Q4. a) State Gibb's Phase rule. Also, find the degree of freedom of the following systems:

i) $NH_4Cl(s)$ $NH_3(g) + HCl(g)$
ii) Aquous solution of NaCl and Na_2CO_3.
iii) Water (liquid) water (vapour). **(6)**

b) Draw the cooling curve of a pure substance and clearly identify the eutectic point in it. **(6.5)**

Q5. a) Differentiate between congruent and Incongruent melting compound by giving suitable examples. **(6)**

b) Draw and explain the phase diagram of Lead-Silver System. **(6.5)**

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Unit-III

Q6. a) Describe in detail the EDTA method of determining the hardness of water. **(6.5)**

b) Explain the use of catalyst in Industrially important processes. Give examples. **(6)**

Q7. a) Discuss the lime-soda process used for external treatment for water softening. **(6.5)**

b) A water sample has the following dissolved salts (mg/L). Calculate its temporary and permanent hardness in ppm of $CaCO_3$.
$Mg(HCO_3)_2$= 80, $MgSO_4$= 110, $CaSO_4$=85, Mg Cl_2=94, $CaCl_2$=84, NaCl=50. **(6)**

Unit-IV

Q8. a) Explain what is Soil Corrosion? How it is affecting the fertility of soil? How it can be prevented? **(6.5)**

b) What is Cathodic protection and sacrificial Anodic protection? **(6)**

Q9. What happens and why?

a) A piece of iron is kept in Saline water. **(3)**

b) A steel pipe is connected to copper plumbing. **(3)**

c) A zinc plate is fixed below the ship. **(3)**

d) Iron next/ washers/ valves are cleaned and packed with zinc dust and rotated. **(3.5)**

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