

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) $\text{NH}_4\text{Cl(s)} \rightleftharpoons \text{NH}_3\text{(g)} + \text{HCl(g)}$
ii) Aqueous 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 .
 $\text{Mg}(\text{HCO}_3)_2 = 80$, $\text{MgSO}_4 = 110$, $\text{CaSO}_4 = 85$, $\text{MgCl}_2 = 94$, $\text{CaCl}_2 = 84$, $\text{NaCl} = 50$. (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)
