(Please write your Exam Roll No.) Exam Roll No. 8521040361?

END TERM EXAMINATION

FIRST SEMESTER [B.TECH] DECEMBER 2017

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. Assume suitable missing data, if any.

Q1. a) Define: i) Octane and Cetane number (3x7=21)
ii) Synthetic Petrol and Power alcohol.

b) Distinguish between softening and demineralization of water with chemical equations.

c) Name the disinfecting agents of water.

d) What is corrosion? How is it different from erosion?

e) Explain the following terms: i) Tinning ii) Metal cladding iii) Electroplating

f) Define: i) Gibb's Phase rule ii) Degree of freedom

g) Draw the phase diagram of water and explain the significance of triple point.

h) Name the catalyst of the following reactions: (4)

i) Hydrogenation of vegetable oils Pt

ii) Homogeneous catalysis of alkenes Ni / Pt

iii) Zeigler- Natta Polymerisation $TiCl_3$

iv) Haber's Process Fe

Unit-I

Q2. a) Explain the working of Bomb Calorimeter in detail with neat diagram. (6)

b) Calculate the GCV and NCV of a gaseous fuel from the following data: -

Volume gaseous fuel burnt at STP = 0.1 m^3 weight of water used for cooling= 26 kg

Temperature of inlet = 25°C

Temperature of outlet = 35°C

Weight of water produced by steam condensation= 0.02 kg

Latent heat of steam= 587 kCal/kg. (6.5)

Q3. a) Describe the method of a carbonization of coal to yield coke. (6)

b) Distinguish between proximate and ultimate analysis. Calculate the weight and volume of air required for condensation of 1 kg of carbon. (6.5)

Unit-II

Q4. a) Explain Heterogeneous catalysis with examples. Discuss the elementary steps of heterogeneous catalysis according to Langmuir- Hinshelwood mechanism. (6)

b) Derive the Michaelis-Menten equation for an enzyme catalysed reaction. Discuss the role of inhibilors in catalysis. (6.5)

P.T.O.

Q5. a) What are phase diagrams? Draw the cooling curves for the following:-
i) Pure substance in molten state.
ii) Molten mixture of two solids. **(6.5)**

b) Also, define the eutectic point.
Draw and explain the phase diagram of Pb-Ag system. **(6)**

Unit-III

Q6. a) Discuss the lime-soda process used for removal of calcium and magnesium hardness. **(6.5)**

b) Calculate the amount of lime required for softening of 6000 L of hard water containing 90 ppm of $MgSO_4$. **(6)**

Q7. a) What is alkalinity of water and explain a method for its determination using methyl orange and phenolphthalein indicators. **(6.5)**

b) 100 ml of a sample required 10 ml of $\frac{N}{50}$ Hcl using methyl organge as indicator. Another 100 ml of sample required 4 ml of $\frac{N}{50}$ Hcl using phenolphthalein as indicator. Express the alkalinities in terms of mg of $CaCO_3$ per litre. **(6)**

Unit-IV

Q8. a) What are factors influencing corrosion? **(6.5)**

b) Define the following terms: **(6)**
i) Cathodic Protection
ii) Galvanization
iii) Sheradising

Q9. a) Discuss the mechanism of the following: **(6)**
i) Oxidation Corrosion
ii) Electrochemical or wet corrosion

b) Discuss in detail the protective measures used against corrosion. **(6.5)**

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