END TERM EXAMINATION

FIRST SEMESTER [B.TECH] MARCH 2023

Paper Code: ETCH-113	Subject: Applied Chemistry
Time: 3 Hours	Maximum Marks: 75

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit. Assume missing data.

Q1   Attempt **all** questions:-   **(2.5x10=25)**
(a) Give the condition when GCV = NCV.
(b) Differentiate between positive and negative catalysis with suitable examples?
(c) Hydrocarbons that are poor gasoline fuels are quite good diesel fuels. Explain.
(d) Distinguish between Homogeneous and Heterogeneous catalysis?
(e) A eutectic mixture has a definite composition and a sharp melting point, yet it is not a compound. Justify.
(f) What do you understand by calcium carbonate equivalent?
(g) Explain dry corrosion with an example.
(h) What is the difference between Triple point & Eutectic point.
(i) An iron rod partly immersed in water undergoes corrosion near waterline. Give reasons.
(j) Write short note on caustic embrittlement?

UNIT-I

Q2   (a) With the help of a neat diagram explain how the calorific value of fuel can be determined by Boy's Gas calorimeter.   **(6.5)**
(b) What are the advantages of catalytic cracking over thermal cracking? **(6)**

Q3   Explain the following:-
(a) The Knocking tendency of petrol or diesel oil can be predicted on the basis of the nature and molecular structure of its constituent compounds.   **(8)**
(b) All coking coals are caking but all caking coals are not coking.   **(4.5)**

UNIT-II

Q4   (a) Compare carbonate conditioning and phosphate conditioning of boiler water with respect to the principles involved, advantages and limitations.   **(6.5)**
(b) 15g of $CaCO_3$ was dissolved in HCl and the solution was made to one liter with distilled water. 100 ml of the above solution required 25 ml of EDTA solution on titration. 100 ml of the hard water sample required 18 ml of the same EDTA solution on titration. After boiling 100 ml of this water, cooling, Filtering and then Titration required 12 ml of EDTA solution. Calculate the temporary and permanent hardness of water.   **(6)**

Q5   (a) Describe ion-exchange method for water softening. Give chemical equations wherever necessary. Report its merits over other processes. **(6.5)**
(b) What is breakpoint chlorination? Explain with the graph.   **(6)**

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UNIT-III

Q6 (a) Explain the process of desilverization of lead & its application. **(6.5)**
     (b) Give the mechanism and kinetics of acid catalysis. **(6)**

Q7 (a) Explain the term triple point, metastable point and critical point by falling the example of Water system. **(6.5)**
     (b) What are enzymes? Derive the Michaelis- Menten equation for the rate of enzyme- catalyzed reactions. **(6)**

UNIT-IV

Q8 (a) Explain the mechanism of rust formation in: **(6)**
       (i) Acid and (ii) neutral
     (b) Differentiate between Dry & wet corrosion by giving suitable example. **(6.5)**

Q9 (a) Why amalgamated zinc reacts slowly with dilute acids? Explain its mechanism in detail. **(3)**
     (b) Write short note on soil corrosion and its control. **(3)**
     (c) What are the protective measures against corrosion? Describe the corrosion control methods. **(6.5)**

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