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**TCH-201**

**B. Tech. (Second Semester)**

**End Semester EXAMINATION, 2017**

**(All Branches)**

**ENGINEERING CHEMISTRY**

*Time : Three Hours ]*

*[ Maximum Marks : 100*

**Note :** (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mention against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What are Zeolites ? How do they function in removing hardness of water ?

(b) Derive an expression for the rate constant of a Second order reaction. Give its units.

(c) Describe different types of reaction intermediates.

2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Describe principle and applications of IR spectroscopy.

(b) A completely exhausted Zeolite softener requires 120 Litres of NaCl solution having 100 g/L of NaCl. How many litres of water having hardness 500 p. p. m. can be softened by the Zeolite.

(c) Comment upon the following :

(i) Molecularity and Order of reactions

(ii) Activation energy and activated complex

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Describe the following :

(i) Lime Soda process

(ii) Classification of polymers

(b) Differentiate between the following :

(i) Bonding and antibonding molecular orbitals

(ii) Inter and Intra molecular Hydrogen bonding

(c) Describe electrochemical theory of rusting of Iron. How can the Iron be prevented from rusting ?

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Give preparation and uses of the following polymers :

(i) Polystyrene

(ii) Teflon

(iii) PMMA

(iv) Kevlar

(b) Describe VSEPR theory. Draw the shape of  $\text{NH}_3$  and  $\text{H}_2\text{O}$  according to VSEPR theory.

(c) Write short notes on the following :

(i) Concentration cells

(ii) Conducting polymers

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Differentiate between the following :

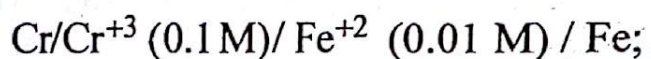
(i)  $\text{S}_{\text{N}}1$  and  $\text{S}_{\text{N}}2$  reactions

(ii) Inductive and mesomeric effect

(b) How GCV and NCV of a fuel can be determined by Bomb Calorimeter ? Explain the construction and working of bomb calorimeter.



(c) Given :



$$E_{\text{Cr}^{+3}/\text{Cr}}^0 = -0.74 \text{ V and } E_{\text{Fe}^{+2}/\text{Fe}}^0 = -0.44 \text{ V}$$

- (i) Write the cell reactions.
- (ii) Calculate the EMF of the cell.