Roll No. | | | | | | | | H

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 softerner 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 NH_3 and H_2O 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) S_{N_1} and S_{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 :

Cr/Cr^{+3} (0.1 M)/ Fe^{+2} (0.01 M) / Fe;

$E^0_{Cr^{+3}/Cr} = -0.74$ V and $E^0_{Fe^{+2}/Fe} = -0.44$ V

(i) Write the cell reactions.

(ii) Calculate the EMF of the cell.