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TCH–201

B. TECH. (SECOND SEMESTER) END SEMESTER EXAMINATION, 2018

(All Branches)

ENGINEERING CHEMISTRY

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions with alternative choice.

(ii) All questions are compulsory.

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

(iv) Each part carries **ten** marks. 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) Differentiate between :

(i) Bonding and Anti-bonding molecular orbitals.

(ii) Inter and Intra molecular hydrogen bonding.

(b) (i) Write the main postulates of VSEPR theory.

(ii) Explain metallic bond on the basis of Electron Sea Theory.

(c) Draw the MOT diagram of HF molecule. Also report about its magnetic nature and bond order.

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

(a) Write a notes on the following :

(i) Stability of carbonations

(ii) Hyperconjugation

(b) Differentiate between SN^1 and SN^2 reactions, with suitable examples and mechanism.

(c) Write a short notes on the following :

(i) Aromatic Electrophilic substitution reaction

(ii) Inductive Effect.

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

(a) Write the preparation, properties and uses of (i) PTFE (ii) Bakelite (iii) Perspex.

(b) Differentiate between :

(i) LDPE and HDPE

(ii) Thermoplastic and Thermoset polyemers.

(c) (i) Define Conducting Polymers.

(ii) Define about the tacticity in polymers. Also give suitable examples

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

(a) Prove that for second order reaction, the half life period of inversely proportional to initial concentration of one of reactant (when the reactants are same).

(b) (i) Write a short note on Activation Energy.

(ii) Discuss about concentration cells.

(c) A Daniel cell, initially contains 100 L each of 1.00 M Cu^{+2} ion and 1.00 M Zn^{+2} ion. Determine the cell potential, after the passage of 0.1×10^6 coulombs of charge.

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

(a) (i) Write a short note on Ion exchange process for softening of water.

(ii) Write the principle of UV-Visible spectroscopy.

(b) (i) Explain the lime soda process used for softening the hard water.

(ii) Give the composition of Biogas. With the help of a neat diagram, explain bio gas plant.

(c) Describe with a neat diagram, how the calorific value is determined by bomb calorimeter. Calculate the GCV and NCV of the coal in cal/gm for a coal sample, tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained : Weight of coal burnt = 0.92 gm, weight of water taken = 550 gm, weight of water equivalent of bomb and calorimeter = 1750 gm, Rise in temperature = 2.25°C, Fuse wire correction = 20 cal, Acid correction = 50cal, Hydrogen = 9% and latent heat of condensation of steam = 580 cal/gm.

F. No. : a-87