BSCT-103 1055

Odd Semester Examination 2018-19

B. TECH. (CSE) (SEMESTER-I)

(New Syllabus)

CHEMISTRY

Time: 03:00 Hours **Max Marks :100**

Note: Student need to attempt **all** questions as per instructions given below. Each question carries equal marks.

Q1. This part contains 6 questions each of 5 marks. Student need to attempt **any four**. (4x5=20)

(a) Discuss the mechanism involved in Aldol condensation.

(b) Explain Nernst equation in detail.

(c) What is bond order? Discuss the molecular orbital diagram of O_2^+ ion with its magnetic character and bond order.

(d) Explain Linear Combination of Atomic Orbitals (LCAO).

(e) Write a short note on Electronegativity.

(f) What is the principle of NMR spectroscopy? Also discuss its applications.

Q2. This part contains 6 questions each of 5 marks. Student need to attempt **any four**. (4x5=20)

(a) Derive the Schrodinger's wave equation for a particle moving in three dimension.

(b) Calculate effective nuclear charge (*Zeff*) at the periphery of

(i) N atom (Z=7)

(ii) Cr atom (Z=24)

(c) Explain Enantiomers and Diastereomers with suitable examples.

(d) Write the properties of hard water and soft water. Why does hard water consume a lot of soap?

(e) Discuss the factors which effect corrosion. Also explain the methods for prevention of corrosion.

(f) Explain metallic bond on the basis of Electron Sea Model.

Q3. This part contains 3 questions each of 10 marks. Student need to attempt **any two**. (2x10=20)

(a) Explain Hard-Soft Acid-Base (HSAB) theory with the help of suitable examples.

(b) Define Ionization energy (IE). What are the factors affecting IE? Also explain its periodicity in the periodic table.

(c) Explain SN^1 and SN^2 reactions with their respective stereochemistry.

Q4. This part contains 3 questions each of 10 marks. Student need to attempt **any two**. (2x10=20)

(a) Describe construction of a Galvanic cell. Write the electrode reactions and formula for its E.M.F.

(b) Give the number of signals in the following organic molecules-

(i) CH_3CH_2Cl

(ii) C_6H_6

(iii) $C_6H_5CH_3$

(iv) CH_3OCH_3

(v) CH_3CH_2OH

(c) Explain conductors, semiconductors and insulators with the help of Band theory.

Q5. This part contains 3 questions each of 10 marks. Student need to attempt any two. (2x10=20)

(a) Define Entropy of a system. Calculate the standard entropy of formation, ΔS^0_f of $CO_2(g)$. Given the standard entropies of $CO_2(g)$, C(s), $O_2(g)$, which are 213.6, 5.740 and 205.0 JK^{-1} respectively.

(b) Explain the following:

(i) F is more electronegative than Cl, although its electron affinity is less than that of Cl.

(ii) CO is diamagnetic while NO is paramagnetic.

(c) What are the main postulates of crystal field theory (CFT). Discuss crystal field splitting in $[Co(NH_3)_6]^{2+}$ complex ion.

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