

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Inorganic Chemistry- II

Subject Code: 5SC02ICH1

Branch: M.Sc. (Chemistry)

Semester: 2

Date: 23/04/2018

Time: 10:30 To 01:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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SECTION – I

- Q-1 Attempt the Following questions (07)**
- B(CH₃)₃ is organometallic compound, but B(OCH₃)₃ is not. Why? (1)
 - Draw the structure of zeise salt. (1)
 - Define organometallic compounds. (1)
 - What is the source of electron in nitrogen fixation? (1)
 - How many inorganic sulphurs are there in [2Fe-2S]? (1)
 - Compare intracellular and extra cellular concentration of Na⁺, K⁺, Ca²⁺ and Mg²⁺. (1)
 - Arrange the following proteins in decreasing order of their activity in Nitrogen fixation. Fe-V, Fe-Mo, Fe-Fe (1)
- Q-2 Attempt all questions (14)**
- Write a note on fluxional behavior. (3)
 - Give the differences between σ -bonded and π -bonded organometallic compounds. (4)
 - Explain mechanism of nitrogen fixation. (7)
- OR**
- Q-2 Attempt all questions (14)**
- Write any five chemical reactions of metallocene. (7)
 - Write a short note on troponin. (4)
 - Draw only structures of M-Cluster and P-Cluster. (3)
- Q-3 Attempt all questions (14)**
- Explain any seven methods for preparation of σ -bonded organometallic compound. (7)
 - Write a short note on Hemoglobin. Give any two roles of globin protein. (7)



OR

- Q-3 Attempt all questions**
- a. Write a note on η^2 complexes. Draw DCD model for ethylene and acetylene. (7)
 - b. Draw and explain [4Fe-4S] ferredoxin. (4)
 - c. Write a short note on Rubredoxin. (3)

SECTION – II

- Q-4 Attempt the Following questions (07)**
- a. Give the principle of ESR spectroscopy. (1)
 - b. Write a limitation of ESR spectroscopy. (1)
 - c. The g value for a reference DPPH is _____ (1)
 - d. Draw the first derivative curve for ESR spectrum. (1)
 - e. Define Ion exchanger. (1)
 - f. Write disadvantages of ion exchange chromatography. (1)
 - g. Define polyatomic ions with suitable examples. (1)

- Q-5 Attempt all questions (14)**
- a. Explain hyperfine splitting formed by the interaction of an unpaired electron with one equivalent hydrogen atoms in ESR spectroscopy. (7)
 - b. Explain the separation of zinc and Cadmium on anion exchanger. (7)

OR

- Q-5 Attempt all questions**
- a. Write a note on hyperfine splitting in ESR. (4)
 - b. Describe types of systems studied by ESR spectroscopy. (3)
 - c. Write properties of ion exchanges. Discuss ion-exchange resins. (7)

- Q-6 Attempt all questions (14)**
- a. Discuss the factor affecting g value. Calculate the g value if methyl radical shows ESR at 3290 G (0.3290 T) in a spectrometer operating at 9230 MHz [where $h = 6.627 \times 10^{-34}$ Js, $\beta = 9.274 \times 10^{-24}$ JT⁻¹]. (7)
 - b. Explain the separation of chloride and bromide on an anion exchanger. (7)

OR

- Q-6 Attempt all Questions**
- a. Derive the expression for determination of Lande's splitting factor. Calculate the value of Lande's splitting factor for a free electron ($S=J=1/2$, $L=0$). (7)
 - b. Explain the types of ion exchanger on the basis of their functional group of the resins. (7)

