

Roll No. _____

B. Sc-M.Sc INTEGRATED PROGRAMME
SCLS, JAMIA HAMDARD
SEMESTER IV EXAMINATION 2019
PAPER CODE: BCH-CC13TH
PAPER TITLE: INORGANIC CHEMISTRY-IV

Time: 3h

Max. Marks: 75

(Write your Roll No. at the top immediately on receipt of this question paper)

Attempt all the questions

Q1. Answer ALL of the following questions.

1x 15 = 15

- (i) How is borax bead formed?
- (ii) Write the formula and describe the formation of blue microcosmic bead of cobalt.
- (iii) Does sodium mask the colour of potassium in flame test? If so, how will you identify potassium in the presence of sodium on the Bunsen flame?
- (iv) How will you test chloride in the presence of bromide and iodide?
- (v) Draw the structure of Zeise's salt.
- (vi) What is Sidwick's rule?
- (vii) Bent nitrosyl is a _____ electron donor and linear nitrosyl is a _____ electron donor in neutral atom procedure.
- (viii) What is cp and cp^* ?
- (ix) What are rescue agents? Give an example.
- (x) What is sickle cell anemia? What is its origin?
- (xi) Patients suffering from Wilson's disease have _____ levels of _____ protein
- (xii) Can ethylene be hydrogenated using Wilkinson's catalyst?
- (xiii) What is steam hydrocarbon reforming process? Write down the chemical reaction.
- (xiv) Give an example of selective reduction by Wilkinson's catalyst.
- (xv) What is a cofactor? What is a coenzyme?

Q2. Attempt ALL questions

- I. Write an essay on the preliminary test of heating the given unknown salt in a clean, dry test tube on the Bunsen flame. **10**

(OR)

Describe the steps involved in the systematic analysis of cations.

- II. What is flame spectrum? Describe the layout and functioning of direct vision spectroscope. **5**

(OR)

What are interfering radicals? Why should they be eliminated during the systematic analysis of cations? How are they eliminated?

Q3. Attempt ALL questions

- I. Write down the structures and electron count for $\text{Mn}_2(\text{CO})_{10}$ and $\text{Co}_2(\text{CO})_8$.

5

(OR)

Describe the synthesis of homoleptic transition metal carbonyls with proper line diagram.

- II. Describe the important chemical reactions of ferrocene.

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(OR)

Draw and explain the molecular orbital diagram of CO molecule.

- III. Write short notes on the structures and electronic configurations of metallocenes.

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(OR)

Draw the structures of $\text{Fe}_2(\text{CO})_9$, $\text{Fe}_3(\text{CO})_{12}$ and $[\text{Fe}_4(\text{CO})_{13}]^{2-}$.

Q4. Attempt ALL questions.

- I. Describe the mechanism of water gas shift reaction with an example.

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(OR)

Describe Heck and Breslow's mechanism of hydroformylation.

- II. What is the original Ziegler-Natta catalyst? How does it differ from a modern Ziegler-Natta catalyst? Describe both mechanisms with suitable examples.

10

(OR)

Define homogeneous and heterogeneous catalysis. Describe both mechanisms with proper examples.

Q5. Attempt ALL questions

- I. Describe the mechanism of action of *cis*-platin.

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(OR)

Describe the effect of pH on carbonic anhydrase activity.

- II. Explain the lesson learnt from a synthetic analog model system for carbonic anhydrase.

5

(OR)

What are allosteric proteins? Describe their activity with an example.

- III. What are heart imaging agents? How are they prepared and injected into the body?

5

(OR)

What is carboxy peptidase A? Describe briefly its active site features and mechanism of catalytic action.

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