

**B.Sc. CHEMISTRY
FOURTH SEMESTER
INORGANIC CHEMISTRY III
BSC – 942 IDMN
[USE OMR FOR OBJECTIVE PART]**

**SET
A**

Duration: 1:30 hrs.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

$1 \times 10 = 10$

Choose the correct answer from the following:

1. NO^+ is isoelectronic with
 - a. O_2
 - b. CO
 - c. CO_2
 - d. O_3
2. $\text{Fe}(\text{CO})_5$ has a
 - a. Tetrahedral geometry
 - b. Square planer geometry
 - c. Trigonal bipyramidal geometry
 - d. Octahedral geometry
3. $\text{Ni}(\text{CO})_4$ is an organometallic compound because it has
 - a. Ionic bond
 - b. Covalent bond
 - c. Ni-C bond
 - d. van der Waal's forces
4. Hapticity refers to
 - a. The number of carbon atoms of the ligand that bind to the metal.
 - b. The number of hydrogen atoms of the ligand that bind to the metal
 - c. The number of oxygen atoms that bind to the metal
 - d. The number of nitrogen atoms that bind to the metal
5. Which of the following is an organometallic compound
 - a. $\text{B}(\text{CH}_3)_3$
 - b. $\text{B}(\text{OCH}_3)_3$
 - c. $\text{B}(\text{SCH}_3)_3$
 - d. $\text{BN}(\text{CH}_3)_3$
6. The highest oxidation state shown by Cr is
 - a. +2
 - b. +6
 - c. +3
 - d. +4
7. The magnetic moment of Fe^{2+} is
 - a. 3.5
 - b. 4.9
 - c. 6.7
 - d. 1
8. Welding glasses contains
 - a. Nd_2O_3 and Pr_2O_3
 - b. Nd_2O_3 and $\text{Ce}_4(\text{NO}_3)_2$
 - c. $\text{Nd}_2(\text{NO}_3)_3$
 - d. Gd_2O_3
9. Percentage of 'mish metal' in Mg alloys is
 - a. 27
 - b. 50
 - c. 15
 - d. 30

10. The color of Ce^{+3} ion in aqueous solution is
- | | |
|--------------|---------|
| a. Green | b. Pink |
| c. Colorless | d. Red |

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(Descriptive)

Time : 1 hr. 15 mins.

Marks: 25

[Answer question no.1 & any two (2) from the rest]

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|---|------------------------|
| <p>1. a. How $\text{Re}_2(\text{CO})_{10}$ is prepared by reductive carbonylation?</p> <p>b. How f-f transitions differ from d-d transitions? Give three reasons.</p> | <p>2+3= 5</p> |
| <p>2. a. Give a brief account of the coordination compounds of nitrosyl with metals.</p> <p>b. Draw the structure of $\text{Ni}(\text{CO})_4$. How was it established?</p> <p>c. What is synergetic bond? Explain with suitable example.</p> | <p>4+4+2=10</p> |
| <p>3. a. "In metal carbonyl nitrosyls, the NO^+ ions are more firmly attached than the CO group." Briefly justify the statement.</p> <p>b. How $\text{Fe}(\text{CO})_5$ is prepared from $\text{Fe}_2(\text{CO})_9$ and vice-versa?</p> <p>c. Why Ce^{4+} show orange red color? Write the characteristics of this transitions.</p> <p>d. Why transition metals show catalytic property? Write the catalysts composition used for Contact process and hydrogenation reaction.</p> | <p>3+2+2+3
=10</p> |
| <p>4. a. Give a brief account of the coordination compounds of nitrosyl with metals.</p> <p>b. Why transition metals tend to form complex?</p> | <p>5+2+1+2
=10</p> |

c. Write electronic configuration and magnetic moment of Ni^{2+} ion.

d. What is the importance of Haber's process? Explain.

5. a. Explain the process of separation of lanthanide elements using ion exchange method.

3+2+2+3
=10

b. Write two consequences of Lanthanide contraction.

c. What are "mish metals"? Give example.

d. Why transition metals show colour? Give three reasons.

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