

M.Sc.(Chem.) Semester - 1 (CBCS) Examination**Oct/Nov. -2018****INORGANIC CHEMISTRY (CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
 2. Figures to the right indicate marks.
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Unit-I (14 Marks)**Answer ALL questions.**

- Que-1 (a) Answer the following. (04)
- (1) Predict the Bond order for the following molecules:
(i) He_2^+ (ii) C_2
 - (2) Give hybridization and geometry of the following.
- (b) Answer any two questions out of three. (10)
- (1) What is bent rule? Explain why bond angle in F_2O is smaller than that of H_2O ?
 - (2) Discuss shape of AB_5 & AB_7 type molecules using VSEPR theory.
 - (3) Explain Walsh diagram.

Unit-2 (14 Marks)**Answer ALL questions.**

- Que-2 (a) Answer the following. (04)
- (1) Why alkali earth metals shows different flame colors?
 - (2) Discuss briefly on oxidation state of Halogen family.
- (b) Answer any two questions out of three. (10)
- (1) Write a note on oxides of Sulfur.
 - (2) Write a note on electro positive character, ionization energy and reactions of boron.
 - (3) Compare ionization energy & electro negativity between Carbon and Nitrogen family.

Unit-3 (14 Marks)**Answer ALL questions.**

- Que-3 (a) Answer the following. (04)
- (1) Give the IUPAC Name of.
(i) $\text{Na}_2[\text{Fe}(\text{CN})_5(\text{NO})]$ (ii) LiAlH_4
 - (2) Calculate the term symbol for following.
(i) d^8 (ii) d^3
- (b) Answer any two questions out of three. (10)
- (1) Give the classification of coordinated compounds.
 - (2) Discuss warner's theory for various ammines of cobalt (III) ion.
 - (3) Discuss geometrical isomerism in compounds having coordination number 4 with one example.

Unit-4 (14 Marks)**Answer ALL questions.**

- Que-4 (a) Answer the following. (04)
- (1) Define labile and inert complexes.
 - (2) Give the factor effecting the rate of substitution in metal complexes.
- (b) Answer any two questions out of three. (10)
- (1) Write a note on substitution reactions in metal complexes. Explain the substitution by dissociation.
 - (2) Discuss the trans effect with theoretical explanation.
 - (3) What is outer sphere electron transfer reaction? Explain with example.

Unit-5 (14 Marks)**Answer ALL questions.**

Que-5 (a) Answer the following. (04)

- (1) What is nuclear recoil?
- (2) Give the example of isotopes used as source in MB spectra.

(b) Answer any two questions out of three. (10)

- (1) What is Mossbauer effect? Explain the instrumentation of Mossbauer spectroscopy.
- (2) Discuss the in MB Spectra of $K_4[Fe(CN)_6]$. Why the quadrupole splitting in $K_3[Fe(CN)_5(NH_3)]$ is observed?
- (3) Explain the MB spectra of $[Fe_2(CO)_9]$ and $[Fe_3(CO)_{12}]$.
