Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF APPLIED SCIENCE

M.Sc., Summer 2017-18 Examination

Semester: 1 **Date: 23/05/2018**
Subject Code: 11205102 **Time: 10:30am to 1:00pm**
Subject Name: Inorganic Chemistry-I **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. Answer the following questions (Each of 04 marks) **(08)**

A) (a) Discuss crystal field splitting for octahedral complex.
(b) Explain tetragonal distortion in octahedral complex.

Q.1. Answer the following questions (Any two)

B) (a) Do as directed: (Each of 02 marks) **(04)**
1. Draw crystal field splitting diagram for tetrahedral complex.
2. Calculate term symbols for p^2 configuration.

(b) Calculate CFSE values for d^1 to d^{10} electronic configurations. **(04)**
(c) Write a note on diborane. **(04)**

Q.2. Answer the following questions

A) (a) Do as directed: **(04)**
1. What do you mean by STYX rules?
2. Draw crystal field splitting diagram for square planar complex.

(b) Write a note on borazine. **(04)**

Q.2. Answer the following questions (Any two)

B) (a) Do as directed: **(03)**
1. Name of B_5H_9 is _____
2. Define bari centre.
3. Define the term carborane.

(b) Discuss bonding in B_4H_{10}. **(03)**
(d) Which are the bonding possibilities in boranes? **(03)**

Q.3. Answer the following questions (Each of 04 marks) **(08)**

A) (a) Discuss valance bond theory with examples.
(b) Discuss valence bond and molecular orbital interpretations of H_2^+ and H_2 molecules.

Q.3. Answer the following questions (Any two)

B) (a) Do as directed: (Each of 02 marks) **(04)**
1. Define metal cluster. Write the names of various types of metal clusters.
2. Discuss various types of orbital overlapping.

(b) Write a note on electron sea theory. **(04)**
(c) Discuss the possibilities of formation of helium molecule and lithium molecule with the help of molecular orbital diagrams. **(04)**

Q.4. Answer the following questions.

A) (a) Do as directed: (Each of 02 marks) **(04)**
1. Draw molecular orbital diagram of CO molecule.
2. What do you mean by Isolobal analogy? Explain it with examples.

(b) Discuss synthesis, structure and bonding of $Ni(CO)_4$. **(04)**

Q.4. Answer the following questions (Any two)

B) (a) Do as directed: (Each of 01 marks) **(03)**
1. Define metallic bond.
2. The shape of BeF_2 molecule is _____.
3. What is the shape of SF_6 molecule?
(A) Tetrahedral (B) Sqaure planar
(C) Octahedral (D) Linear

(b) Write a note on bond order. **(03)**
(c) Why water is bent and ammonia is pyramidal in shape? **(03)**