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SHIVAJI UNIVERSITY, KOLHAPUR

DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

B.Sc. (Part – I) (Semester – I) (New) (CBCS) (NEP)

Examination March/April, 2023

CHEMISTRY (Paper - I)

DSC – 3A: Inorganic Chemistry

Sub. Code: 88180

Day and Date: Monday, 05-06-2023 **Total Marks: 40**

Time: 02.30 p.m. to 04.30 p.m.

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagrams wherever necessary.
4) Use of Scientific calculator is allowed.

Q. 1 A. Select the most correct alternative from the following. **[04]**

1. If Azimuthal quantum number, $\ell = 1$, atomic orbital will be ……..
   a) s b) d
   c) p d) f
2. General outermost electronic configuration of elements of group 2 (IIA) is ……..
   a) ns^1 b) ns^{1-2}
   c) ns^2 d) $ns^2\ np^{1-6}$
3. Ionisation energy is represented by symbol ……..
   a) + I b) – E
   c) –U d) - H
4. Which of the following molecule has zero dipole moment ?
   a) HF b) CCl_4
   c) H_2O d) $CHCl_3$

B. Answer in one sentence only. **[04]**

a) What is the geometry of SF_6 molecule?
b) Define dipole moment.
c) What is the bond order of O_2 molecule?
d) Define atomic orbital.

Q. 2 Attempt any TWO of the following. **[16]**

a) What is hybridisation? Give the conditions of hybridisation.

b) Draw MO diagram of N_2 molecule and comment on its bond order, stability and magnetic character.

c) What are quantum numbers? Discuss any two of them.

Q. 3 Write short note on any FOUR of the following. [16]

a) Shapes of 'd' atomic orbitals.

b) On the basis of hybridization, explain formation of $SiCl_4$ molecule.

c) Distinguish between bonding molecular orbital (BMOs) and antibonding molecular orbital (ABMOs).

d) Write short note on Aufbau principle.

e) General characteristics of ionic compounds.

f) Give conditions for successful overlap.

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SHIVAJI UNIVERSITY, KOLHAPUR

DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

B.Sc. (Part – I) (Semester – I) (New) (NEP) Examination Oct, 2023

CHEMISTRY (Paper -I)

DSC– D3: Inorganic Chemistry

Sub. Code: 88180

Day and Date: Sunday, 05 -11-2023 **Total Marks: 40**

Time: 02.30 p.m. to 04.30 p.m.

Instructions:
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Draw neat diagrams and give equations wherever necessary.**
4) **Use of Scientific calculator and logarithmic table is allowed.**
5) **Attempt any one question paper**

Question Paper Set - I

Q 1 Choose the most correct alternative for each of the following and rewrite the sentences**.** **[08]**

a) Which of the following orbital is dumbell shaped ?

a) s b) p c) d d) f

b) --------- element is most electronegative in periodic table

a) F b) O c) N d) Cl

c) Co-ordinate bond is indicated by ----------

a) small arrow b) hyphen c) small dash d) dotted line

d) Which of the following molecule has a zero dipole moment------

a) CH_4 b) CCl_4 c) CO_2 d) All of these

e) The atomic number of Aluminium is ----------

a) 5 b) 7 c) 8 d) 13

f) Geometry of sp3 type hybridization is ----------

a) linear b) tetrahedral c) Octahedral d) trigonal planar

g) The cations are --------- than their parent atoms.

b) smaller b) larger c) same d) both b and c

h) Lewis acid is ---------- acceptor.

a) proton b) oxide ion c) anion d) electron pair

Q 2) Attempt any TWO of the following. [16]

a) Define quantum number and Explain any two in detail.

b) What is ionic bond ? Discuss the general characteristics of ionic compound.

c) What are boranes? How will you prepare diboranes ? Discuss it's structure in detail.

Q.3) Answer any four of the following. **[16]**

a) Distinguish between Hard acid and soft acid.

b) On the basis of hybridization explain the structure of BF_3.

c) Give the electronic structure of group 13(IIIA) elements.

d) Define hybridization and Explain conditions for hybridization.

e) Discuss the applications of HSAB principle.

f) Explain the shapes of p orbitals.

Question Paper Set - II

Q 1 A) Answer the following in one sentence. **[04]**

a) What is the geometry of BF_3 molecule?

b) Define ionic bond.

c) Write the formula of Bond Order .

d) Define melting point

B) Choose the most correct alternative for each of the following and rewrite the sentences. **[04]**

i) If Azimuthal quantum number, l = 0, atomic orbital will be------

a) s b) p c) d d) f

ii) Lattice energy is represented by symbol ----------

a) +I b) -U c) -E d) -H

iii) Which of the following molecule has a zero dipole moment------

a) $CHCl_3$ b) CCl_4 c) HF d) H_2O

iv) The atomic number of sodium is ----------

a) 11 b) 7 c) 8 d) 13

Q 2) Attempt any TWO of the following. **[16]**

a) Define quantum number and Explain any two in detail.

b) Discuss the Born-Haber cycle for sodium chloride and its applications

c) Draw MO diagram of N_2 molecule and comment on its bond order, stability and magnetic character.

Q.3) Answer any four of the following. **[16]**

a) Distinguish between atomic orbital and molecular orbital.

b) On the basis of hybridization explain the structure of SF_6.

c) Explain the shapes of d orbitals.

d) General characteristics of ionic compounds.

e) Derive the de-Broglies equation.

f) Define hybridization and Explain conditions for hybridization.

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SHIVAJI UNIVERSITY KOLHAPUR

DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

B. Sc. (Part – I) Sem – I Examination March/April 2022

Title of Subject :- Chemistry **Paper No. I**

Title of Paper :- Inorganic Chemistry **Subject Code :- 71605**

Day & Date :- **Total Marks:- 50**

Time :-

……..

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagrams wherever necessary.
4) Use of Scientific calculator is allowed.

Q.1) Select the correct alternative from the following. **[10]**

a) If Azimuthal quantum number, $\ell = 1$, atomic orbital will be ……..
i) s ii) d
iii) p iv) f

b) Energy required to detach an electron from isolated gaseous atom is called……enthalpy.
i) Electron ii) Ionisation
iii) Electron gain iv) Electronegativity

c) The temperature at which vapour pressure of solid becomes equal to vapour pressure of liquid is called ……..
i) melting point ii) boiling point
iii) saturation point iv) none of these

d) Which of the following molecule has a zero dipole moment?
i) HF ii) $CHCl_3$
iii) H_2O iv) CCl_4

e) The formation of stable ionic solid will be favoured by …….
i) low ionization energy ii) high electron affinity
iii) high lattice energy iv) all of these

f) The geometry of …….. molecule is trigonal planar.
i) BF_3 ii) $BeCl_2$
iii) $SiCl_4$ iv) SF_6

g) Lattice energy is represented by symbol ……..
i) + I ii) – E
iii) –U iv) - H

h) Bond angle in $SiCl_4$ is ……..
i) 109.28^0 ii) 90^0
iii) 107^0 iv) 104.5

i) Which of the following has bond order 3.
i) O_2 ii) N_2
iii) B_2 iv) NO

j) Bonding molecular orbitals are at ……

i) higher energy level ii) lower energy level

iii) at the same energy level iv) centre

Q.2) Attempt any TWO of the following. [20]

a) What are quantum numbers? Explain all in detail

b) Draw MO diagram of N_2 molecule and comment on its bond order, stability and magnetic character.

c) What is ionic bond? Explain the energetics of ionic bond formation.

Q.3) Attempt any FOUR of the following. [20]

a) Discuss shapes of 'd' atomic orbitals.

b) Distinguish between bonding molecular orbital (BMOs) and antibonding molecular orbital (ABMOs).

c) Explain sp^3 hybridization with suitable example.

d) Explain Dipole moment

e) On the basis of hybridization, explain formation of SF_6 molecule.

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SHIVAJI UNIVERSITY KOLHAPUR

DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

B. Sc. (Part – I) Sem – I Examination March/April 2022

Title of Subject :- Chemistry **Paper No. I**

Title of Paper :- Inorganic Chemistry **Subject Code :- 71605**

Day & Date :- **Total Marks:- 50**

Time :-

……..

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagrams wherever necessary.
4) Use of Scientific calculator is allowed.

Q.1) Select the correct alternative from the following. **[10]**

a) If Azimuthal quantum number, $\ell = 1$, atomic orbital will be ……..
i) s ii) d
iii) p iv) f

b) Energy required to detach an electron from isolated gaseous atom is called……enthalpy.
i) Electron ii) Ionisation
iii) Electron gain iv) Electronegativity

c) The temperature at which vapour pressure of solid becomes equal to vapour pressure of liquid is called ……..
i) melting point ii) boiling point
iii) saturation point iv) none of these

d) Which of the following molecule has a zero dipole moment?
i) HF ii) $CHCl_3$
iii) H_2O iv) CCl_4

e) The formation of stable ionic solid will be favoured by …….
i) low ionization energy ii) high electron affinity
iii) high lattice energy iv) all of these

f) The geometry of …….. molecule is trigonal planar.
i) BF_3 ii) $BeCl_2$
iii) $SiCl_4$ iv) SF_6

g) Lattice energy is represented by symbol ……..
i) + I ii) – E
iii) –U iv) - H

h) Bond angle in $SiCl_4$ is ……..
i) 109.28^0 ii) 90^0
iii) 107^0 iv) 104.5

i) Which of the following has bond order 3.
i) O_2 ii) N_2
iii) B_2 iv) NO

j) Bonding molecular orbitals are at ……

i) higher energy level ii) lower energy level

iii) at the same energy level iv) centre

Q.2) Attempt any TWO of the following. [20]

a) What are quantum numbers? Explain all in detail

b) Draw MO diagram of N_2 molecule and comment on its bond order, stability and magnetic character.

c) What is ionic bond? Explain the energetics of ionic bond formation.

Q.3) Attempt any FOUR of the following. [20]

a) Discuss shapes of 'd' atomic orbitals.

b) Distinguish between bonding molecular orbital (BMOs) and antibonding molecular orbital (ABMOs).

c) Explain sp^3 hybridization with suitable example.

d) Explain Dipole moment

e) On the basis of hybridization, explain formation of SF_6 molecule.

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Total No. of Pages: 4

SHIVAJI UNIVERSITY, KOLHAPUR

DATTAJIRAO KADAM ARTS, SCIENCE AND COMMERCE COLLEGE, ICHALKARANJI

B.Sc. (Part – I) (Semester – I) (New) (NEP)

Examination March/April, 2024

CHEMISTRY (Paper -I)

DSC-3A Inorganic Chemistry

Sub. Code: 88180

Day and Date: Saturday, 30 -03-2024 **Total Marks: 40**

Time: 02.30 p.m. to 04.30 p.m.

Instructions:
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Draw neat diagrams and give equations wherever necessary.**
4) **Use of Scientific calculator and logarithmic table is allowed.**
5) **Attempt any one question paper**

Question Paper Set - I

Q 1 Choose the most correct alternative for each of the following and rewrite the sentences. **[08]**

i) If Azimuthal quantum number, $\ell = 0$, atomic orbital will be------

a) s b) p c) d d) f

ii) The atomic number of Potassium is ----------

a) 11 b) 7 c) 8 d) 19

iii) Covalent bond is indicated by ----------

a) small arrow b) hyphen c) double arrow d) dotted line

iv) In $BeCl_2$ bond angle is ------

a) 90^0 b) 180^0 c) 120^0 d) 240^0

v) The Nitrogen is ---------- group element.

a) 15 b) 17 c) 14 d) 13

vi) Geometry of $sp^3 d^2$ type hybridization is ----------

a) linear b) tetrahedral c) Octahedral d) trigonal planar

vii) electron affinity is represented by symbol ----------

a) +I b) -U c) -E d) -H

viii) Lux-Flood base is ---------- donar.

a) cation b) oxide ion c) proton d) electron pair

Q 2) Attempt any TWO of the following. [16]

a) What are s block elements. Explain in detail trend of atomic radii and ionization energy w. r..t. s - block elements**.**

b) Discuss the general characteristics of ionic compound.

a) What are boranes ? How will you prepare diborane ? Discuss it's structure in detail.

Q.3) Answer any four of the following. **[16]**

a) Define and explain Bronsted-Lowry concept of acid and base.

b) On the basis of hybridization explain the structure of $BeCl_2$.

c) Give the electronic configuration of group 15(VA) elements.

d) On the basis of VSEPR theory explain the structure of NH_3.

e) Discuss the limitations of HSAB principle.

f) Explain the azimuthal quantum number and spin quantum number.

Question Paper Set - II

Q 1 A) Select the most correct alternative from the following [04]

i) If Azimuthal quantum number, ℓ = 3, atomic orbital will be------

a) s b) p c) d d) f

ii) Ionisation energy is represented by symbol ----------

a) +I b) -U c) -E d) -H

iii) Which of the following molecule has a zero dipole moment------

a) $CHCl_3$ b) CO_2 c) HF d) H_2O

iv) The atomic number of Potassium is ----------

a) 11 b) 7 c) 8 d) 19

B) Answer in one sentence only. [04]

a) What is the geometry of $BeCl_2$ molecule?

b) What is the symbol of lattice energy.

c) Write the formula of dipole moment .

d) Define bond order.

Q 2) Attempt any TWO of the following. [16]

a) Define atomic Orbital and Explain shapes of s and p atomic orbitals in detail.

b) Discuss the energetic of ionic bond formation.

c) Draw MO diagram of N_2 molecule and comment on its bond order, stability and magnetic character.

Q.3) Answer any four of the following. [16]

a) Explain the s-s overlap and s-p_x overlap

b) On the basis of hybridization explain the structure of BF_3.

c) Explain in detail atomic radii w.r.t. to s-block element.

d) Discuss the Fajans rule in brief.

e) State and explain Heisenberg uncertainity principle and Aufbau principle.

f) Define hybridization and Explain conditions for hybridization.