Unit - I → Non - Transition Elements — Inorganic

1 Mark

1. Usually boron does not form cation, Why ?
   - April 2018

2. Define the term carborain ?
   - March 2016

3. Mention any two polymorphs of carbon ?
   - Dec. 2016

4. Which silicates not shair their corners ?
   - Dec. 2016

5. Give any two difference of alpha sulpher & monoclenic sulpher ?
   - April 2015

6. Define the term sphosphazenes ?
   - Nov 2014, 2008

7. At which temperature the phosphorous rock is heated with coke & sand to form white phosphorous ?
   - NOV. 2014

8. What does diborane reacts with
   i) ammonia and ii) drimethyl boron

9. Write a note on carboranes — 4 Mark

- 4 Mark

10. Explain peroxo compound of boron

11. properties of non-transition elements
- March 2016

12. sketch the molecule B_2H_6 and describe it structure & synthasis
- Dec 2016

13. What are different polymorphs of sulpher. Discuss their structure in short.
- Dec 2016

14. What are carbides & Discribe shortly the covalent carbides.
- Dec 2016

15. poly morphysm in sulpher
- octo 2015, April 2014

16. polymorphism of carbon and sulpher

17. What are carbides. How they are prepaired and drow the structure of Al_4C_3 carbides
- octo 2015

18. What is polymorphism? explain allotropes of carbon and phosphorous
- octo 2015, NOV 2014

19. Describe the synthasis, properties and structure of carborain?

20. Give the example of phosphazenes, How are they made and whate are the structur
- April 2014

- 8 Mark

21. Describe the method of synthasis, properties and structure of carborain and borazeneş
- April 2018

22. Write a brief account on preperation, properties and structure of carboraines and silicates
- March 2016

23. Give ditailed classification of silicates with ellustrative example.
- Dec. 2016

24. What are silicates?, what are their type?. Discuss structure and bonding in a ring silicat
- octo 2015, April 2014

25. Discribe the synthasis, properties and structure diborane and borazine
- octo 2015, April 2014

unit II A) Stereochemistry & Bonding in Main group compounds

Im Questions

- Define $P\pi-P\pi$ bonding (2015)
- Draw the structure of XeO_3 using VSEPR theory? (2015)
- Who developed VSEPR theory? (2013, 2015)
- Predict the no. of lone pairs in BrF_3 & PCl_5 using VSEPR theory. (2015)
- What is $d\pi-d\pi$ bonding (2013)
- Predict the no. of lone pair of electrons in SF_6 & IF_3 molecule. (2013)
- Write a Bent Rule (2013)
- Write hybridisation & geometry of XeO_4 molecule. (2013)
- Name the molecules in which $P\pi-P\pi$ bonding involved (2012)
- Define the term hybridization. (2012)
- Although the formation of ammonia & water molecule involve sp^3 hybridization their bond angles are shorter than the normal tetrahedral angle. Why? (2012)
- If NO_2 molecule is angular in shape then write its bond angle & bond length. (2014)
- Write the name & geometry of SO_3^{2-} ion. (2015)
- Write the Boiling point of ammonia (NH_3). (2015)
- What is the geometry of molecules which possesses sp^3d^2 hybridization (2013)
- Bond angle H–N–H in ammonia molecule is _____. (2013)

4 m Questions

Q Explain some simple reactions of covalently bonded molecules with suitable examples. (2012, 2015)

Q Write note on $P\pi$-$d\pi$ & $d\pi$-$d\pi$ bonding (2015, 2012, 2013, 2013 semI)

Q Write note on $d\pi$-$d\pi$ bonds. (2013)

Q Write short note on Bent rule. (2012, 2013)

Q Explain the following terms (2012, 2013(ii))

i) Drawbacks of VSEPR theory

ii) Energies of hybridization

Q Explain the $d\pi$-$d\pi$ bonding involved in molecule give some examples. (2012)

Q Short note on Energies of hybridization (2013)

Q Explain the hybridization involving in 'f' orbitals with suitable examples. (2013)

Q Explain the following bondings involved in the molecule with suitable examples. (2013 semI)

i) $P\pi$-$P\pi$

ii) $d\pi$-$d\pi$

Q In IF_7 and XeF_4, both I and Xe undergoes sp^3d^2 hybridization Discuss & compare structure & bonding in IF_7 and XeF_6. (2013)

8m Questions

Q Explain the following with VSEPR theory. (2015)

i) Trends of repulsive interaction between bond pairs and lone pairs of electrons.

ii) CH_4, NH_3, H_2O involve sp^3 hybridization, but bond angles in these molecules are different.

Q a) Discuss the assumptions of VSEPR theory with illustrations. (2013 semI)

b) Explain Bent rule with suitable examples.

(2013, 2012 (1m), 2013 (4m), 2015 (4m), 2012)

Q What is VSEPR theory? Describe the formation of tetrahedral structure for the CH_4, NH_3 & H_2O molecule but show different bond angles, Explain on the basis of VSEPR theory?

Q Discuss the VSEPR theory. Illustrate carefully that VSEPR has to be combined with the concept of hybridization to account for the geometry of covalent molecule. (2012)

II (B) - Non Aqueous Solvents

Inorganic

Q.1 Answer in one sentance. (1Mark)

1. Define - lanthanide contraction.
2. Define - carborane.
3. The reduction potential of elemental fluorine is higher as compared to other halogen why?
4. Phosphorous rock is heated at 1733 K with coke and sand to form _____ (2016, 2014)
5. In lanthanide series on moving from left to right across period, the covalent and ionic radii decrease? why? (2016, 2014)
6. Write general electronic configuration of actinides?
7. Any two industrial uses of anhydrous sulphuric acid?
8. Self ionization reaⁿ involving NH_3 solvent?
9. SF_6 is known, while SCl_6 is not known. why?
10. Half life time of ^{232}Th and ^{238}U.
11. How many corners of SiO_4, tetrahedron are shared in three dimenshional sillicates?
12. How red phosphorous is produced from white phosphorous?
13. Why lanthanide are coloured? if they contain unpaired electron?
14. Write a reaction of dinitrogen tetraoxide (N_2O_4).
15. Define - $P\pi$-$d\pi$ bonding.
16. Compton effect?
17. Function of Heamoglobin?
18. Draw a structure of XeO_3 using VSEPR theory?
19. $K_2Cr_2O_7$ is coloured? why?
20. Function of sodium and pottasium in biological system?
21. Geometry of molecule poses sp^3d^2 hybridisation?

Q. 2 Short Note or 4 Mark question.

(1) Write the physical and chemical characteristics of liquid ammonia?

(2) Explain - (a) Autoionization reaⁿ of ammonia and Sulphuric acid?
(b) classification of solvent

2015, 2016 (3) Physical and chemical properties of liquid ammonia?

(4) Explain and state Bent rule with illustrative example?

(5) Pπ - dπ and dπ - Pπ bonding?

(6) Explain -
(1) Auto-Ionisation in NH_3 and H_2SO_4
(2) Physical properties of dinitrogen tetr-oxide?

(7) Walsh digram?

(8) Properties of dinitrogen tetraoxide and reaⁿ in-volved it?

(9) Explain the various equilibria in anhydrous sulphuric acid?

(10) Write note on - liquid dinitrogen tetraoxide?

(11) Pi metal complex.

Q.3 Long answer question (8 mark)

① Types of reaction in solvent ? explain with example ?

② Explain VSEPR theory ?

③ Types of solvent ? discuss various reaⁿ that occur in the non-aqueous solvent ?

④ How does diborane react with i) ammonia
ii) trimethyl boron.

⑤ What is non-aqueous solvent ? Explain the use of H_2SO_4 as acid solvent and NH_3 as base solvent.

Unit-III

F Block elements (Lanthanides and Actinides)

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1) What is lanthanoid contraction? April-2018, Dec. 2016

2) "in lanthanides series on moving from left to right across a period, the covalent and ionic decreases" Why? March-2016, NOV. 2014

3) "The spectral lines from the actinides are 10 times as intense as lanthanides" Why? October-2015, April 2015, April 2014

4) Which is rapid method for separation of lanthanides? October-2015, April-2015

5) Write general configuration of lanthanides NOV.-2014, 2012

6) "The heavier lanthanide metal are less reactive than lighter lanthanide metals" Why? NOV 2014

7) "cerium can be separated from lanthanide mixtures quite easily" Why? April 2014

8) Name the modern method used for separation of lanthanides? March-2018

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1) Actinides have greater tendency to form complexes than lanthanides. Explain April-2018
2) Explain the spectral and magnetic properties of actinides-April 2018 March-2016
3) Describe the various modern methods used for the separation of lanthanides April-2018
4) How actinides separated by solvent extraction method March-2016, April-2015
5) What are actinides? Write the name and electronic configuration of actinides? What are aplication of actinides? March 2016
6) Write note on. a) Production of lanthanide metals March 2016, April-2015
7) Name the lanthanide elements is correct order, give their chemical symbols and electronic configuration and mention at least four application of lanthanide elements. - December 2016
8) What is lanthanide contraction and What as its are sequences? - 2016
9) What are problems in the separation of lanthanides from one another? Discuss the modern methods for the separation of lanthanides? December-2016, April 2014, 2009
10) Write note on. a) use of lanthanides as shift Reagent December-2016, April 2014
11) Why separation of lanthanides is difficult? Discuss solvent extract methods for their separation from one another? April-2015
12) Describe spectral and magnetic properties of lanthanides. What are application of lanthanide ~~extraction~~ compounds? - Nov. 2014, 2009
13) What are difficulties are separation of lanthanides elements? Explain ion exchange method for the separation of lanthanide-Nov. 2014
14) What are magnetic properties of lanthanides? Illustrate your answer with examples - April-2014
15) Discuss the oxidation states and application of lanthanides-2012

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16) What are problems in the separation of lanthanides from one another? Discuss the modern methods for the separation of lanthanides? - December 2016, April 2014, 2009

16) What are the problems encountered in separation of actinides from one another? Discuss the ion exchange solvents extraction methods for the seperation of actinides? - 2012, 2009

17) What is lanthanide contraction? How would you account for it? What are the important consequences? - 2011, 2010

18) Describe briefly the various methods used for the separation for the lanthanide. Which method is more preferable? - 2011

19) What are actinides? Why are they so called? Give their electronic configuration. Write the important properties and uses of uranium? - 2010

20) Explain the magnetic properties of lanthanides and actinides. comment on organometallic chemistry of 'F' block elements. Give use of lanthanide and actinide compounds in industry. - 2010

21) Mention the use of lanthanides and their salts.

22) Write note on
a) application of lanthanides - 2009

28) Explain organometallic chemistry lanthanides and actinides - 2009

24) Explain the application of lanthanides and actinides compounds in industry - 2009

Solid state chemistry

Rajdhani

DATE / /

— 1 Mark

Q. What is the position of fermi energy level in intrinsic semiconductor?
March - 2016

Q. When does an intrinsic semiconductor behaves on insulator?
March - 2016

Q. Plot a graph of resistance versus temp. for semiconducting material
April - 2015 , Nov. - 2014

Q. Write two examples of p-type semiconductor.
April - 2015 , Nov. - 2014

Q. Define insulator.
April - 2015

Q. In P- type semiconductors where the acceptor are located?
October - 2017

Q. Which equation is used to calculate the conductivity of a semiconductor?
oct. - 2017

Q Write the names of the methods used for the preparation of the semiconductors. Oct. - 2017

Q. What is the characteristic difference bet.^n metals & semiconductors from the consideration of temp. coefficient of resistivity?
December - 2016

Q. What is the approximate range of resistivity of an insulator at 20°c?
December - 2016

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Q. Name the methods used for the synthesis & purification of Semiconducting material.
December - 2016.

Q. "Insulator are bad conductors of electricity." Why?
Oct.-2015

Q. Define intrinsic Semiconductor.
Nov. - 2014

Q. Write expression for effective magnetic moment of complexes.
Nov. - 2013

Q. Define the term mobility of electrons.
March - 2016.

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DATE / /

Q. Name the methods used for the synthesis & purification of Semiconducting material.
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Nov. - 2013

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March - 2016.

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4-mark DATE / /

Q. How high purity Semiconducting material are synthesized? Explain one method in detail.
March - 2016.

Q. Why an increase in temprature decreases the resistivity of a semiconductor & increases the resistivity of metals (conductors).
March - 2016 ; Nov. - 2014

Q. Discuss temp. dependent conductivity of conductor & semiconductor,
~~March - 2016~~ April - 2015.

Q. Write Note - Intrinsic & extrinsic Semiconductors.
~~Mar~~ April - 2015

Q. Explain zone refining method for synthesis of Semiconducting material.
Nov. - 2013 , oct. - 2015

Q. Distinguish bet^n conductor , insulator & Semiconductor on the basis of band diagrom , Why the conductivity of a conductor decreases with increase in temp.
December - 2016

Q. obtain an expression for a carrier density of an intrinsic Semiconductor?
December - 2016

Q. How is the band model helpfw in explaining the various properties of Semiconductors & insulators.
December - 2016.

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— 8 Mark

Q. Describe the conduction mechanism in intrinsic & extrinsic semiconductor.
March – 2016

Q. Discuss the behavior & properties of conductors, semiconductors & insulators on the basis of band model.
April – 2015

Q. Discuss intrinsic & extrinsic Semiconductor. What is the effect of dopant on conduction mechanism of Semiconductor?
Nov – 2013

Q. use energy level diagrams & the band theory to explain the difference bet^n Conductors, insulators & Semiconductors.
oct. – 2017

Q. Explain in detail different types of semiconductors with suitable examples.
oct. – 2017

Q. Diagrammatically show the energy levels of pure semiconductors, semiconductors with donor & acceptor levels. Explain dependence of Conductivity of Semiconductor on temp.
December – 2016. Nov – 2014

Q. Explain energy level diagram in pure Semiconductor & impure Semiconductor with the presence of acceptor as well as donor levels.
oct. – 2015

Bioinorganic Chemistry — 1 Mark

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DATE / /

Q. What are cytochromes ?
March - 2016

Q. How many electrons required for nitrogen fixation?
April - 2015. , oct. - 2017

Q. Write the list of trace elements in biological process.
April - 2015. , oct. - 2015 , Nov. - 2013

Q. What is the function of myoglobin ?
oct - 2017

Q. What is the function of haemoglobin in biological system?
December - 2016. , Nov. - 2014 , oct - 2015

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DATE / /

— 4 Mark

Q. What do you understand by essential & troce elements in biological system ? Give suitable examples.
March-2016 , Nov.-2013 , December-2016

Q. Write a short note — Nitrogen fixation in soil.
March-2016

Q. What is the function of cytochrome P-450 ?
oct.-2017

Q. Explain the process of biological nitrogen fixation briefly.
oct.-2017 , Nov.-2014 , oct.-2015

Q. Write note — Role of metal ions in biological process.
oct.-2017

Q. Write note — Metalloprotiens
December-2016