



INDIAN SCHOOL AL WADI AL KABIR

Class: XI	Department: SCIENCE 2020 -21 SUBJECT : CHEMISTRY	Date of submission: 20.12.2020
Worksheet No: 11 WITH ANSWERS	Chapter: THE p BLOCK ELEMENTS	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

MULTIPLE CHOICE QUESTIONS (1M)

- In general, Boron trihalides acts as
 - Strong reducing agents
 - Lewis acids
 - Lewis bases
 - Dehydrating agents
- Which is false about Carbon?
 - It has crystalline as well as amorphous allotropes.
 - It can form $p\pi-p\pi$ bond with other carbon atoms.
 - It cannot form $p\pi-p\pi$ bond with atoms like N and O.
 - C_{60} is also one of the allotropes of Carbon.
- The exhibition of highest coordination number depends on the availability of vacant orbitals in the central atom. Which of the following elements is not likely to act as central atom in MF_6^{3-} ?
 - B
 - Al
 - Ga
 - In
- Catenation, i.e., linking of similar atoms depends on size and electronic configuration of atoms. The tendency of catenation in Group 14 elements follows the order
 - $C > Si > Ge > Sn$
 - $C \gg Si > Ge = Sn$
 - $Si > C > Sn > Ge$
 - $Ge > Sn > Si > C$

5. Ionisation enthalpy ($\Delta_i H_1$ kJ mol⁻¹) for the elements of Group 13 follows the order.
- $B > Al > Ga > In > Tl$
 - $B < Al < Ga < In < Tl$
 - $B < Al > Ga < In < Tl$
 - $B > Al < Ga > In < Tl$
6. The hybrid state of C in C₆₀ is
- sp³
 - sp
 - sp²
 - dsp²
7. A metal M forms chlorides, MCl₂ and MCl₄ (+2 and +4 oxidation states). Which of the following statements about these chlorides is correct?
- MCl₂ is more volatile than MCl₄.
 - MCl₂ is more soluble in anhydrous ethanol than MCl₄.
 - MCl₂ is more ionic than MCl₄.
 - MCl₂ is more easily hydrolysed than MCl₄.
8. Which of the following set contains oxide in the sequence basic, amphoteric and acidic respectively?
- SO₂, P₂O₅, CO
 - BaO, Al₂O₃, SiO₂
 - CaO, SiO₂, Al₂O₃
 - Al₂O₃, CO₂, CO
9. Assertion: Most of the compounds of p-block elements are covalent.
Reason: p-block elements, in general, have high electron affinities.
- Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
 - Both Assertion and Reason are true and Reason is not the correct explanation of the Assertion.
 - Assertion is true but Reason is false.
 - Assertion is false but Reason is true.
10. Assertion: The heavier p-block elements do not form strong π bonds.
Reason: The heavier elements of p-block form d π -d π bonds.
- Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
 - Both Assertion and Reason are true and Reason is not the correct explanation of the Assertion.
 - Assertion is true but Reason is false.
 - Assertion is false but Reason is true.

SHORT ANSWER TYPE (2 M)

11. Define the terms
 - a. Inert pair effect.
 - b. Electron deficient compounds

12. Give reason for the following.
 - a. IE_1 of the main group elements decreases down the group.
 - b. IE_1 of Ga > Al.

13. Classify the following as neutral, acidic, basic and amphoteric.
 Al_2O_3 , CO_2 , SiO_2 , CO

14. Explain the following.
 - a. Con. HNO_3 can be transported in aluminium containers.
 - b. A mixture of NaOH and Al is used to open drains.

15. What happens when (write equations)
 - a. $SiCl_4$ undergoes hydrolysis.
 - b. Tin is heated with steam.

SHORT ANSWER TYPE (3 M)

16. Account for the following.
 - a. Pb^{2+} is more stable than Pb^{4+} .
 - b. Fullerene is the purest form of carbon.
 - c. Carbon differs from the rest of the group 14 elements.

17. Justify the following statements.
 - a. Graphite is a non-metal but a good conductor of electricity.
 - b. Diamond is covalent but has a very high melting point.
 - c. $[AlF_6]^{3-}$ is known but not $[BF_6]^{3-}$

18. Give reason
 - a. Graphite is used as a lubricant.
 - b. Diamond is a good abrasive.
 - c. BF_3 acts as a Lewis acid.

LONG ANSWER TYPE (5M)

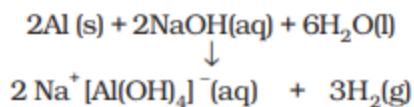
19. a. Discuss the structure of Buckminster fullerene.
 - b. Explain why $SiCl_4$ is hydrolysed while CCl_4 is not.
 - c. Show the amphoteric nature of Al.
 - d. If B–Cl bond has a dipole moment, explain why BCl_3 molecule has zero dipole moment.
 - e. How can you explain higher stability of BCl_3 as compared to $TiCl_3$?

20. Match the following.

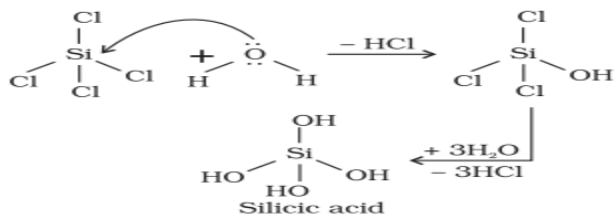
Column I	Column II
i. BF_4^-	p. Oxidation state of central atom is +4
ii. AlCl_3	q. Strong oxidising agent
iii. SnO	r. Lewis acids
iv. PbO_2	t. Can be further oxidised
	u. Tetrahedral shape

Hints

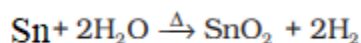
1. b
 2. c
 3. a
 4. b
 5. d
 6. c
 7. c
 8. b
 9. b
 10. a
11. a. The inert pair effect is the tendency of the two electrons in the outermost atomic *s*-orbital to remain unshared. Inert pair effect is the increasing stability of oxidation states that are two less than the group valency for the heavier elements of groups 13, 14, 15 and 16. The outermost *s* electrons are more tightly bound to the nucleus in these atoms, and therefore more difficult to ionize or share.
- b. Certain compounds have central atom with lesser number of valence electrons when compared to octet configuration. Hence, they are good electron acceptors. Eg BCl_3
12. a. Z_{eff} decreases, shielding effect increases, Outermost electrons are loosely bonded to the nucleus down the group.
- b. Ga – d orbital -offer poor shielding effect and hence the outermost electron is closely bonded to the nucleus.
13. Al_2O_3 – amphoteric
 CO_2 – acidic
 SiO_2 – acidic
CO - Neutral
14. a. Conc. HNO_3 can be stored and transported in aluminium containers since it reacts with aluminium to form thick protective oxide layer which makes aluminium passive.
- b. Aluminium pieces dissolve in dilute NaOH to evolve dihydrogen **gas** whose presence can be used to open clogged drain



15. a.



b.



16. a. Inert pair effect

b. Fullerenes are pure carbons that are in the shape of spherical hollow cage like a soccer ball with 60 carbon atoms. Fullerene is the purest as it has no surface bonds to attract other molecules to react with it.

c. Anomalous behaviour- explain

17. a. Each carbon atom in hexagonal ring, sp^2 hybridisation and makes three sigma bonds with three neighbouring carbon atoms.

Fourth electron forms a π bond. The electrons are delocalised hence conductor.

b. In diamond each carbon atom - sp^3 hybridisation and linked to four other C atoms in tetrahedral fashion. The structure extends in space and produces a rigid three-dimensional network of carbon atoms.

c. Al has 3d orbitals whereas B does not have.

18. a. Graphite has layered structure. Layers are held by van der Waals forces and distance between two layers is 340 pm. Each layer is composed of planar hexagonal rings of carbon atoms. Graphite cleaves easily between the layers and, therefore, it is very soft and slippery.

b. In diamond each carbon atom undergoes sp^3 hybridisation and linked to four other carbon atoms by using hybridised orbitals in tetrahedral fashion. The structure extends in space and produces a rigid three-dimensional network of carbon atoms. In this structure, directional covalent bonds are present throughout the lattice.

c. Electron deficient, electron pair acceptor

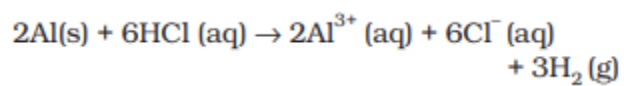
19. a. Fullerenes are cage like molecules. C_{60} molecule has a shape like soccer ball and called Buckminsterfullerene

It contains twenty-six- membered rings and twelve five-membered rings. All the carbon atoms are equal and they undergo sp^2 hybridisation. Each carbon atom forms three sigma bonds with other three C atoms.

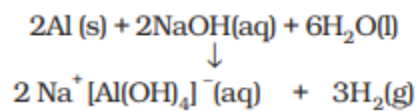
b. Si undergoes hydrolysis by initially accepting lone pair of electrons from water molecule in d orbitals of

Si, finally leading to the formation of Si(OH)_4 .

c. **Al acts as a base**



Al acts as an acid



d. The resultant of dipoles 1 and 2 will be equal and opposite to the third dipole.

e. Tl – Inert pair effect hence +1 is more stable.

20. i – u

ii – r

iii – t

iv - p, q

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