	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**DEPARTMENT: SCIENCE 2021-22** **SUBJECT: CHEMISTRY**	**Date of submission:** **30.08.2021**
Worksheet No: 06 **with answers**	**Chapter: THE p BLOCK ELEMENTS**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC:**	**ROLL NO.**

MULTIPLE CHOICE QUESTIONS

1. The length of oxygen-oxygen bond in ozone is _____
   a. 128 pm
   b. 134 pm
   c. 430 pm
   d. 290 pm

2. N-N bond is weaker than the single P-P bond because
   a. high interelectronic repulsion of the bonding electrons.
   b. high interelectronic repulsion of the non-bonding electrons
   c. no repulsion between bonding electrons
   d. no repulsion between non-bonding electrons

3. On a small scale, ammonia is obtained from ammonium salts which decompose when treated with
   a. caustic soda
   b. calcium chloride
   c. magnesium hydroxide
   d. sodium chloride

4. The negative electron gain enthalpy of F is less than that of Cl
   a. due to the small size of fluorine atom
   b. due to strong interelectronic repulsions in the relatively small 2p orbitals of fluorine.
   c. Both a and b
   d. None of these

5. X-X bond dissociation enthalpy show which of the following trends.
   a. $Cl_2 > Br_2 > F_2 > I_2$
   b. $F_2 > Br_2 > Cl_2 > I_2$

c. $I_2 > Br_2 > Cl_2 > F_2$
d. $Cl_2 > Br_2 > F_2 > I_2$

6. Among the following which is the strongest oxidizing agent?
a. Br_2 b. Cl_2
c. F_2 d. I_2

7. The shape of XeF_4 is
a. tetrahedral b. square planar
c. pyramidal d. linear

8. The boiling points of hydrides of group 16 are in the order
a. $H_2O > H_2Te > H_2S > H_2Se$
b. $H_2O > H_2S > H_2Se > H_2Te$
c. $H_2O > H_2Te > H_2Se > H_2S$
d. None of these

9. The set with correct order of acidity is
a. $HClO < HClO_2 < HClO_3 < HClO_4$
b. $HClO_4 < HClO_3 < HClO_2 < HClO$
c. $HClO < HClO_4 < HClO_3 < HClO_2$
d. $HClO_4 < HClO_2 < HClO_3 < HClO$

10. The formation of $O_2^+ [PtF_6]^-$ is the basis for the formation of first xenon compound. This is because
a. O_2 and Xe have different sizes.
b. both O_2 and Xe are gases.
c. O_2 and Xe have comparable electronegativities.
d. O_2 and Xe have comparable ionisation enthalpies.

11. Which of the following is the correct statement?
a. F_2 has higher dissociation energy than Cl_2.
b. F has higher electron affinity than Cl.
c. HF is stronger acid than HCl.
d. Boiling point increases down the group in halogens.

12. Among the following compounds, which on heating do not produce N_2?
a. $(NH_4)_2Cr_2O_7$
b. $NH_4Cl + NaNO_2$
c. $NH_4Cl + CaO$
d. $Ba(N_3)_2$

13. Bleaching action of SO_2 is due to its
a. acidic property
b. basic property
c. reducing property

d. oxidising property

14. Match the interhalogen compounds of column I with the geometry in Column II .

Column I	Column II
i. XX'_3	p. Pentagonal bipyramidal
ii. XX'_5	q. Bent T shape
iii. XX'_7	r. Square pyramidal

a. i - q , ii – r , iii – p
b. i - q , ii – p, iii – r
c. i – r, ii – p , iii – q
d. i - p, ii – q , iii - r

15. Assertion: Finely divided iron does not form ferric chloride with HCl.
Reason: HCl produces hydrogen gas with iron.
a. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
b. Both Assertion and Reason are true and Reason is not a correct explanation of the Assertion.
c. Assertion is true but Reason is false.
d. Assertion is false and Reason is true.

16. Assertion: Bond angle of H_2S is smaller than H_2O.
Reason: Electronegativity of the central atom increases, bond angle decreases.
a. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
b. Both Assertion and Reason are true and Reason is not a correct explanation of the Assertion.
c. Assertion is true but Reason is false.
d. Assertion is false and Reason is true.

17. Assertion: SF_6 cannot be hydrolysed but SF_4 can be.
Reason: Six F atoms in SF_6 prevent the attack of H_2O on sulphur atom of SF_6.
a. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
b. Both Assertion and Reason are true and Reason is not a correct explanation of the Assertion.
c. Assertion is true but Reason is false.
d. Assertion is false and Reason is true.

18. Assertion: Dinitrogen is inert at room temperature.
Reason: Dinitrogen directly combines with lithium to form ionic nitrides.
a. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion.
b. Both Assertion and Reason are true and Reason is not a correct explanation of the Assertion.
c. Assertion is true but Reason is false.
d. Assertion is false and Reason is true.

1 MARK TYPE

19. Complete the following equations.
i. $XeF_2 + H_2O \rightarrow$

ii. I_2 + HNO_3 (conc) →
iii. XeF_4 + H_2O →
iv. NaOH (hot and conc) + Cl_2 →
v. XeF_4 + O_2F_2 →

20. Give reasons for the following.

a. Sulphur in vapour state exhibits paramagnetic behaviour.
b. In the structure of HNO_3, the N-O bond (121 pm) is shorter than the N-OH bond (140 pm).
c. ICl is more reactive than I_2.
d. The electron gain enthalpy with negative sign for Fluorine is less than that of Chlorine, still Fluorine is a stronger oxidizing than Chlorine.
e. Helium is used in driving apparatus as a diluent for oxygen.
f. Oxygen has less electron gain enthalpy with negative sign than Sulphur.
g. H_2Te is the strongest reducing agent amongst all the hydrides of Group 16 elements.
h. N_2 is less reactive at room temperature.

2 MARKS TYPE

21. What happens when
a. Chlorine gas is passed through a cold dilute solution of NaOH?
b. Sulphur dioxide gas is passed through an aqueous solution of Fe(III) salt?

22. Answer the following.

a. Why does fluorine not play the role of a central atom in interhalogen compounds?
b. Why do noble gases have very low boiling points?

23. Predict the shape and the asked angle (90^o or more or less) in each of the following cases:
i. ClF_3 and the angle F-Cl-F
ii. XeF_2 and the angle F-Xe-F

3 MARKS TYPE

24. Account for the following statements.
i. Fluoride ion has higher hydration enthalpy than chloride ion.
ii. Nitrogen do not form pentahalide.
iii. Thermal stability decreases from H_2O to H_2Te.

25. Give the formula and describe the structure of a noble gas species which is isostructural with
i. ICl_4^- ii. IBr_2^- iii. BrO_3^-

5 MARKS TYPE

26. a. Arrange the following in the order of property indicated for each

i . HF , HCl , HBr , HI (increasing acidic strength)
ii. NH_3 , PH_3 , AsH_3 , SbH_3 , BiH_3 (increasing base strength)

b. Arrange the following in the decreasing order of their reducing character.
HF , HCl , HBr , HI

c. Give reasons
When Cl_2 reacts with excess of F_2, ClF_3 is formed and not FCl_3

27. Among the hydrides of group 15 elements, which have the
a. lowest boiling point?
b. maximum basic character?
c. highest bond angle?
d. maximum reducing character?

CASE STUDY QUESTION WITH ANSWER

28. Read the passage given below and answer the following questions:

Ozone is an unstable, dark blue diamagnetic gas. It absorbs the UV radiation strongly, thus protecting the people on earth from the harmful UV-radiation from the sun. The use of chlorofluorocarbon (CFC) in aerosol and refrigerator and their subsequent escape into the atmosphere, is blamed for making holes in the ozone layer over the Antarctica. Ozone acts as a strong oxidising agent in acidic and alkaline medium. For this property, ozone is used as a germicide and disinfectant for sterilizing water. It is also used in laboratory for the ozonolysis of organic compounds and in industry for the manufacture of potassium permanganate, artificial silk, etc.

(i) Which of the following statements is not correct for ozone?
(a) It oxidises lead sulphide
(b) It oxidises potassium iodide
(c) It oxidises mercury
(d) It cannot act as bleaching agent.
Ans. d

(ii) Ozone reacts with moist iodine gives
(a) HI
(b) HIO_3
(c) I_2O_5
(d) I_2O_4
Ans. b

(iii) Ozone acts as an oxidising agent due to
(a) liberation of nascent oxygen
(b) liberation of oxygen gas
(c) both (a) and (b)
(d) none of these
Ans. a

(iv) The colour of ozone molecule is
(a) white
(b) blue
(c) pale green
(d) pale yellow

Ans. b

Answer Key

1. a
2. b
3. a
4. c
5. a
6. c
7. b
8. c
9. a
10. d
11. d
12. c
13. c
14. a
15. a
16. c
17. a
18. c

19. i.

$$2XeF_2\,(s) + 2H_2O(l) \rightarrow 2Xe\,(g) + 4\,HF(aq) + O_2(g)$$

ii.

$$I_2 + 10HNO_3 \rightarrow 2HIO_3 + 10NO_2 + 4H_2O$$

iii

$$6XeF_4 + 12\,H_2O \rightarrow 4Xe + 2XeO_3 + 24\,HF + 3\,O_2$$

iv.

$$6\,NaOH + 3Cl_2 \rightarrow 5NaCl + NaClO_3 + 3H_2O$$

(hot and conc.)

v.

$$XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$$

20. a. Due to unpaired electrons in the antibonding π^* orbital
    b. N-O bond has partial double bond character due to resonance. N-OH bond is a single bond.
    c. Due to dissimilar atoms with different electronegativities.
    d. Low enthalpy of dissociation of F-F bond and high hydration enthalpy of F.
    e. Less reactive, noble gas. Very less solubility in blood.
    f. The electron is added to larger n= 3 level in S and therefore less electron – electron repulsion.
    g. Weak overlapping between large orbitals of Te and small orbitals of H
. h. Triple bonded , very stable

21. a

$$2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$$
(cold and dilute)

b.

$$2Fe^{3+} + SO_2 + 2H_2O \rightarrow 2Fe^{2+} + SO_4^{2-} + 4H^+$$

22 a. Small size and absence of d orbitals.
b. Very weak van der Waals forces.

23. i. Less than 90°, Bent T structure
ii. More than 90°, Linear structure

24. i. Small size, high electronegativity of F.
ii. Absence of d orbitals
iii. Bond dissociation enthalpy decreases down the group.

25. i. XeF_4 , Square planar, Draw structure
ii. XeF_2, Linear , draw structure
iii. XeO_3 , Trigonal pyramidal

26. a. i. $HF < HCl < HBr < HI$
ii. $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$

b. $HI > HBr > HCl > HF$

c. Fluorine does not possess d orbitals, so it cannot expand its octet to bond with three chlorine atoms and form FCl_3. Chlorine has empty d orbitals and thus, it can expand its octet to bond with three fluorine atoms and form ClF_3.

27. a. PH_3
b. NH_3
c. NH_3
d. BiH_3

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