



INDIAN SCHOOL DARSAIT  
DEPARTMENT OF CHEMISTRY



Subject: Chemistry		Topic : p-Block Elements	Date of Worksheet: 7..9.2018
Resource Person: SREEKALA M		Date of Submission: _____	
Name of the Student: _____		Class & Division: XII	Roll Number: _____
1.	Which is a stronger acid in aqueous solution, HCl or HI? And why?		1
2.	Which one has higher electron gain enthalpy with negative sign, sulphur or oxygen?		1
3.	Which xenon compound is isostructural with $\text{ICl}_4^-$ ?		1
4.	Which of the following compounds has a lone pair of electrons at the central atom? $\text{H}_2\text{S}_2\text{O}_8$ , $\text{H}_2\text{S}_2\text{O}_7$ , $\text{H}_2\text{SO}_3$ , $\text{H}_2\text{SO}_4$		1
5.	Complete the following reactions: a) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \xrightarrow{\text{heat}}$ b) $\text{I}^- + \text{O}_3 + \text{H}_2\text{O} \rightarrow$ c) $\text{NaOH}(\text{ hot and conc.}) + \text{Cl}_2 \rightarrow$ d) $\text{XeF}_4 + \text{O}_2\text{F}_2 (143\text{K}) \rightarrow$ e) $\text{Br}_2 + \text{F}_2 (\text{excess}) \rightarrow$ f) $\text{PCl}_3 + \text{H}_2\text{O} \rightarrow$ g) $\text{XeF}_2 + \text{PF}_5 \xrightarrow{\Delta}$ h) $\text{NaN}_3 \rightarrow$ i) $\text{F}_{2(\text{g})} + \text{H}_2\text{O}(\text{l}) \rightarrow$ j) $\text{Ca}_3\text{P}_2(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow$	k) $\text{P}_4 + \text{NaOH} + \text{H}_2\text{O} \rightarrow$ l) $\text{Cu} + \text{HNO}_3(\text{dil}) \rightarrow$ m) $\text{P}_4 + \text{SO}_2\text{Cl}_2 \rightarrow$ n) $\text{Fe}^{3+} + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$ o) $\text{XeF}_6 + \text{H}_2\text{O}(\text{excess}) \rightarrow$ p) $\text{C} + \text{H}_2\text{SO}_4(\text{conc.}) \rightarrow$ q) $\text{Cl}_2 + \text{F}_2 (\text{excess}) \rightarrow$ r) $\text{AgCl}(\text{s}) + \text{NH}_3(\text{aq}) \rightarrow$ s) $\text{HgCl}_2(\text{aq}) + \text{PH}_3(\text{g}) \rightarrow$ t) $\text{PCl}_5 + \text{H}_2\text{O}(\text{excess}) \rightarrow$ u) $\text{Cu}^{2+} + \text{NH}_3 (\text{excess}) \rightarrow$	1 mark each
6.	Give chemical reaction in support of the following observations. a) Sulphuric acid has low volatility b) Iodide ions can be oxidized by oxygen in acidic medium		2
7.	a) Suggest a quantitative method for estimation of the gas which protects us from UV rays of the sun. b) Nitrogen oxides emitted from the exhaust system of supersonic jet aeroplanes slowly deplete the concentration of ozone layer in upper atmosphere. Comment.		2

8.	<p>Draw the structures of the following molecules</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">i. <math>\text{BrF}_3</math></td> <td style="width: 33%;">viii. <math>\text{XeF}_4</math></td> <td style="width: 33%;">xv. <math>\text{N}_2\text{O}_5</math></td> </tr> <tr> <td>ii. <math>\text{XeOF}_4</math></td> <td>ix. <math>\text{O}_3</math></td> <td>xvi. <math>\text{HOClO}_2</math></td> </tr> <tr> <td>iii. <math>\text{H}_2\text{S}_2\text{O}_7</math></td> <td>x. <math>\text{S}_8</math></td> <td>xvii. <math>\text{XeF}_6</math></td> </tr> <tr> <td>iv. Solid <math>\text{PCl}_5</math></td> <td>xi. <math>\text{NF}_3</math></td> <td>xviii. <math>\text{SF}_4</math></td> </tr> <tr> <td>v. <math>\text{H}_2\text{S}_2\text{O}_8</math></td> <td>xii. <math>\text{PCl}_3</math></td> <td>xix. <math>\text{ClF}_3</math></td> </tr> <tr> <td>vi. <math>\text{H}_3\text{PO}_2</math></td> <td>xiii. <math>\text{XeF}_2</math></td> <td>xx. <math>\text{BrF}_5</math></td> </tr> <tr> <td>vii. <math>\text{H}_3\text{PO}_3</math></td> <td>xiv. <math>\text{XeO}_3</math></td> <td></td> </tr> </table>	i. $\text{BrF}_3$	viii. $\text{XeF}_4$	xv. $\text{N}_2\text{O}_5$	ii. $\text{XeOF}_4$	ix. $\text{O}_3$	xvi. $\text{HOClO}_2$	iii. $\text{H}_2\text{S}_2\text{O}_7$	x. $\text{S}_8$	xvii. $\text{XeF}_6$	iv. Solid $\text{PCl}_5$	xi. $\text{NF}_3$	xviii. $\text{SF}_4$	v. $\text{H}_2\text{S}_2\text{O}_8$	xii. $\text{PCl}_3$	xix. $\text{ClF}_3$	vi. $\text{H}_3\text{PO}_2$	xiii. $\text{XeF}_2$	xx. $\text{BrF}_5$	vii. $\text{H}_3\text{PO}_3$	xiv. $\text{XeO}_3$		1 mark each
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9.	<p>Arrange the following in the order of property indicated for each set:</p> <p>i) <math>\text{HF}</math>, <math>\text{HCl}</math>, <math>\text{HBr}</math>, <math>\text{HI}</math> -Increasing acid strength.</p> <p>ii) <math>\text{NH}_3</math>, <math>\text{PH}_3</math>, <math>\text{AsH}_3</math>, <math>\text{SbH}_3</math>, <math>\text{BiH}_3</math> - Increasing reducing power.</p> <p>iii) <math>\text{HCl}</math>, <math>\text{HI}</math>, <math>\text{HBr}</math>, <math>\text{HF}</math> - Decreasing thermal stability.</p> <p>iv) <math>\text{Xe}</math>, <math>\text{He}</math>, <math>\text{Kr}</math>, <math>\text{Rn}</math>, <math>\text{Ne}</math> - Decreasing order of electron gain enthalpy .</p> <p>v) <math>\text{F}_2</math>, <math>\text{Cl}_2</math>, <math>\text{Br}_2</math>, <math>\text{I}_2</math> - Increasing bond dissociation enthalpy.</p>	1 mark each																					
10.	<p>Write balanced chemical equations for the following reactions:</p> <p>i) Reaction of <math>\text{Cl}_2</math> with cold and dilute <math>\text{NaOH}</math>.</p> <p>ii) When phosphine is passed through Copper sulphate solution.</p> <p>iii) Chlorine reacts with hot concentrated solution of sodium hydroxide.</p> <p>iv) Orthophosphorus acid is heated.</p> <p>v) <math>\text{PtF}_6</math> and Xenon are mixed together.</p>	1 mark each																					
11.	<p>An orange solid A on heating gives a colourless gas B. The gas B in dry condition is passed over heated Ca to give a solid C. The solid C further reacts with water to produce gas D which forms a blue coloured compound E on reaction with copper sulphate solution. Identify A,B,C,D,E and give the sequence of reactions involved.</p>	2																					
12.	<p>a) Which neutral molecule would be isoelectronic with <math>\text{ClO}^-</math> ?</p> <p>b) Of <math>\text{Bi(V)}</math> and <math>\text{Sb(V)}</math> which may be a stronger oxidizing agent and why?</p> <p>c) Describe the favourable conditions for the manufacture of sulphuric acid by Contact process.</p> <p>d) Mention the optimum conditions for the industrial manufacture of ammonia by Haber' process.</p>	1 mark each																					
13	<p>Account for the following:</p> <p>a) Ammonia is a stronger base than phosphine.</p> <p>b) Bond angle in <math>\text{PH}_3</math> molecule is lesser than that in <math>\text{NH}_3</math>.</p> <p>c) Solid <math>\text{PCl}_5</math> is an ionic compound.</p> <p>d) <math>\text{PCl}_5</math> is known but <math>\text{NCl}_5</math> is not known.</p> <p>e) Phosphorous has a greater tendency for catenation than nitrogen.</p> <p>f) Red phosphorus is less reactive than white phosphorous</p> <p>g) Pentahalides are more covalent than trihalides.</p> <p>h) Phosphorous(<math>\text{P}_4</math>) is more reactive than nitrogen(<math>\text{N}_2</math>).</p> <p>i) The stability of +3 state increases down the group in group 15 of the periodic table.</p> <p>j) Bond angle of <math>\text{PH}_4^+</math> is higher than <math>\text{PH}_3</math></p>	1 mark each																					

k)	H <sub>3</sub> PO <sub>2</sub> acts as a monobasic acid.	
l)	Sulphur vapour exhibits paramagnetic behavior.	
m)	O <sub>3</sub> is more powerful oxidizing agent.	
n)	Ozone is thermodynamically unstable.	
o)	All bonds in PCl <sub>5</sub> are not equal in length.	
p)	SF <sub>6</sub> is much less reactive than SF <sub>4</sub> .	
q)	H <sub>2</sub> S is less acidic than H <sub>2</sub> Te.	
r)	SF <sub>4</sub> is hydrolysed whereas SF <sub>6</sub> is not easily hydrolysed.	
s)	H <sub>2</sub> O is liquid while H <sub>2</sub> S is a gas.	
14.	Explain the following:	1 mark each
a)	Iron dissolves in HCl to form FeCl <sub>2</sub> and not FeCl <sub>3</sub> .	
b)	Fluorine is a stronger oxidizing agent than chlorine.	
c)	Fluorine does not exhibit any positive oxidation state	
d)	Noble gases are the least reactive elements.	
e)	XeF <sub>2</sub> has a linear shape and not a bent structure.	
f)	Amongst all noble gases only xenon is known to form compounds with oxygen and fluorine.	
g)	Helium is used in diving equipment	
h)	No distinct chemical compound of helium is known.	
i)	Most of the reactions of fluorine are exothermic	
j)	The following order of increase in strength of acids: PH <sub>3</sub> < H <sub>2</sub> S < HCl	
k)	The oxidizing power of oxoacids of chlorine follows the order: HClO <sub>4</sub> < HClO <sub>3</sub> < HClO <sub>2</sub> < HClO	
l)	The acidic property of oxoacids of chlorine follows the order: HClO <sub>4</sub> > HClO <sub>3</sub> > HClO <sub>2</sub> > HClO	
m)	In the structure of HNO <sub>3</sub> molecule, the N-O bond(121pm) is shorter than N-OH bond (140pm)	
n)	In solution of H <sub>2</sub> SO <sub>4</sub> in water, the second dissociation constant Ka <sub>2</sub> is less than the first dissociation constant Ka <sub>1</sub>	
o)	The pKa value for HOCl is higher than that of HClO <sub>2</sub>	
p)	. Inter halogen compounds are more reactive than halogens	
q)	The basic character among the hydrides of group 15 elements decreases with increasing atomic numbers	