



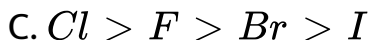
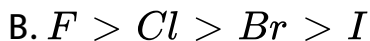
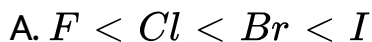
CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

THE P-BLOCK ELEMENTS (XII)

Level I Homework

1. Electron affinity of halogens follows the order



D. $Cl > Br > I > F$

Answer:

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2. The oxidation states shown by halogens are -1, +1, +3, +5 and +7. The oxidation state(s) shown by all the halogens is

A. -1 and +3

B. -1, +1 and +3

C. Only -1

D. Only +3

Answer:

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3. When F_2 gas reacts with H_2O , it forms

A. O_2 gas

B. O_2F_2 gas

C. HOF

D. Both 2 and 3

Answer:

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4. F_2 combines with O_2 to form OF_2 and O_2F_2 which are:

- A. Oxygen fluorides
- B. Oxides of fluorine
- C. Anhydride of HOF
- D. Both 2 and 3

Answer:



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5. The order of acidity of oxides of chlorine:

(i) Cl_2O , (ii) Cl_2O_3 , (iii) Cl_2O_6 , (iv) Cl_2O_7 is

A. $I < II < III < IV$

B. $I > II > III > IV$

C. $I > III > II > IV$

D. $IV > I > II > III$

Answer:

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6. Deacon's process is used for the manufacture of:

A. HNO_3

B. I_2

C. Cl_2

D. Br_2

Answer:

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7. Aqua regia, which is used for dissolving noble metals like gold and platinum etc. Is:

- A. 1: 3 mixture of conc.HCl and conc. HNO_3
- B. 3: 1 mixture of conc. HCl and conc. HNO_3
- C. 1: 1 mixture of conc. HCl and conc. HNO_3
- D. 3: 1 mixture of dilute HCl and conc. HNO_3

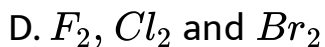
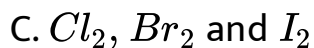
Answer:



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8. Halogens react with oxygen to form many oxoacids, commonly named as hypohalous acid, halous acid, halic

acid and perhalic acid. The halogen(s) which form (s) halous acid is/are:



Answer:



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9. The number of peroxide linkages in perchloric acid is

A. Zero

B. One

C. Two

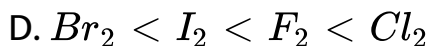
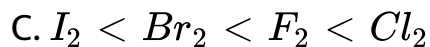
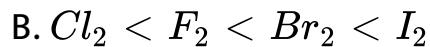
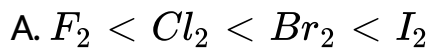
D. Four

Answer:



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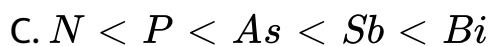
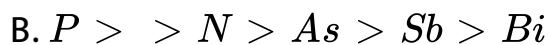
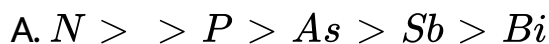
10. Which is the correct order of bond length?



Answer:

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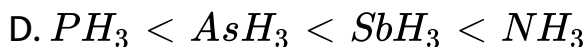
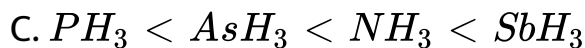
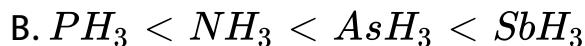
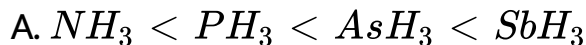
11. Catenation property of group 15 elements follow the order



Answer:

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12. Melting point of hydrides of nitrogen family follows the order:

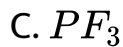


Answer:



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13. Which of the following halides of group 15 is not hydrolysed?



D. Both 1 and 3

Answer:



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14. Brown ring test is used for the identification of





Answer:

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15. White phosphorus occurs as discrete P_4 units, where P atoms lie at the corners of a regular tetrahedral. The PPP bond angle is

A. 90°

B. $109^\circ 28'$

C. 60°

D. 120°

Answer:



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16. Orthophosphorus acid on heating gives

- A. Hypophosphorus acid
- B. Orthophosphoric acid
- C. Phosphene gas
- D. Both 2 and 3

Answer:



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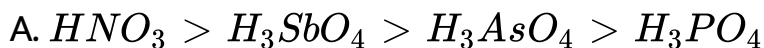
17. Which of the following is correct?

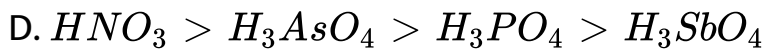
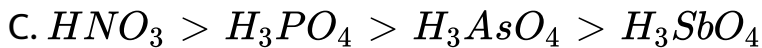
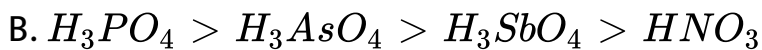
- A. H_3PO_3 is dibasic and reducing
- B. H_3PO_3 is dibasic and non-reducing
- C. H_3PO_3 is tribasic and reducing
- D. H_3PO_3 is tribasic and non-reducing

Answer:

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18. The correct order of decreasing acidic strength of oxyacids of group 15 element is:

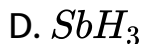
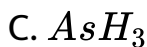




Answer:

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19. The bond angle is maximum in



Answer:

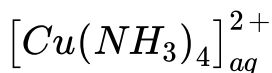


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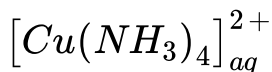
20. When excess of $NH_3(aq)$ is added to a blue solution containing Cu^{2+} ions

A. Solution turns red due to formation of Cu^+ ions

B. Solution becomes red due to formation of



C. Solution become deep blue due to formation of



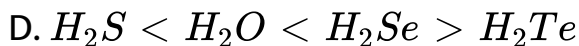
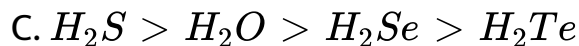
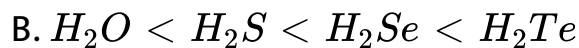
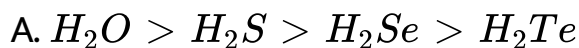
D. Solution becomes colourless due to excess colourless



Answer:

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21. The correct order of acidity of hydrides of oxygen family:



Answer:

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22. S and O both are non-metals in the oxygen family, but their melting points are largely different, O = 90 K and S = 718 K. This is because

A. A. S is larger in size than O

B. B. S exhibits more oxidation states +2, +4 and +6
whereas O exhibits only -2 and +2 oxidation states

C. C. O exists as diatomic molecule whereas S exists as polyatomic molecule (S_8)

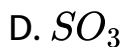
D. D. S has more allotropes than O

Answer:



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23. Which of the following is not a reducing oxide?



Answer:



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24. Which element in group 16 do not form dichlorides and dibromides?



B. Tellurium

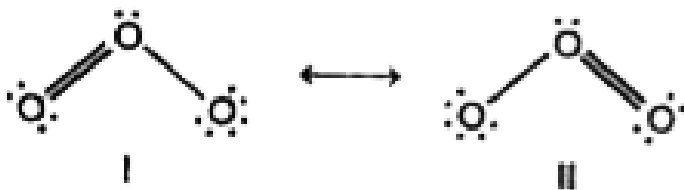
C. Oxygen

D. Sulphur

Answer:

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25. O_3 molecule is a resonance hybrid of the two structure I and II



The two oxygen-oxygen bond lengths in ozone molecule are

- A. Identical
- B. Slightly different
- C. Largely different
- D. Cannot be measured due to resonance

Answer:



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26. S_8 ring of both rhombic sulphur and monoclinic sulphur has crown shaped structure. The S-S-S bond angle in S_8 ring is:

A. $109^\circ 28'$

B. 107°

C. 104°

D. 120°

Answer:



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27. In the contact process of manufacturing of H_2SO_4 , the catalyst used is:

A. P_2O_5

B. V_2O_5

C. Rh

D. NO

Answer:



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28. Number of S = O bonds in pyrosulphuric acid are

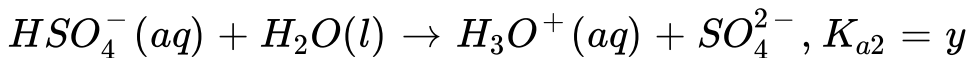
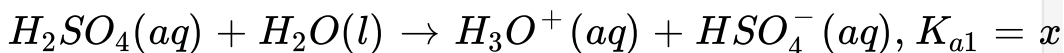
- A. two
- B. four
- C. five
- D. six

Answer:



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29. H_2SO_4 in aqueous medium ionises in two steps



What is relation between x and y

A. $x < y$

B. $x = y$

C. $x > y$

D. $x > y$

Answer:



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30. What is the product when Mg react with SO_2 ?

A. MgO

B. $MgSO_4$

C. MgS

D. Both 1 and 3

Answer:

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Level II Group 15 Elements Pnictogens

1. Which of the following is a false statement regarding the general characteristics of nitrogen family?

A. A. Outer electronic configuration is ns^2np^3

B. B. Nitrogen exist as diatomic species N_2 , while others exist as polyatomic

C. C. All elements except nitrogen gas exhibit allotropy

D. D. $R_3N = O$ exists but $R_3P = O$ doesn't

Answer:

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2. Nitrogen shows anomalous properties with other elements in its group. Which statement is incorrect?

A. A. Catenation tendency of nitrogen is higher.

B. B. Nitrogen mainly form covalent compounds and due to its high electronegative character, shows oxidation state -3, but others exhibit oxidation state -3 to +5

C. C. For nitrogen, oxidation state +1 to +4 compounds undergo disproportionation in acid medium

D. D. Nitrogen is chemically inert due to high bond enthalpy.

Answer:



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3. Group 15 elements combine with hydrogen to form hydrides MH_3 . Which is false regarding their properties?

A. A. Bond angle decreases from NH_3 to SbH_3 due to increase in size of central atom and decrease in electronegativity

B. B. stability and basic character increases from NH_3 to BiH_3

C. c. Reducing agent



D. D. Order of boiling point



Answer:

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4. Group 15 elements combine with oxygen to form various oxides, identify the wrong property?

A. A. All oxides of nitrogen are basic

B. B. Oxides of phosphorous P_4O_6 and P_4O_{10} are acidic

C. C. As_2O_3 is weakly acidic, Sb_2O_3 amphoteric and oxide of Bi is weakly basic

D. D. Oxides of P have cage like structure

Answer:

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5. Pure dinitrogen is prepared in the laboratory by heating

- A. Barium azide or sodium azide
- B. NH_4Cl with $NaNO_2$ solution
- C. Ammonium dichromate
- D. Ammonia with CuO or bleaching powder

Answer:



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6. The non combustible hydride of nitrogen, colourless gas with pungent smell, high enthalpy of formation

(exothermic) soluble in water is produced in the nature by

- A. heating ammonium chloride with slaked lime
- B. By heating ammonium sulphate with sodium hydroxide
- C. By hydrolysis of Mg_3N_2 or Haber process
- D. By slow decomposition of organic matter like urea

Answer:



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7. Which of the following test can be used to distinguish ammonia?

- A. It gives dense white fumes with con. HCl (a drop)
- B. It gives brown precipitate with Nessler's reagent
- C. When $CuSO_4$ solution is added to NH_3 it gives deep blue complex
- D. All the above

Answer:

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8. Which is incorrect regarding the most important oxoacid of nitrogen, HNO_3 (aqua fortis)?

- A. A. It is prepared in the laboratory by heating KNO_3 with con. H_2SO_4

B. B. It is a strong oxidising agent and cold dilute solution of it react with Zn to give N_2O

C. C. In aqueous medium give NO_3 ion

D. D. Con. HNO_3 react with carbon, iodine, sulphur and phosphorous to give CO_2 , I_2O_5 , H_2SO_4 & H_3PO_4

Answer:

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9. NO_2 can be prepared by

A. Heating NH_4NO_3

B. Heating $Pb(NO_3)_2$

C. By heating $NaNO_2$ with $FeSO_4$ and con. H_2SO_4

D. Heating con. HNO_3 with P_4O_{10}

Answer:

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10. Phosphorous can be extracted by:

A. Heating Rock phosphate with coke and silica in an electric furnace

B. Heating white P_4 at 573 K in an inert atmosphere

C. Heating red P_4 in a sealed tube at 803 K

D. Heating white P_4 at 473 K under high pressure

Answer:



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11. Which of the following statement is false regarding phosphine (PH_3)?

A. A. Prepared in the lab by heating white P_4 with NaOH solution in an inert atmosphere of CO_2

B. B. It can be prepared by action of calcium phosphide with water or dilute HCl

C. C. PH_3 is purified by absorbing in HI to form phosphonium iodide which is again treated with KOH to give off phosphine.

D. D. Stable in aqueous solution and more basic than



Answer:



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12. Phosphorous form two types of halides PX_3 and PX_5 .

Pentahalides are more covalent. Which is incorrect? (1) PCl_3

is a colourless fuming liquid, prepared by action of white P_4

on thionylchloride (2) PCl_5 is an yellow/white crystalline

solid with pungent smell obtained by action P_4 with

sulphuryl chloride(SO_2Cl_2),decomposes on heating and act

only as oxidant. (3)In the solid state PCl_5 exit as ionic solid.

(4) PCl_5 react with H_2O to form PCl_3 and HCl .

- A. A. PCl_3 is a colourless fuming liquid, prepared by action of white P_4 on thionylchloride ($SOCl_2$)
- B. B. PCl_5 is an yellow/white crystalline solid with pungent smell obtained by action P_4 with sulphuryl chloride (SO_2Cl_2), decomposes on heating and act only as oxidant
- C. In the solid state PCl_5 exist as ionic solid
- D. PCl_5 react with H_2O to form PCl_3 and HCl

Answer:



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13. Match the following:



1) By heating H_3PO_4

2) White P_4 + alkali

3) P_2O_3 + H_2O

4) P_4O_{10} + H_2O

A. $A \rightarrow 1, B \rightarrow 2, C \rightarrow 3, D \rightarrow 3$

B. $A \rightarrow 2, B \rightarrow 3, C \rightarrow 4, D \rightarrow 1$

C. $A \rightarrow 3, B \rightarrow 2, C \rightarrow 4, D \rightarrow 1$

D. $A \rightarrow 3, B \rightarrow 2, C \rightarrow 1, D \rightarrow 4$

Answer:



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1. Which of the following are the characteristic properties of group 16?

A. A. Group 16 elements are collectively known as chalcogens

B. B. All elements of group 16 exhibit allotropy and negative electron gain enthalpy



C. C. They have low I.E. values compared to group 15

D. D. All the above

Answer:



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2. Elements of oxygen family react with hydrogen to form

H_2E . Which is incorrect statement?

A. Reducing power $H_2S < H_2Se < H_2Te$

B. Acidic character increases due to decrease in bond energy

C. Thermal stability $H_2O > H_2S > H_2Se > H_2Te$

D. Bond angle $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

Answer:



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3. All elements group 16 react with first member oxygen to form oxides. Which is an incorrect statement?

A. All elements form dioxides and trioxides

B. SO_2 is a gas but SeO_2 is a solid TeO_2 PoO_2 are non volatile crystalline solids

C. SO_3 , SeO_3 , TeO_3 are acidic

D. In cyclic trimer of SO_3 (Solid) there are three S-S bonds

Answer:



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4. Elements of group 16 react with halogens of the type EX_6 , EX_4 and EX_2 . Which is false regarding these halides? (1)The stability of halides decreases in the order $F > Cl > Br > I$ (2)All hexafluorides are in gaseous state with octahedral structure (3)Among tetrafluorides SF_4 is a gas, SeF_4 is liquid and TeF_4 solid with seesaw structure (sp^3d hybridisation) (4)Certain monohalides are dimeric in nature ($S_2F_2, S_2Cl_2, SeCl_2$ and Se_2Br_2), they do not disproportionate on heating. Dioxygen react directly with platinum.

A. The stability of halides decreases in the order

B. All hexafluorides are in gaseous state with octahedral structure

C. Among tetrafluorides SF_4 is a gas, SeF_4 liquid and TeF_4 solid with see saw structure (sp_3d hybridisation)

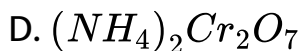
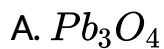
D. Certain monohalides are dimeric in nature (S_2F_2 , S_2Cl_2 , $SeCl_2$ and Se_2Br_2), they do not disproportionate on heating. Dioxygen react directly with platinum.

Answer:



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5. Which of the following compounds will not give oxygen on heating?

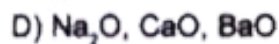
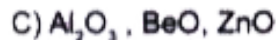
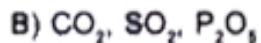
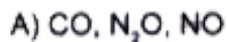


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6. Match the following



1) Mixed oxides

2) Neutral oxides

3) Amphoteric oxides

4) Acidic oxides

5) Basic oxides

A. $A \rightarrow 2, B \rightarrow 4, C \rightarrow 3, D \rightarrow 5, E \rightarrow 1$

B. $A \rightarrow 4, B \rightarrow 2, C \rightarrow 3, D \rightarrow 1, E \rightarrow 5$

C. $A \rightarrow 2, B \rightarrow 4, C \rightarrow 5, d \rightarrow 3, E \rightarrow 1$

D. $A \rightarrow 4, B \rightarrow 2, C \rightarrow 1, D \rightarrow 3, E \rightarrow 4$

Answer:



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7. The diamagnetic allotrope of oxygen is present in stratosphere. This thermodynamically unstable allotrope is depleted by chlorofluorocarbons and NO. Which of the following is false statement w.r.t it?

A. Thermal decomposition is endothermic

- B. It has bent structure, bond order 1.5, bond length 128 pm, pale blue colour and stabilized by resonance
- C. It reacts with KI aqueous solution in presence of borate buffer
- D. It has no reaction with $KMnO_4$ and give the test-tailing of mercury

Answer:

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8. Sulphur has allotropic forms . Which of the following is not true? (1) Rhombic sulphur changes to monoclinic at 369 K and at this temperature both form exist. (2) Both alpha

and beta forms contain S_8 molecules having crown structure heating to 600°C , becomes diamagnetic

(3) Sulphur also exist as S_6 chair form with S-S bond length 205.7 pm and angle 102.2

A. Rhombic sulphur changes to monoclinic at 369 K and

at this temp both form exist

B. Both a and p forms contain S_8 molecules having

crown structure

C. heating to 600°C , becomes diamagnetic

D. Sulphur also exist as S_6 chair form with S-S bond

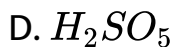
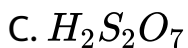
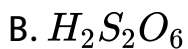
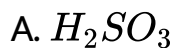
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Answer:



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9. The oxoacid of sulphur that contain a lone pair of electron on sulphur is:



Answer:



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10. When carbon is heated with con. H_2SO_4 the gas liberated is/are:

- A. Only CO_2
- B. Only SO_2
- C. Mixture of CO & CO_2
- D. Mixture of SO_2 and CO_2

Answer:

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Level II Group 17 Halogen Family

1. Which of the following is wrong regarding halogens?

A. A. Fluorine is the most abundant among halogens

B. B. Reactivity of halogens decreases down the group and electronegativity also in same manner

C. C. All halogens have colour with high negative

$\Delta_{eg}H$, $\Delta_{eg}H$ of order $F < Cl > Br > I$

D. D. Bond dissociation enthalpy $F_2 > Cl_2 > Br_2 > I_2$

Answer:



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2. Cl_2 react with excess NH_3 to give

A. N_2 and NH_4Cl

B. NCl_3 and HCl

C. N_2 and NCl_3

D. NCl_3 and NH_4Cl

Answer:



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3. Which is incorrect regarding interhalogen compounds?

A. F could not form central atom of interhalogen compounds

B. They are more reactive than constituent halogens
except fluorine

C. VSEPR theory explain their geometry

D. ClF_3 and BrF_3 are used for the preparation of
 ClF_6

Answer:

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4. Match the following:

A) ClF

B) ClF_3

C) BrF_5

D) IF_7

1) sp^3d^2 hybridisation, pentagonal bipyramidal

2) sp^3 , linear

3) sp^3d T-shape

4) sp^3d^2 square pyramidal

A. $A \rightarrow 2, B \rightarrow 3, C \rightarrow 4, D \rightarrow 1$

B. $A \rightarrow 1, B \rightarrow 3, C \rightarrow 4, D \rightarrow 2$

C. $A \rightarrow 3, B \rightarrow 2, C \rightarrow 4, D \rightarrow 1$

D. $A \rightarrow 2, B \rightarrow 4, C \rightarrow 3, D \rightarrow 1$

Answer:



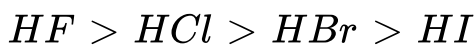
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5. Which are correct statements:

(A) Oxides of Bromine are most stable

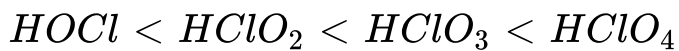
(B) Fluorine form 2 oxides and iodine oxide decompose on heating

(C) Acidity and reducing power of HX acids follow the order



(D) Fluorine form only one oxoacid HOF and the acidity of

oxoacids of chlorine



A. A,B

B. B,D

C. A,B,C,D

D. A,C

Answer:



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6. Which products are expected from the disproportionation of hypochlorous acid

A. HClO_3 and Cl_2O

B. $HClO_2$ and $HClO_4$

C. HCl and Cl_2O

D. HCl and $HClO_3$

Answer:



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Level II Group 18 Noble Gases

1. Elements of group 18 are known as noble gases because

A. Chemically inactive, but react with few elements under certain conditions

- B. Except Rn, all others occur in the atmosphere of which Ar is the major element
- C. He and Ne don't form clathrate compounds
- D. Noble gases have comparatively large size

Answer:

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2. The formation of $O_2^+ [PtF_6]^-$ led to the preparation of xenon compound $Xe^+ [PtF_6]^-$. This is because

- A. O_2 and Xe have comparable sizes
- B. Both O_2 and Xe are gases
- C. O_2 and Xe have comparable ionisation enthalpies

D. O_2 and Xe have very close electronegativity

Answer:

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3. Which are correct regarding noble gases?

B) Low MP and BP.

C) Low ionisation enthalpy and low $\Delta_{eg}H$ for neon

D) High diffusion property with helium

E) Except $\Delta_i H_1$ all other physical properties like BP.

increases down the group

A. A-E

B. A,B,D,E

C. A,C,D,E

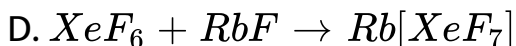
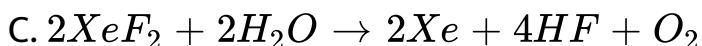
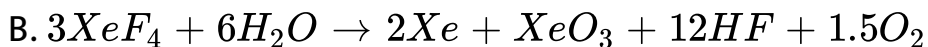
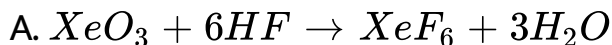
D. A,B,C,D

Answer:



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4. Which of the following reactions of xenon compounds is not feasible?

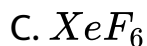


Answer:

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5. Xenon react with fluorine to form 3 types of fluorides.

When Xe treated with F_2 (2 : 1 ratio) at 673 K and 1 bar pressure give:



Answer:

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6. Match the following:

- | | |
|--------------------|---|
| A) XeF_6 | 1) sp^3d^2 distorted octahedron |
| B) XeO_3 | 2) sp^3d^2 , square planar |
| C) XeOF_4 | 3) sp^3 pyramidal |
| D) XeF_4 | 4) sp^3d^2 square pyramidal |

A. $A \rightarrow 1, B \rightarrow 3, C \rightarrow 4, D \rightarrow 2$

B. $A \rightarrow 3, B \rightarrow 1, C \rightarrow 2, D \rightarrow 4$

C. $A \rightarrow 1, B \rightarrow 3, C \rightarrow 2, D \rightarrow 4$

D. $A \rightarrow 4, B \rightarrow 3, C \rightarrow 2, D \rightarrow 1$

Answer:



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1. Assertion: N_2 is less reactive than P

Reason: Nitrogen gas more negative electron gain enthalpy than phosphorous

- A. if both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false
- D. If both assertion and reason are false

Answer:



2. Assertion: SF_6 can't be hydrolysed but SF_4 can be.

Reason: Six fluorine atoms in SF_6 prevent the attack of H_2O on sulphur atom of SF_6

- A. if both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false
- D. If both assertion and reason are false

Answer:



3. Assertion: HI cannot be prepared by the reaction of KI with concentration H_2SO_4

Reason: HI has the lowest H-X bond strength among halogen acids. : if both assertion and reason are true and reason is the correct explanation of assertion, If both assertion and reason are true but reason is not the correct explanation of assertion, If assertion is true but reason is false, If both assertion and reason are false

A. if both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:



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4. Assertion: Xenon is the only group 18 element which form compounds.

Reason: Xenon doesn't form clathrates.

A. if both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:



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5. Assertion: O_3 is a better oxidant than H_2O_2

Reason: The E^0 of O_3 is higher than H_2O_2

A. if both assertion and reason are true and reason is

the correct explanation of assertion

B. If both assertion and reason are true but reason is

not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer:



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