

p-Block Elements Important Questions With Answers

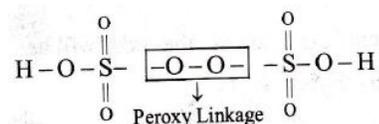
NEET Chemistry 2023

1. Which of the following oxoacid of sulphur has -O-O- linkage?

- a) $\text{H}_2\text{S}_2\text{O}_7$, pyrosulphuric acid b) H_2SO_3 , sulphurous acid c) H_2SO_4 , sulphuric acid

d) $\text{H}_2\text{SO}_2\text{O}_8$, peroxodisulphuric acid

Solution : -



2. P_2O_5 is heated with water to give _____.

- a) Hypophosphorous acid b) Phosphorous acid c) Hypophosphoric acid **d) Orthophosphoric acid**

Solution : -

When P_2O_5 (or P_4O_{10}) is heated with water, it forms orthophosphoric acid (H_3PO_4).

3. Holme's signal uses chemical compound

- a) calcium carbide b) calcium phosphide **c) calcium carbide and calcium phosphide**

d) calcium carbide and aluminium carbide

Solution : -

Holme's signal uses calcium carbide and calcium phosphide. The spontaneous combustion of phosphine is technically used in Holme's signals. Containers containing a mixture of calcium carbide and calcium phosphide are pierced and thrown in the sea when the gases burn and serve as a signal.

4. Assertion: Carbon monoxide is a poisonous gas.

Reason: Carbon monoxide combines with haemoglobin to form carboxy - haemoglobin which prevents absorption of oxygen by it

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

5. Oxidation of thiosulphate by iodine gives _____.

- a) Tetrathionate ion** b) Sulphide ion c) Sulphate ion d) Sulphite ion

Solution : -



Thiosulphate ion Tetrathionate ion

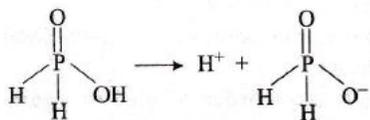
6. H_3PO_2 is the molecular formula of an acid of phosphorous. Its name and basicity respectively are _____

- a) Phosphorous acid and 2 b) Hypophosphorous acid and 2 **c) Hypophosphorous acid and one**

d) Hypophosphoric acid and two

Solution : -

The name of H_3PO_2 is hypophosphorous acid when dissolve in water, it gives only one H^+ , so its basicity is one.

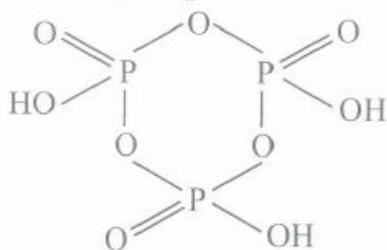


7. How many P-O-P bonds appear in cyclotrimetaphosphoric acid?

- a) Four **b) Three** c) Two d) One

Solution : -

Cyclotrimetaphosphoric acid is $(\text{HPO}_3)_3$



Number of P-O-P bonds = 3

8. Electropositive character for the elements of group 13 follows the order

- a) $\text{B} > \text{Al} > \text{Ga} > \text{In} > \text{Tl}$ b) $\text{B} < \text{Al} < \text{Ga} < \text{In} < \text{Tl}$ c) $\text{B} < \text{Al} > \text{Ga} < \text{In} > \text{Tl}$ **d) $\text{B} < \text{Al} > \text{Ga} > \text{In} > \text{Tl}$**

Solution : -

As we move from B to Al, the sum of $\Delta_i\text{H}_1 + \Delta_i\text{H}_2 + \Delta_i\text{H}_3$ decreases substantially (6887 kJ mol^{-1} to 5137 kJ mol^{-1}) due to increase in the atomic size and hence Al has a high tendency to lose electrons. Since the electrode potentials increase from Al to Tl, therefore, their electropositive character decreases, i.e., Al (- 1.66 V) to Ga (- 0.56 V) to In (- 0.34 V) to Tl (+ 1.26 V) accordingly.

9. Noble gases do not react with other elements because _____ .

- a) They are monoatomic b) They are found in abundance c) The size of their atoms is very small
d) They are completely paired up and have stable electron shells

Solution : -

In general, noble gases are not very reactive Their chemical inertness is due to the fact that they have completely filled ns^2np^6 electronic configuration of their valence shells. The other reasons are very high ionisation enthalpy and almost zero electron affinity.

10. Borax is not used

- a) as a styptic to stop bleeding **b) in making enamel and pottery glazes** c) as a flux in soldering
d) in making optical glasses

Solution : -

Borax is not used as a styptic to stop bleeding.

11. The following acids have been arranged in order of decreasing acid strength. Identify the correct order.

I. ClOH II. BrOH III. IOH

- a) I > II > III** b) II > I > III c) III > II > I d) I > III > II

12. Which of the following is not tetrahedral in shape?

- a) NH_4^+ b) SiCl_4 **c) SF_4** d) SO_4^{2-}

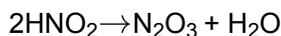
Solution : -

SF_4 has trigonal bipyramidal geometry as S in SF_4 undergoes, Sp^3d hybridisation.

13. Which of the following oxides is anhydride of nitrous acid?

- a) N_2O_3 b) NO_2 c) **NO** d) N_2O_4

Solution : -

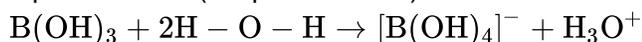


14. Which of the following statements about H_3BO_3 is not correct?

- a) **It is a strong tribasic acid** b) It is prepared by acidifying an aqueous solution of borax
 c) It has a layer structure in which planar BO_3 units are joined by hydrogen bonds
 d) It does not act as proton donor but acts as a Lewis acid by accepting hydroxyl ion

Solution : -

Boric acid (H_3BO_3) is a weak monobasic acid with $K_a = 1.0 \times 10^{-9}$. It may be noted that boric acid does not act as a protonic acid (i.e. proton donor) but behaves as a Lewis acid by accepting a pair of electrons from OH^- ion.



15. Which of the following is not a use of noble gases?

- a) Argon is widely used for filling incandescent electric bulbs.
 b) Neon is used in safety devices for protecting electrical instruments.
 c) Radon is used in radiotherapy of cancer. d) **Helium is filled in tubes of cycles and scooters tyres.**

Solution : -

Helium is used in filling tubes of aeroplane tyres.

16. Which one has the lowest boiling point?

- a) NH_3 b) **PH_3** c) AsH_3 d) SbH_3

Solution : -

Due to absence of H-bonding, PH_3 has the lowest boiling point. Thus, the order of boiling point of hydrides of group 15 is



17. Match the column I with column II and mark the appropriate choice.

Column I	Column II
(A) H_2SO_4	(i) Highest electron gain enthalpy
(B) CCl_3NO_2	(ii) Chalcogen
(C) Cl_2	(iii) Tear gas
(D) Sulphur	(iv) Storage batteries

- a) **(A) \rightarrow (iv), (B) \rightarrow (iii) (C) \rightarrow (i), (D) \rightarrow (ii)** b) (A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (ii)
 c) (A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii) d) (A) \rightarrow (ii), (B) \rightarrow (i), (C) \rightarrow (iii), (D) \rightarrow (iv)

18. Boron is unable to form BF_6^{3-} ions due to

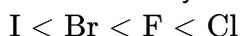
- a) **non-availability of d-orbitals** b) small size of boron atom c) non-metallic nature
 d) less reactivity towards halogens.

19. Which of the following elements has maximum electron affinity?

- a) **Cl** b) Br c) I d) F

Solution : -

The electron affinity decreases from $Cl \rightarrow Br \rightarrow I$, i.e., on moving down the group. However, electron affinity of fluorine is unexpectedly low. It cannot be explained by any simple mechanism. It is probably due to small size of the atom. The addition of an extra electron produces high electron charge density in a relatively compact 2p subshell resulting in strong electron-electron repulsion. The repulsive forces between electrons imply low electron affinity. So, the correct order of electron affinity for halogens is



20. There is a large number of carbon compounds due to

- a) H_3PO_2 b) H_3BO_3 c) H_3PO_4 d) H_3PO_3

Solution : -

H_3PO_4 is a tribasic acid as it has 3P-OH bonds i.e., 3 ionisable H atoms thus, can form three series of salts.

28. Which of the following is an isoelectronic pair?

- a) ICl_2 , ClO_2 **b) BrO_2^- , BrF_2^+** c) ClO_2 , BrF d) CN^- , O_3

Solution : -

Both BrO_2^- ($35+2 \times 8+1=52$) and BrF_2^+ ($35+2 \times 9-1=52$) have 52 electrons.

29. Which of the following phosphorus is the most reactive?

- a) Scarlet phosphorus **b) White phosphorus** c) Red phosphorus d) Violet phosphorus

Solution : -

White phosphorus has low ignition temperature. So, it is most reactive among all the allotropes.

30. Fluorine is the best oxidising agent because it has

- a) highest electron affinity **b) highest reduction potential** c) highest oxidation potential
d) lowest electron affinity.

31. Fill in the blanks by choosing the appropriate option. Conc. H_2SO_4 chars paper, wood and sugar by removing_(i) from them. It is also known as ii. It is manufactured by_(iii)_process. It is a strong (iv) and (v) acid.

a)

(i)	(ii)	(iii)	(iv)	(v)
H_2O	oil of vitriol	Contact	oxidising	dibasic

b)

(i)	(ii)	(iii)	(iv)	(v)
O_2	oil of vitriol	Oleum	dehydrating	monobasic

c)

(i)	(ii)	(iii)	(iv)	(v)
H_2O	oil of olay	Solvay	dehydrating	dibasic

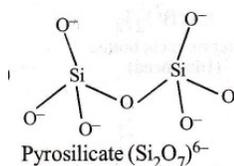
d)

(i)	(ii)	(iii)	(iv)	(v)
SO_2	oil of winter green	Contact	oxidising	monobasic

32. Name the type of the structure of silicate in which one oxygen atom of $[\text{SiO}_4]^{4-}$ is shared?

- a) Linear chain silicate** b) Sheet silicate c) Pyrosilicate d) Three dimensional

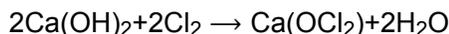
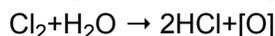
Solution : -



33. A black powder when heated with conc. HCl gives a greenish yellow gas. The gas acts as an oxidising and a bleaching agent. When it is passed over slaked lime, a white powder is formed which is a ready source of gas. The black powder and white powder respectively are

- a) KClO_3 and NaClO_3 **b) MnO_2 and $\text{Ca}(\text{OCl})_2$** c) MnO_2 and KClO_3 d) MnCl_4 and COCl_2

Solution : -



34. Which of the following statements is not correct about the structure of PCl_5 ?

- a) PCl_5 has a trigonal bipyramidal structure. b) Three equatorial P-Cl bonds are equivalent.

c) The two axial bonds are different and longer than equatorial bonds.

d) Equatorial bond pairs suffer more repulsion than that of the axial bond pairs.

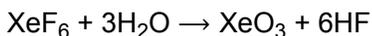
Solution : -

The axial bond pairs suffer more repulsion as compared to equatorial bond pairs.

35. Which among the following statements is incorrect?
 a) XeF_4 and SbF_5 combine to form salt. b) He and Ne do not form clathrates.
c) He has highest boiling point in its group d) He diffuses through rubber and polyvinyl chloride.
36. Boric acid is an acid because its molecule
 a) contains replaceable H^+ ion b) gives up a proton **c) accepts OH^- from water releasing proton**
 d) combines with proton from water molecule
37. Which of the following is not correct about xenon hexafluoride?
 a) It has oxidation state of +6. b) The hybridisation involved in XeF_6 is sp^3d^3
 c) The shape of XeF_6 is distorted octahedral and can be represented as
d) On hydrolysis it gives Xe, HF and O_2

Solution : -

On hydrolysis the products formed are XeO_3 and HF



38. Assertion: Atomic radius of Ga is larger than that of aluminium.
 Reason: Atomic radius always increases down the group.
 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**

Solution : -

There are deviations in properties of elements of a group in p - block. Atomic radius of Ga is less than that of Al because of the presence of additional 10 d-electrons which offer poor screening effect for the outer electrons from the increased nuclear charge in gallium.

39. On heating a mixture of NH_4Cl and KNO_2 , we get
 a) NH_4NO_3 b) $\text{KNH}_4(\text{NO}_3)_2$ **c) N_2** d) NO

Solution : -



40. Match the list of noble gas compounds in column I with their shapes in column II and mark the appropriate choice.

Column I	Column II
(A) XeF_4	(i) Distorted octahedral
(B) XeF_6	(ii) Tetrahedral
(C) XeO_3	(iii) Square planar
(D) XeO_4	(iv) Trigonal pyramidal

- a) (A) \rightarrow (iv); (B) \rightarrow (iii); (C) \rightarrow (ii); (D) \rightarrow (i) b) (A) \rightarrow (i); (B) \rightarrow (ii); (C) \rightarrow (iii); (D) \rightarrow (iv)
 c) (A) \rightarrow (ii); (B) \rightarrow (iii); (C) \rightarrow (iv); (D) \rightarrow (i) **d) (A) \rightarrow (iii); (B) \rightarrow (i); (C) \rightarrow (iv); (D) \rightarrow (ii)**
41. Which of the following pairs of compounds is isoelectronic and isostructural?
 a) BeCl_2 , XeF_2 b) Tel_2 , XeF_2 **c) IBr_2^- , XeF_2** d) IF_3 , XeF_2

Solution : -

Thus, both IBr_2^- and XeF_2 have linear geometry. So, they are iso-structural and number of valence electrons present in both the species is same, i.e., 22. Thus, they are also isoelectronic.

S.No.	Compounds	Number of valence electrons	Geometry
1.	BeCl_2	$2+14=16$	Linear
2.	XeF_2	$8+14=22$	Linear
3.	Tel_2	$6+14=20$	Bent or V-shape

4.	IBr_2^-	$7+14+1=22$	Linear
5.	IF_2	$7+21=28$	T-shape

42. Which of the following statements is false?

- a) Radon is obtained from the decay of radium b) Helium is inert gas
 c) Xenon is the most reactive among the rare gases
d) The most abundant rare gas found in the atmosphere is helium

Solution : -

The amount of noble gases present in atmosphere (in percent by) is given below

Element (Volume %)	Abundance
He	5.24×10^{-4}
Ne	1.82×10^{-3}
Ar	0.934
Kr	1.14×10^{-3}
Xe	8.7×10^{-6}

So, argon is most abundant, not helium.

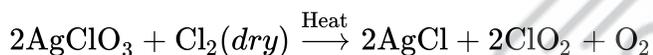
43. Which is the correct arrangement of the compounds based on their bond strength?

- a) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$** b) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$ c) $\text{HCl} > \text{HF} > \text{HBr} > \text{HI}$ d) $\text{HF} > \text{HBr} > \text{HCl} > \text{HI}$

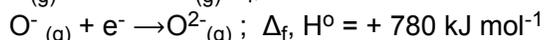
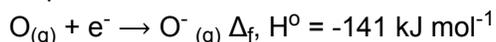
44. Which one of the following oxides of chlorine is obtained by passing dry chlorine over silver chlorate at 90°C ?

- a) Cl_2O b) ClO_3 **c) ClO_2** d) ClO_4

Solution : -



45. The formation of the oxide ion, $\text{O}^{2-}(\text{g})$ from oxygen atom requires first an exothermic and then an endothermic step as shown below:



Thus, process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon. It is due to the fact that:

- a) O ion has comparatively, smaller size than oxygen atom b) Oxygen is more electronegative
 c) addition of electron in oxygen results in larger size of the ion.

d) electron repulsion outweighs the stability gained by achieving noble gas configuration

Solution : -

The process of formation of O^{2-} in gas phase is unfavourable even though O^{2-} is isoelectronic with neon because electron repulsion outweigh the stability gained by achieving noble gas configuration.

46. In the clathrates of xenon with water the nature of bonding in Xe and H_2O molecule is

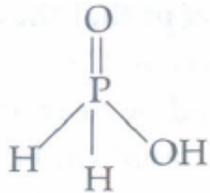
- a) covalent b) hydrogen bonding c) coordinate **d) dipole-induced dipole**

47. Which of the following statements is not valid for oxoacids of phosphorus?

- a) Orthophosphoric acid is used in the manufacture of triple superphosphate.
b) Hypophosphorous acid is a diprotic acid.
 c) Alloxoacids contain tetrahedral four coordinated phosphorus
 d) All oxoacids contain at least one $\text{P}=\text{O}$ unit and one $\text{P}-\text{OH}$ group.

Solution : -

Hypophosphorus acid is a monoprotic acid



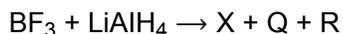
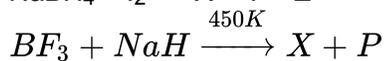
48. Which of the following types of forces bind together the carbon atoms in diamond?

- a) Ionic **b) Covalent** c) Dipolar d) van der Waals

Solution : -

In diamond, each carbon atom undergoes sp^3 hybridisation and is covalently bonded to three other carbon atoms by single bonds

49. $NaBH_4 + I_2 \rightarrow X + Y + Z$



X, Y, Z, P, Q and R in the reactions a

a)

X	Y	Z	P	Q	R
$Na_4B_4O_7$	NaI	H ₂	H ₂	LiF	AlF ₃

b)

X	Y	Z	P	Q	R
B_2H_6	NaI	H ₂	NaF	LiF	AlF ₃

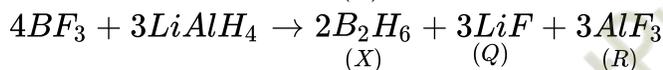
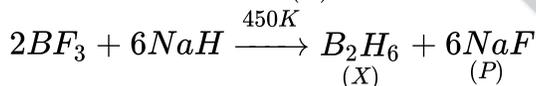
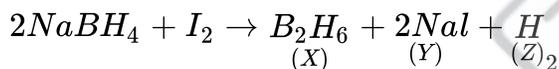
c)

X	Y	Z	P	Q	R
B_2H_6	BH ₃	NaI	$B_3N_3H_6$	Al_2F_6	AlF ₃

d)

X	Y	Z	P	Q	R
BH ₃	B_2H_6	H ₂	$B_3N_3H_6$	LiF	AlF ₃

Solution : -



50. What happens when a mixture of cobalt oxide and borax is heated in a flame on a loop of platinum wire?

- a) A transparent white bead is formed. b) A bright pink coloured $NaBO_2$ bead is formed
c) A blue coloured $Co(BO_2)_2$ bead is formed. d) A red coloured $Co(BO_2)_2$ bead is formed.

Solution : -

