

The p-Block Elements

(Group 13 to Group 18)

- Which one of the following reactions of Xenon compounds is not feasible? [AIEEE-2009]
 - $3\text{XeF}_4 + 6\text{H}_2\text{O} \rightarrow 2\text{Xe} + \text{XeO}_3 + 12\text{HF} + 1.5\text{O}_2$
 - $2\text{XeF}_2 + 2\text{H}_2\text{O} \rightarrow 2\text{Xe} + 4\text{HF} + \text{O}_2$
 - $\text{XeF}_6 + \text{RbF} \rightarrow \text{Rb[XeF}_7]$
 - $\text{XeO}_3 + 6\text{HF} \rightarrow \text{XeF}_6 + 3\text{H}_2\text{O}$
- In bond dissociation energy of B-F in BF_3 is 646 kJ mol^{-1} whereas that of C-F in CF_4 is 515 kJ mol^{-1} . The correct reason for higher B-F bond dissociation energy as compared to that of C-F is [AIEEE-2009]
 - Stronger σ bond between B and F in BF_3 as compared to that between C and F in CF_4
 - Significant $p\pi - p\pi$ interaction between B and F in BF_3 whereas there is no possibility of such interaction between C and F in CF_4
 - Lower degree of $p\pi - p\pi$ interaction between B and F in BF_3 than that between C and F in CF_4
 - Smaller size of B-atom as compared to that of C-atom
- In Which of the following arrangements, the sequence is not strictly according to the property written against it? [AIEEE-2009]
 - $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$: increasing acid strength
 - $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$: increasing basic strength
 - $\text{B} < \text{C} < \text{O} < \text{N}$: increasing first ionization enthalpy
 - $\text{CO}_2 < \text{SiO}_2 < \text{SnO}_2 < \text{PbO}_2$: increasing oxidising power
- Which of the following has maximum number of lone pairs associated with Xe? [AIEEE-2011]
 - XeF_2
 - XeO_3
 - XeF_4
 - XeF_6
- The molecule having smallest bond angle is [AIEEE-2012]
 - AsCl_3
 - SbCl_3
 - PCl_3
 - NCl_3
- Among the following oxoacids, the correct decreasing order of acid strength is [JEE (Main)-2014]
 - $\text{HOCl} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$
 - $\text{HClO}_4 > \text{HOCl} > \text{HClO}_2 > \text{HClO}_3$
 - $\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HOCl}$
 - $\text{HClO}_2 > \text{HClO}_4 > \text{HClO}_3 > \text{HOCl}$
- Which one of the following properties is not shown by NO? [JEE (Main)-2014]
 - It is diamagnetic in gaseous state
 - It is a neutral oxide
 - It combines with oxygen to form nitrogen dioxide
 - Its bond order is 2.5
- Which among the following is the most reactive? [JEE (Main)-2015]

(1) Cl_2	(2) Br_2
(3) I_2	(4) ICl
- Which one has the highest boiling point? [JEE (Main)-2015]

(1) He	(2) Ne
(3) Kr	(4) Xe
- Assertion : Nitrogen and Oxygen are the main components in the atmosphere but these do not react to form oxides of nitrogen.
Reason : The reaction between nitrogen and oxygen requires high temperature. [JEE (Main)-2015]
 - Both assertion and reason are correct, and the reason is the correct explanation for the assertion
 - Both assertion and reason are correct, but the reason is not the correct explanation for the assertion
 - The assertion is incorrect, but the reason is correct
 - Both the assertion and reason are incorrect

11. The pair in which phosphorous atoms have a formal oxidation state of +3 is [JEE (Main)-2016]
- Pyrophosphorous and hypophosphoric acids
 - Orthophosphorous and hypophosphoric acids
 - Pyrophosphorous and pyrophosphoric acids
 - Orthophosphorous and pyrophosphorous acids
12. The reaction of zinc with dilute and concentrated nitric acid, respectively, produces [JEE (Main)-2016]
- NO_2 and NO
 - NO and N_2O
 - NO_2 and N_2O
 - N_2O and NO_2
13. Which of the following reactions is an example of a redox reaction? [JEE (Main)-2017]
- $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeOF}_4 + 2\text{HF}$
 - $\text{XeF}_6 + 2\text{H}_2\text{O} \rightarrow \text{XeO}_2\text{F}_2 + 4\text{HF}$
 - $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow \text{XeF}_6 + \text{O}_2$
 - $\text{XeF}_2 + \text{PF}_5 \rightarrow [\text{XeF}]^+ \text{PF}_6^-$
14. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are [JEE (Main)-2017]
- Cl^- and ClO^-
 - Cl^- and ClO_2^-
 - ClO^- and ClO_3^-
 - ClO_2^- and ClO_3^-
15. Which of the following are Lewis acids? [JEE (Main)-2018]
- PH_3 and BCl_3
 - AlCl_3 and SiCl_4
 - PH_3 and SiCl_4
 - BCl_3 and AlCl_3
16. The compound that does not produce nitrogen gas by the thermal decomposition is [JEE (Main)-2018]
- $\text{Ba}(\text{N}_3)_2$
 - $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
 - NH_4NO_2
 - $(\text{NH}_4)_2\text{SO}_4$
17. Correct statements among a to d regarding silicones are
- They are polymers with hydrophobic character
 - They are biocompatible
 - In general, they have high thermal stability and low dielectric strength
 - Usually, they are resistant to oxidation and used as greases [JEE (Main)-2019]
- (a), (b) and (d) only
 - (a), (b), (c) and (d)
 - (a), (b) and (c) only
 - (a) and (b) only
18. Good reducing nature of H_3PO_2 is attributed to the presence of [JEE (Main)-2019]
- Two P – OH bonds
 - One P – H bond
 - One P – OH bond
 - Two P – H bonds
19. The number of 2-centre-2-electron and 3-centre-2-electron bonds in B_2H_6 respectively are [JEE (Main)-2019]
- 4 and 2
 - 2 and 2
 - 2 and 4
 - 2 and 1
20. The pair that contains two P-H bond in each of the oxoacids is [JEE (Main)-2019]
- $\text{H}_4\text{P}_2\text{O}_5$ and $\text{H}_4\text{P}_2\text{O}_6$
 - $\text{H}_4\text{P}_2\text{O}_5$ and H_3PO_3
 - H_3PO_2 and $\text{H}_4\text{P}_2\text{O}_5$
 - H_3PO_3 and H_3PO_2
21. The chloride that CANNOT get hydrolysed is [JEE (Main)-2019]
- PbCl_4
 - CCl_4
 - SnCl_4
 - SiCl_4
22. Iodine reacts with concentrated HNO_3 to yield Y along with other products. The oxidation state of iodine in Y, is [JEE (Main)-2019]
- 7
 - 1
 - 5
 - 3
23. Chlorine on reaction with hot and concentrated sodium hydroxide gives [JEE (Main)-2019]
- Cl^- and ClO^-
 - Cl^- and ClO_2^-
 - ClO_3^- and ClO_2^-
 - Cl^- and ClO_3^-
24. The element that does NOT show catenation is [JEE (Main)-2019]
- Sn
 - Ge
 - Pb
 - Si

25. Diborane (B_2H_6) reacts independently with O_2 and H_2O to produce, respectively [JEE (Main)-2019]

- (1) H_3BO_3 and B_2O_3 (2) HBO_2 and H_3BO_3
 (3) B_2O_3 and H_3BO_3 (4) B_2O_3 and $[BH_4]^-$

26. The covalent alkaline earth metal halide ($X = Cl, Br, I$) is [JEE (Main)-2019]

- (1) BeX_2 (2) SrX_2
 (3) CaX_2 (4) MgX_2

27. C_{60} , an allotrope of carbon contains

[JEE (Main)-2019]

- (1) 16 hexagons and 16 pentagons
 (2) 18 hexagons and 14 pentagons
 (3) 20 hexagons and 12 pentagons
 (4) 12 hexagons and 20 pentagons

28. The correct order of the oxidation states of nitrogen in NO , N_2O , NO_2 , and N_2O_3 is [JEE (Main)-2019]

- (1) $NO_2 < NO < N_2O_3 < N_2O$
 (2) $N_2O < NO < N_2O_3 < NO_2$
 (3) $NO_2 < N_2O_3 < NO < N_2O$
 (4) $N_2O < N_2O_3 < NO < NO_2$

29. The correct statements among I to III regarding group 13 element oxides are

- (I) Boron trioxide is acidic.
 (II) Oxides of aluminium and gallium are amphoteric.
 (III) Oxides of indium and thallium are basic.

[JEE (Main)-2019]

- (1) (II) and (III) only (2) (I) and (II) only
 (3) (I), (II) and (III) (4) (I) and (III) only

30. The oxoacid of sulphur that does not contain bond between sulphur atoms is : [JEE (Main)-2019]

- (1) $H_2S_4O_6$ (2) $H_2S_2O_4$
 (3) $H_2S_2O_7$ (4) $H_2S_2O_3$

31. The correct order of catenation is :

[JEE (Main)-2019]

- (1) $C > Si > Ge \approx Sn$ (2) $C > Sn > Si \approx Ge$
 (3) $Si > Sn > C > Ge$ (4) $Ge > Sn > Si > C$

32. The number of pentagons in C_{60} and trigons (triangles) in white phosphorus, respectively, are :

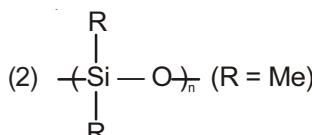
[JEE (Main)-2019]

- (1) 20 and 3 (2) 12 and 3
 (3) 12 and 4 (4) 20 and 4

33. The noble gas that does NOT occur in the atmosphere is : [JEE (Main)-2019]

- (1) Ne (2) Kr
 (3) He (4) Ra

34. The basic structural unit of feldspar, zeolites, mica, and asbestos is : [JEE (Main)-2019]



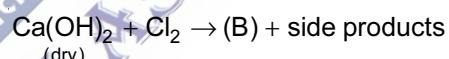
- (3) SiO_2
 (4) $(SiO_3)^{2-}$

35. The C–C bond length is maximum in

[JEE (Main)-2019]

- (1) graphite (2) C_{60}
 (3) diamond (4) C_{70}

36. In the following reactions, products (A) and (B), respectively, are



[JEE (Main)-2020]

- (1) $NaOCl$ and $Ca(OCl)_2$
 (2) $NaClO_3$ and $Ca(ClO_3)_2$
 (3) $NaOCl$ and $Ca(ClO_3)_2$
 (4) $NaClO_3$ and $Ca(OCl)_2$

37. The number of bonds between sulphur and oxygen atoms in $S_2O_8^{2-}$ and the number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are [JEE (Main)-2020]

- (1) 4 and 6 (2) 8 and 8
 (3) 8 and 6 (4) 4 and 8

38. White phosphorus on reaction with concentrated $NaOH$ solution in an inert atmosphere of CO_2 gives phosphine and compound (X). (X) on acidification with HCl gives compound (Y). The basicity of compound (Y) is [JEE (Main)-2020]

- (1) 3 (2) 2
 (3) 4 (4) 1

39. The compound that cannot act both as oxidising and reducing agent is [JEE (Main)-2020]
- H_3PO_4
 - H_2SO_3
 - H_2O_2
 - HNO_2
40. The reaction of $\text{H}_3\text{N}_3\text{B}_3\text{Cl}_3$ (A) with LiBH_4 in tetrahydrofuran gives inorganic benzene (B). Further, the reaction of (A) with (C) leads to $\text{H}_3\text{N}_3\text{B}_3(\text{Me})_3$. Compounds (B) and (C) respectively, are [JEE (Main)-2020]
- Borazine and MeBr
 - Borazine and MeMgBr
 - Diborane and MeMgBr
 - Boron nitride and MeBr
41. On heating compound (A) gives a gas (B) which is a constituent of air. This gas when treated with H_2 in the presence of a catalyst gives another gas (C) which is basic in nature. (A) should not be: [JEE (Main)-2020]
- $\text{Pb}(\text{NO}_3)_2$
 - $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
 - NH_4NO_2
 - NaN_3
42. Aqua regia is used for dissolving noble metals (Au, Pt, etc.). The gas evolved in this process is [JEE (Main)-2020]
- NO
 - N_2
 - N_2O_5
 - N_2O_3
43. In a molecule of pyrophosphoric acid, the number of P – OH, P = O and P – O – P bonds/moiety(ies) respectively are [JEE (Main)-2020]
- 4, 2 and 0
 - 4, 2 and 1
 - 3, 3 and 3
 - 2, 4 and 1
44. On heating, lead (II) nitrate gives a brown gas (A). The gas (A) on cooling changes to a colourless solid/liquid (B). (B) on heating with NO changes to a blue solid (C). The oxidation number of nitrogen in solid (C) is : [JEE (Main)-2020]
- + 3
 - + 4
 - + 5
 - + 2
45. The reaction in which the hybridisation of the underlined atom is affected is [JEE (Main)-2020]
- $\underline{\text{XeF}}_4 + \text{SbF}_5 \rightarrow$
 - $\text{H}_2\underline{\text{SO}}_4 + \text{NaCl} \xrightarrow{420\text{ K}}$
 - $\underline{\text{H}_3\text{PO}}_2 \xrightarrow{\text{Disproportionation}}$
 - $\underline{\text{NH}}_3 \xrightarrow{\text{H}^+}$
46. The structure of PCl_5 in the solid state is [JEE (Main)-2020]
- Tetrahedral $[\text{PCl}_4]^+$ and octahedral $[\text{PCl}_6]^-$
 - Square pyramidal
 - Trigonal bipyramidal
 - Square planar $[\text{PCl}_4]^+$ and octahedral $[\text{PCl}_6]^-$
47. Reaction of ammonia with excess Cl_2 gives [JEE (Main)-2020]
- NH_4Cl and HCl
 - NCl_3 and HCl
 - NCl_3 and NH_4Cl
 - NH_4Cl and N_2
48. Boron and silicon of very high purity can be obtained through [JEE (Main)-2020]
- Vapour phase refining
 - Electrolytic refining
 - Liquation
 - Zone refining
49. The correct statement with respect to dinitrogen is [JEE (Main)-2020]
- N_2 is paramagnetic in nature
 - It can be used as an inert diluent for reactive chemicals
 - It can combine with dioxygen at 25°C
 - Liquid dinitrogen is not used in cryosurgery
50. The reaction of NO with N_2O_4 at 250 K gives [JEE (Main)-2020]
- N_2O_3
 - N_2O_5
 - N_2O
 - NO_2
51. Chlorine reacts with hot and concentrated NaOH and produces compounds (X) and (Y). Compound (X) gives white precipitate with silver nitrate solution. The average bond order between Cl and O atoms in (Y) is _____. [JEE (Main)-2020]
52. The number of Cl = O bonds in perchloric acid is, “_____. [JEE (Main)-2020]