Chapter 7

P-block Elements (Group 15, 16, 17 and 18)

(Assertion and Reason Questions)

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(c) Assertion is correct, reason is incorrect

(d) Assertion is incorrect, reason is correct.

Q.1. Assertion : Dinitrogen is inert at room temperature.
Reason : Dinitrogen directly combines with lithium to form ionic nitrides.

Q.2. Assertion : N_2 is less reactive than P_4.
Reason : Nitrogen has more electron gain enthalpy than phosphorus.

Q.3. Assertion : When a metal is treated with conc. HNO_3 it generally yields a nitrate, NO_2 and H_2O.
Reason : Conc. HNO_3 reacts with metal and first produces a metal nitrate and nascent hydrogen. The nascent hydrogen then further reduces HNO_3 to NO_2

Q.4. Assertion : White phosphorus is more reactive than red phosphorus.
Reason : Red phosphorus consists of P_4 tetrahedral units linked to one another to form linear chains.

Q.5. Assertion : Bond angle of H_2S is smaller than H_2O.
Reason : Electronegativity of the central atom increases, bond angle decreases.

Q.6. Assertion : Both rhombic and monoclinic sulphur exist as S_8 but oxygen exists as O_2.
Reason : Oxygen forms pπ – pπ multiple bond due to small size and small bond length but pπ – pπ bonding is not possible in sulphur.

Q.7. 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.

Q.8. Assertion: Ozone is thermodynamically stable with respect to oxygen.
Reason: Decomposition of ozone into oxygen results in the liberation of heat.

Q.9. Assertion : Inert gases are monoatomic,
Reason : Inert gases have stable configuration.

Q.10. Assertion : Fluorine exists only in-1 oxidation state.
Reason: Fluorine has $2s^2 2p^5$ configuration.

Q.11. Assertion : The fluorine has lower reactivity.
Reason : F-F bond has low bond dissociation energy.

Q.12. Assertion: F-F bond in F_2 molecule is weak.
Reason: F atom is small in size.

-x-x-x-

ANSWER KEY

Q.1 : (c) **Q.2 :** (c) **Q.3 :** (a)

Q.4 : (b) White phosphorus exists as P4 tetrahedral molecule having P-P-P bond angle 60º. Hence the molecule is under strain and more reactive. On the other hand red phosphorus exists as P4 tetrahedra which are joined together through covalent bonds giving polymeric structure.

Q.5 : (c) **Q.6 :** (a) **Q.7 :** (a) **Q.8 :** (d)

Q.9 : (a) **Q.10 :** (a) **Q.11 :** (c) **Q.12 :** (a)