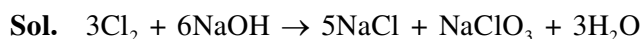


## COMPLETE P-BLOCK

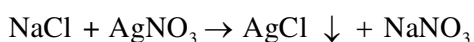
1. Chlorine reacts with hot and concentrated NaOH and produces compounds (X) and (Y). Compound (X) gives white precipitate with silver nitrate solution. The average bond order between Cl and O atoms in (Y) is \_\_\_\_\_.
2. The redox reaction among the following is :
  - (1) Combination of dinitrogen with dioxygen at 2000 K
  - (2) Formation of ozone from atmospheric oxygen in the presence of sunlight
  - (3) Reaction of H<sub>2</sub>SO<sub>4</sub> with NaOH
  - (4) Reaction of [Co(H<sub>2</sub>O)<sub>6</sub>]Cl<sub>3</sub> with AgNO<sub>3</sub>
3. Among the statements (a) - (d), the correct ones are -
  - (a) Decomposition of hydrogen peroxide gives dioxygen
  - (b) Like hydrogen peroxide, compounds, such as KClO<sub>3</sub>, Pb(NO<sub>3</sub>)<sub>2</sub> and NaNO<sub>3</sub> when heated liberated dioxygen
  - (c) 2-Ethylanthraquinone is useful for the industrial preparation of hydrogen peroxide.
  - (d) Hydrogen peroxide is used for the manufacture of sodium perborate
  - (1) (a), (b) and (c) only
  - (2) (a) and (c) only
  - (3) (a), (b), (c) and (d)
  - (4) (a), (c) and (d) only
4. The number of bonds between sulphur and oxygen atoms in S<sub>2</sub>O<sub>8</sub><sup>2-</sup> and the number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are :
  - (1) 4 and 8
  - (2) 4 and 6
  - (3) 8 and 8
  - (4) 8 and 6
5. White Phosphorus on reaction with concentrated NaOH solution in an inert atmosphere of CO<sub>2</sub> gives phosphine and compound (X). (X) on acidification with HCl gives compound (Y). The basicity of compound (Y) is :
  - (1) 4
  - (2) 1
  - (3) 2
  - (4) 3
6. The reaction of H<sub>3</sub>N<sub>3</sub>B<sub>3</sub>Cl<sub>3</sub> (A) with LiBH<sub>4</sub> in tetrahydrofuran gives inorganic benzene (B). Further, the reaction of (A) with (C) leads to H<sub>3</sub>N<sub>3</sub>B<sub>3</sub>(Me)<sub>3</sub>. Compounds (B) and (C) respectively, are:
  - (1) Boron nitride and MeBr
  - (2) Borazine and MeMgBr
  - (3) Borazine and MeBr
  - (4) Diborane and MeMgBr
7. The reaction of NO with N<sub>2</sub>O<sub>4</sub> at 250 K gives :
  - (1) N<sub>2</sub>O<sub>5</sub>
  - (2) NO<sub>2</sub>
  - (3) N<sub>2</sub>O
  - (4) N<sub>2</sub>O<sub>3</sub>
8. Reaction of ammonia with excess Cl<sub>2</sub> gives :
  - (1) NH<sub>4</sub>Cl and N<sub>2</sub>
  - (2) NCl<sub>3</sub> and NH<sub>4</sub>Cl
  - (3) NH<sub>4</sub>Cl and HCl
  - (4) NCl<sub>3</sub> and HCl
9. The correct statement with respect to dinitrogen is :
  - (1) liquid dinitrogen is not used in cryosurgery.
  - (2) it can be used as an inert diluent for reactive chemicals.
  - (3) it can combine with dioxygen at 25°C
  - (4) N<sub>2</sub> is paramagnetic in nature.
10. The equation that represents the water-gas shift reaction is :
  - (1)  $\text{CO(g)} + \text{H}_2\text{O(g)} \xrightarrow[\text{Catalyst}]{673\text{K}} \text{CO}_2\text{(g)} + \text{H}_2\text{(g)}$
  - (2)  $\text{CH}_4\text{(g)} + \text{H}_2\text{O(g)} \xrightarrow[\text{Ni}]{1270\text{K}} \text{CO(g)} + 3 \text{H}_2\text{(g)}$
  - (3)  $\text{C(s)} + \text{H}_2\text{O(g)} \xrightarrow{1270\text{K}} \text{CO(g)} + \text{H}_2\text{(g)}$
  - (4)  $2\text{C(s)} + \text{O}_2\text{(g)} + 4\text{N}_2\text{(g)} \xrightarrow{1273\text{K}} 2\text{CO(g)} + 4\text{N}_2\text{(g)}$
11. 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 :
  - (1) +5
  - (2) +2
  - (3) +4
  - (4) +3
12. The statement that is not true about ozone is :
  - (1) in the stratosphere, it forms a protective shield against UV radiation.
  - (2) it is a toxic gas and its reaction with NO gives NO<sub>2</sub>.
  - (3) in the atmosphere, it is depleted by CFCs.
  - (4) in the stratosphere, CFCs release chlorine free radicals (Cl) which reacts with O<sub>3</sub> to give chlorine dioxide radicals.

13. On heating compound (A) gives a gas (B) which is 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:

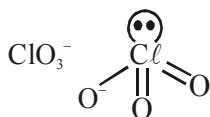
- (1)  $(NH_4)_2Cr_2O_7$
- (2)  $Pb(NO_3)_2$
- (3)  $NaN_3$
- (4)  $NH_4NO_2$

**SOLUTION****1. NTA Ans. (1.66 to 1.67)**

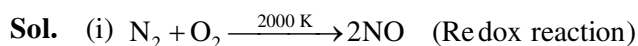
(X) (X)



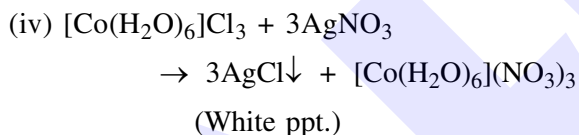
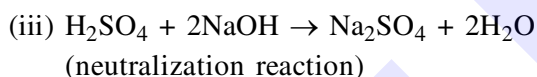
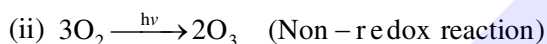
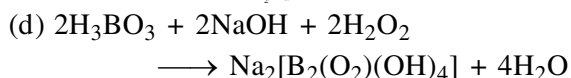
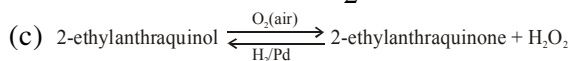
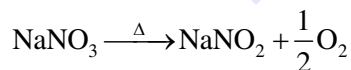
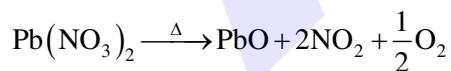
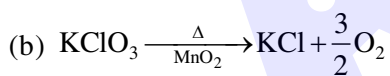
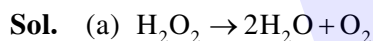
(X)



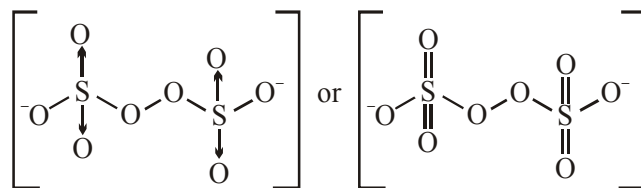
$$\begin{aligned} \text{Bond order of Cl-O Bond} &= 1 + \frac{2}{3} = \frac{5}{3} \\ &= 1.66 \text{ or } 1.67 \end{aligned}$$

**2. NTA Ans. (1)**

during the reaction, oxidation of nitrogen take place from 0 to 2 and reduction of oxygen take place from 0 to -2. It means this reaction is redox reaction.

**3. NTA Ans. (3)**

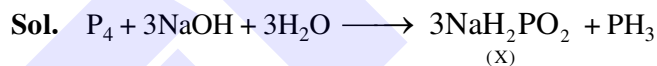
All statements are correct

**4. NTA Ans. (3)**

8 bonds are present between sulphur and oxygen. (It is best answer in given options)

**Rhombic sulphur :**

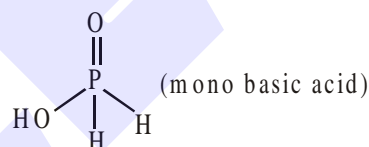
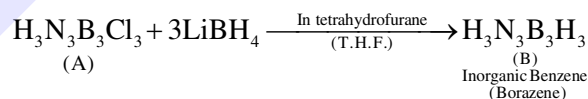
8 bonds are present between sulphur and sulphur atoms.

**5. NTA Ans. (2)**

(X)



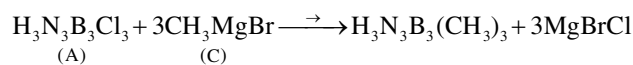
(Y)

**6. NTA Ans. (2)****Sol.**

(A)

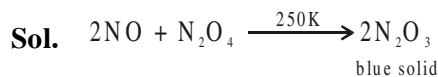
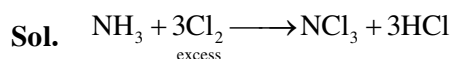
(B)  
Inorganic Benzene  
(Borazene)

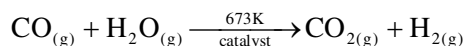
+3LiCl

+3BH<sub>3</sub>.THF

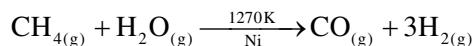
(A)

(C)

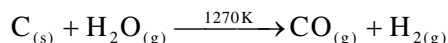
**7. Official Ans. by NTA (4)****8. Official Ans. by NTA (4)****9. Official Ans. by NTA (2)**

**10. Official Ans. by NTA (1)****Sol.** (1) Water gas shift reaction

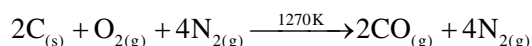
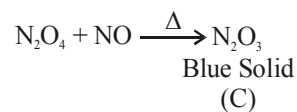
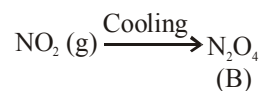
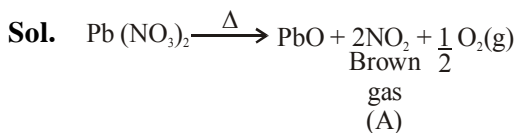
(2) Water gas is produced by this reaction.



(3) Water gas is produced by this reaction

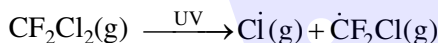
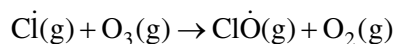
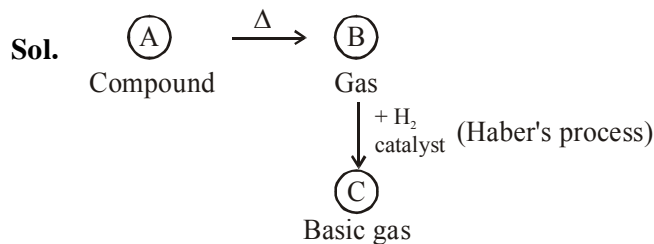
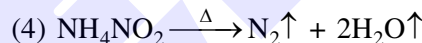
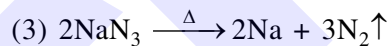
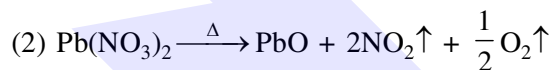
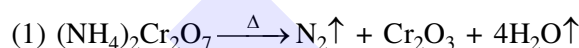


(4) producer gas is produced by this reaction.

**11. Official Ans. by NTA (4)**O.S. of nitrogen in  $\text{N}_2\text{O}_3$  is + 3

$$\text{N}_2\text{O}_3 \quad 2x + 3(-2) = 0$$

$$x = + 3$$

**12. Official Ans. by NTA (4)****Sol.** In the stratosphere, CFCs release chlorine free radical ( $\text{Cl}\cdot$ )which react with  $\text{O}_3$  to give chlorine oxide ( $\text{ClO}\cdot$ ) radical not chlorine dioxide ( $\text{ClO}_2$ ) radical.**13. Official Ans. by NTA (2)**Basic gas (C) must be ammonia ( $\text{NH}_3$ ).It means (B) gas should be  $\text{N}_2$  which is formed by heating of compound (A).So, (A) should not be  $\text{Pb}(\text{NO}_3)_2$