



### III. Multiple Choice Questions

Question 1. Among the following molecules, in which does bromine show the maximum oxidation number?

- (a)  $\text{Hg}_2(\text{BrO}_3)_2$
- (b)  $\text{Br} - \text{Cl}$
- (c)  $\text{KBrO}_4$
- (d)  $\text{Br}_2$

Question 2. Which of the following halogens do not exhibit a positive oxidation number in their compounds?

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

Question 3. Which of the following is most powerful oxidizing agent in the following.

- (a)  $\text{O}_3$
- (b)  $\text{KMnO}_4$
- (c)  $\text{H}_2\text{O}_2$
- (d)  $\text{K}_2\text{Cr}_2\text{O}_7$

Question 4. On the reaction



sulphuric acid acts as

- (a) an oxidizing agent
- (b) a reducing agent
- (c) a catalyst
- (d) an acid as well as an oxidant

Question 5. The oxidation number of the carboxylic carbon atom in  $\text{CH}_3\text{COOH}$  is

- (a) +2 (b) +4 (c) +1 (d) +3

Question 6. When methane is burnt in oxygen to produce  $\text{CO}_2$  and  $\text{H}_2\text{O}$  the oxidation number of carbon changes by

- (a) -8 (b) zero (c) +8 (d) +4

Question 7. The oxidation number of carbon is zero in

- (a)  $\text{HCHO}$
- (b)  $\text{CH}_2\text{Cl}_2$
- (c)  $\text{C}_{12}\text{H}_{22}\text{O}_{21}$
- (d)  $\text{C}_6\text{H}_{12}\text{O}$

Question 8. Which of the following are not redox reactions?

- (a)  $\text{Mg} + \text{N}_2 \longrightarrow \text{Mg}_3\text{N}_2$
- (b)  $\text{K}_4[\text{Fe}(\text{CN})_6] + \text{H}_2\text{SO}_4 + \text{H}_2\text{O} \longrightarrow \text{K}_2\text{SO}_4 + \text{CO} + \text{FeSO}_4 + (\text{NH}_4)_2\text{SO}_4$
- (c)  $\text{I}_2 + 3\text{Cl}_2 \longrightarrow \text{ICl}_3$
- (d)  $\text{CuSO}_4 + \text{NH}_3 \longrightarrow [\text{Cu}(\text{NH}_3)_4]\text{SO}_4$

Question 9. Which one among the following is not example of autoredox reaction?

- (a)  $\text{P}_4 + \text{OH}^- \longrightarrow \text{H}_2\text{PO}_4^- + \text{PH}_3$
- (b)  $\text{H}_2\text{O}_2 \longrightarrow \text{H}_2\text{O} + \text{O}_2$
- (c)  $\text{S}_2\text{O}_3^{2-} \longrightarrow \text{SO}_4^{2-} + \text{S}$
- (d)  $\text{AgCl} + \text{NH}_3 \longrightarrow [\text{Ag}(\text{NH}_3)_2]\text{Cl}$

Question 10. In the ethylene molecule the two carbon atoms have the oxidation numbers.

- (a) -1, -1 (b) -2, -2
- (c) -1, -2 (d) +2, -2

Answer:

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (d)

5. (d)
6. (d)
7. (e)
8. (b) and (d)
9. (d)
10. (b)

#### IV. Hots Questions

Question 1. (a) Formulate possible compounds of Cl in its O.S. is: 0, -1, +1, +3, +5, +7.

(b) List three measures used to prevent rusting of iron.

Answer:

(a)  $\text{Cl}_2$ , HCl, HOCl, HOClO, HOClO<sub>2</sub>, HOClO<sub>3</sub> respectively.

(b) (i) galvanization (coating iron by a more reactive metal)

(ii) greasing/oiling

(iii) painting

Question 2. Account for the following:

(a) While  $\text{H}_2\text{O}_2$  can act as oxidising as well as reducing agent in their reactions,  $\text{O}_3$  and  $\text{HNO}_3$  acts as oxidants only.

(b) When cone.  $\text{H}_2\text{SO}_4$  is added to an inorganic mixture containing chloride, HCl is produced but if a mixture contains bromide, then we get red vapours of bromine.

Answer:

(a) In  $\text{H}_2\text{O}_2$  oxidation number of O = -1 and can vary from 0 to -2 (+2 is possible in  $\text{OF}_2$ ). The oxidation number can decrease or increase, because of this  $\text{H}_2\text{O}_2$  can act both oxidising and reducing agent.

(b) HCl is a weak reducing agent and can reduce  $\text{H}_2\text{SO}_4$  to  $\text{SO}_2$  and hence HCl is not oxidised to  $\text{Cl}_2$ . When  $\text{NaBr}$  is heated  $\text{Br}_2$  is produced, which is a strong reducing agent and itself oxidised to red vapour of  $\text{Br}_2$ .

Question 3. Account for the following:

(a)  $\text{HNO}_3$  acts only as an oxidising agent while  $\text{HNO}_2$  can act both as reducing and oxidising agent.

(b)  $\text{ClO}_4^-$  does not show disproportionation reaction.

(c) Ozone acts as an oxidising agent.

Answer:

(a) The oxidation number of nitrogen in  $\text{HNO}_3$  is +5 thus increase in oxidation number +5 does not occur hence  $\text{HNO}_3$  cannot act as reducing agent but acts as an oxidising agent. In  $\text{HNO}_2$  oxidation number of nitrogen is +3, it can decrease or increase with range of -3 to +5, hence it can act as both oxidising and reducing agent.

(b) Chlorine is in maximum oxidation state +7 in  $\text{ClO}_4^-$  so it does not show the disproportionation reaction.

(c) Because it decomposes to give nascent oxygen.

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