

CONCEPT ACADEMY

“UTSAAH” Test Series

“Live out of your imagination, not your history.” —*Stephen Covey*

Subject – Chemistry NEET IIT-JEE I CUET I Foundation XI

Utsaah Test No. 11

Total Marks 45

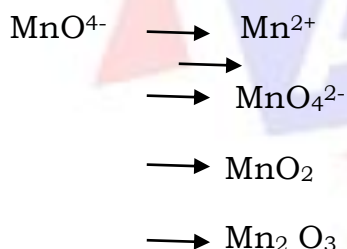
Time 45 Minutes

Chapter 8- Redox Reaction

NOTE-Paper Contains 20 MCQ, Each carry 2 marks.

There is no negative marking. Q.No. 21 should be solved on the back side of OMR Sheet which Carry 5 marks.

1. MnO_4^- is good oxidising agent in different medium changing to –



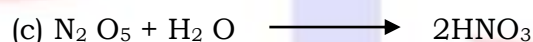
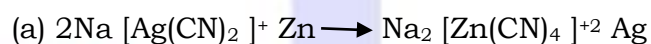
Changes in oxidation number respectively are –

- (a) 1, 3, 4, 5
 (b) 5, 4, 3, 2
 (c) 5, 1, 3, 4
 (d) 2, 6, 4, 3
2. Oxidation number of Cl in CaOCl_2 (bleaching powder) is –
- (a) Zero, since it contains Cl_2
 (b) –1, since it contains Cl^-

(c) +1, since it contains ClO^-

(d) +1 and –1 since it contains ClO^- and Cl^-

3. Which of the following is a redox-reaction-



4. What would happen when a solution of potassium chromate is treated with an dilute nitric acid?

- (a) CrO_4^{2-} is reduced to +3 state of Cr
 (b) CrO_4^{2-} is oxidized to +7 state of Cr
 (c) Cr^{3+} and $\text{Cr}_2\text{O}_7^{2-}$ are formed
 (d) $\text{Cr}_2\text{O}_7^{2-}$ and H_2O are formed

5. The oxidation state of Cr in $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$ is

- (a) +2
 (b) +3
 (c) 0
 (d) +1

6. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is –

- (a) +6
(b) +4
(c) +3
(d) +2
7. Which of the following can act as an oxidising as well as reducing agent?
(a) chlorine
(b) air
(c) ozone
(d) SO₂
8. In the reaction:
 $4\text{Fe} + 3\text{O}_2 \longrightarrow 4\text{Fe}_3 + + 6\text{O}_2^{2-}$
which of the following statement is incorrect?
(a) metallic iron is a reducing agent.
(b) Fe³⁺ is an oxidising agent.
(c) it is a redox reaction.
(d) metallic iron is reduced to Fe³⁺ .
9. The largest oxidation number exhibited by an element depends on its outer electronic configuration. With which of the following outer electronic configurations the element will exhibit largest oxidation number?
(a) 3d₁ 4s₂
(b) 3d₃ 4s₂
(c) 3d₅ 4s₁
(d) 3d₅ 4s₂
10. The strongest reducing agent among the following is –
(a) F⁻
(b) Cl⁻
(c) Br⁻
(d) I⁻
11. In the photosynthesis of carbohydrate and oxygen from carbon dioxide and water in presence of sunlight and chlorophyll, which of the following statement is not correct?
(a) It involves a redox reaction.
(b) CO₂ is reduced to carbohydrates.
(c) Water is oxidised to oxygen.
(d) CO₂ is oxidised to carbohydrates.
12. Oxidation number of iodine varies from
(a) -1 to +1
(b) -1 to +7
(c) +3 to +5
(d) -1 to +5
13. When SO₂ is passed through acidified potassium dichromate solution, the oxidation state of S is changed from
(a) +4 to 0
(b) +4 to +2
(c) +4 to +6
(d) +6 to +4
14. Oxidation number of nitrogen in HNO₃ is

- (a) +7
 (b) +6
 (c) -7
 (d) +5

15. The oxidation number of Cl in Cl_2O_7 is

- (a) + 7**
 (b) + 5
 (c) + 3
 (d) - 7

Explanation: Cl show different oxidation state as -1 to +7 due to vacant d orbital. As oxygen is more electronegative than Cl. Oxygen size is small hence its more electronegative and show -2 oxidation states.

*Here Cl_2O_7 then equation is: $2x + 7 \times (-2) = 0$
 $x = +7$ hence oxidation state of Cl is +7. I think you get your answer how to find oxidation state.*

16. What is known as Autooxidation?

- (a) Formation of H_2O by the oxidation of H_2O_2 .
(b) Formation of H_2O_2 by the oxidation of H_2O .
 (c) Both (1) and (2) are true
 (d) None of the above

Explanation: Autoxidation is any oxidation that occurs in presence of oxygen. The term is usually used to describe the degradation of organic compounds in air (as a source of oxygen). Autoxidation produces hydroperoxides and cyclic organic peroxides. These species can react further to form many products. The process is relevant to many phenomena including aging, paint, and spoilage of foods, degradation of petrochemicals, and the industrial production of chemicals. Autoxidation is important because it is a useful reaction for converting compounds to oxygenated derivatives, and also because it occurs in situations where it is not desired (as in the destructive cracking of the rubber in automobile tires or in rancidification).

Water automatically gets oxidised to hydrogen peroxide.

17. The tendency of an electrode to lose electrons is known as

- (a) Electrode Potential
 (b) Reduction Potential
(c) Oxidation Potential
 (d) E.M.F.

Explanation: The magnitude of the electrode potential of a metal is a measure of its relative tendency to lose or gain electrons. i.e., it is a measure of the relative tendency to undergo oxidation (loss of electrons) or reduction (gain of electrons).

$M \rightarrow M^{n+} + ne^-$ (oxidation potential)

$M^{n+} + ne^- \rightarrow M$ (reduction potential)

18. If equal volumes of 1M KMnO_4 and 1M $\text{K}_2\text{Cr}_2\text{O}_7$ solutions are allowed to oxidize Fe^{2+} in acidic medium. The amount of iron oxidized will be:

- (a) More with KMnO_4
(b) More with $\text{K}_2\text{Cr}_2\text{O}_7$
 (c) Equal with both oxidising agents
 (d) Cannot be determined

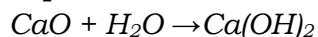
Explanation: The reason due to which the amount of Fe oxidised will be more with $\text{K}_2\text{Cr}_2\text{O}_7$ is: the change in the oxidation state (or number) or n factor is greater with KMnO_4

Also, $\text{K}_2\text{Cr}_2\text{O}_7$ is a very strong oxidising agent and holds the ability to take the electrons but KMnO_4 is more stronger than $\text{K}_2\text{Cr}_2\text{O}_7$.

19. Which of the following processes does not involve either oxidation or reduction?

- (a) Formation of slaked lime from quick lime**
 (b) Heating Mercuric Oxide
 (c) Formation of Manganese Chloride from Manganese oxide
 (d) Formation of Zinc from Zinc blende

Explanation: Here, in this reaction



Oxidation number doesn't change so its not a redox reaction.

20. One mole of N_2H_4 loses ten moles of electrons to form a new compound A. Assuming that all the nitrogen appears in the new compound, what is the oxidation state of nitrogen in A? (There is no change in the oxidation state of hydrogen.)

- (a) -1
(b) -3
(c) +3
(d) +5

Explanation: First to find oxidation number of Nitrogen in N_2H_4

Oxidation number of H = +1

Let oxidation number of nitrogen be x

$$2x + 4(1) = 0$$

$$2x = -4$$

$$x = -2$$

Each nitrogen atom has -2 oxidation number. So taken both nitrogen atoms in account gives oxidation number -4.

Change in oxidation number of nitrogen on losing 10 mol of electrons (considering no change in oxidation number of hydrogen atoms)

$$-4 - (-10) = +6$$

Therefore, oxidation number of 2 nitrogen atoms in compound Y is +6. Hence, oxidation number of each nitrogen atom will be +3 in new compound Y.

21. How many millilitres of 0.5 M H_2SO_4 are needed to dissolve 0.5 g of copper(II)carbonate?
- (a) 6.01
(b) 4.5
(c) 8.1
(d) 11.1

Explanation: The volume can be calculated :

$$N_1V_1 = N_2V_2$$

$$N_1 = \text{Normality of } \text{H}_2\text{SO}_4 = 0.5 \times 2 = 1 \text{ N}$$

$$V_1 = \text{Volume of } \text{H}_2\text{SO}_4$$

$$\text{Molar mass of copper(II) carbonate} = 123.5 \text{ g}$$

$$N_2 = \text{Normality of copper (II) carbonate} = (0.5 \times 2) / (123.5) \text{ N}$$

$$V_2 = \text{Volume of copper (II) carbonate} = 1000 \text{ mL}$$

So, after applying the formula,

$$1 \times V_1 = (0.5 \times 2) / (123.5) \times 1000$$

$$\text{Hence, } V_1 = 8.09 \text{ mL}$$

$$= \text{approx. } 8.1 \text{ mL}$$

22. The oxidation state of Cr in $\text{Cr}(\text{CO})_6$ is

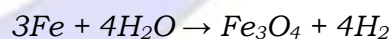
- (a) 0**
(b) 2
(c) 2
(d) 6

23. Which of the following processes does not involve oxidation of iron?

- (a) Formation of $\text{Fe}(\text{CO})_5$ from Fe.
(b) Liberation of H_2 from steam by iron at high temperature.
(c) Rusting of iron sheets.
(d) Decolourisation of blue CuSO_4 solution by iron.

Explanation: Oxidation number of Fe in $\text{Fe}(\text{CO})_5$ is zero.

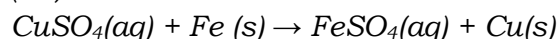
In both Fe and $\text{Fe}(\text{CO})_5$, the oxidation state of iron is zero.



team rusting



(+3)



(0) (+2)

24. The number of moles of KMnO_4 reduced by one mole of KI in alkaline medium is

- (a) One
(b) Two
(c) Five
(d) One fifth.

25. The oxidation number of Mn is maximum in

- (a) MnO_2
- (b) K_2MnO_4
- (c) Mn_3O_4
- (d) **KMnO_4 .**

