



CHEMISTRY

BOOKS - CENGAGE CHEMISTRY

CHEMICAL REACTIONS

Mandatory Exercise Exercise Set I

1. Write balanced chemical equation for the reaction:

Magnesium reacts with steam forming magnesium oxide and liberating hydrogen.



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2. Write balanced chemical equation for the reaction:

Copper reacts with nitric acid to form copper nitrate, reddish brown

fumes of nitrogen dioxide, and water.

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3. Write balanced chemical equation for the reaction:

Hydrogen peroxide (H_2O_2) decomposes in the presence of manganese dioxide, to give oxygen and water.

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4. Write balanced chemical equation for the reaction:

Phosphorus readily burns in chlorine gas, to form phosphorus pentachloride.

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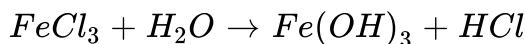
5. Write balanced chemical equation for the reaction:

Butane (C_4H_{10}) burns in air to give carbon dioxide and water. Along

with these two products, a large amount of heat energy is given out.

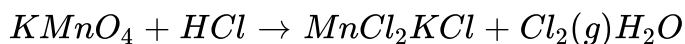
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6. Balance the skeletal equation:



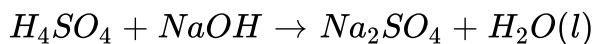
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7. Balance the skeletal equation:



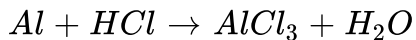
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8. Balance the skeletal equation:



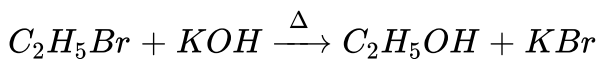
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9. Balance the skeletal equation:



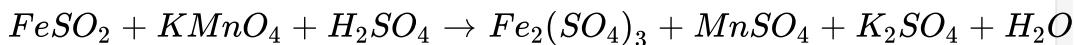
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10. Balance the skeletal equation:



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11. Balance the skeletal equation:



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12. What is the significance of coefficient in a balanced chemical equation ?



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13. What is Redox reaction ? Explain with example.



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14. Which quantities are conserved in all oxidation reductin reaction.

A. Charge only

B. mass only

C. both

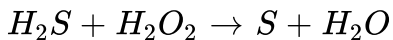
D. None

Answer: C



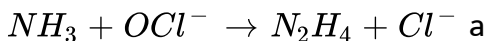
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15. Identify oxidising and reducing agent in equation



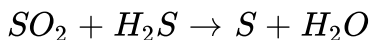
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16. Identify oxidising and reducing agent in equation



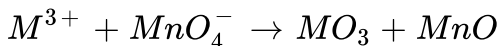
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17. Identify oxidising and reducing agent in equation



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18. Identify oxidising and reducing agent in equation





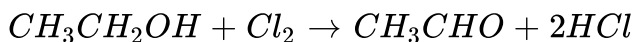
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19. Identify oxidising and reducing agent in equation



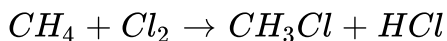
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20. Identify oxidising and reducing agent in equation



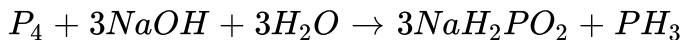
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21. Identify oxidising and reducing agent in equation



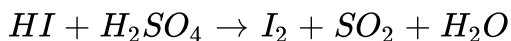
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22. Identify oxidising and reducing agent in equation



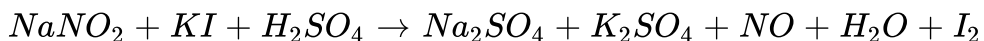
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23. Identify oxidising and reducing agent in equation



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24. Identify oxidising and reducing agent in equation



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25. The reaction $Ag^{2+}(aq) + Ag(s) \rightleftharpoons 2Ag^+(aq)$ An example of.

A. Reduction

B. Oxidation

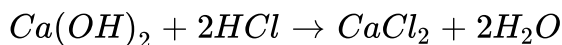
C. Disproportionation

D. none

Answer: C

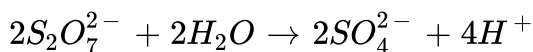
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26. Identify the redox & non redox reaction



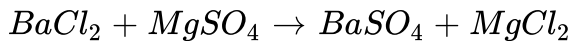
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27. Identify the redox & non redox reaction



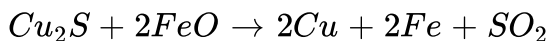
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28. Identify the redox & non redox reaction



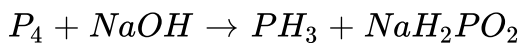
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29. Identify the redox & non redox reaction



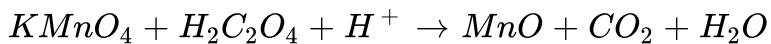
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30. Identify the redox & non redox reaction



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31. Identify the redox & non redox reaction



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Mandatory Exercise Exercise Set Ii

1. Fill in the blank

$KMnO_4$ is an example of a _____ agent.

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2. Fill in the blank

$2H_2S + SO_2 \rightarrow 2H_2O + 3S \downarrow$ In the above reaction, H_2S has been oxidised to _____

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3. Fill in the blank

An oxidising agent is an electron _____

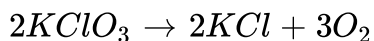
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4. Fill in the blank

The change from $FeCl_3$ to $FeCl_2$ is _____

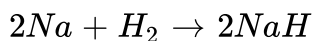
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5. Explain oxidation and reduction with the help of reaction:



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6. Explain oxidation and reduction with the help of reaction:



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7. Breaking of lead broide into lead and bromine is an example of

- A. decomposition reaction
- B. photochemical reacton
- C. diplacement reaction
- D. neutralisation reaction

Answer: A

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8. $PbO + 4HCl \rightarrow PbCl + 2HO + Cl$, the substnce undergoing oxidation is

- A. lead dioxide
- B. hydrochloric acid

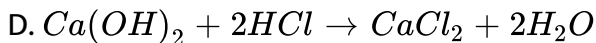
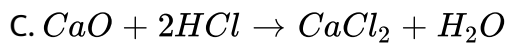
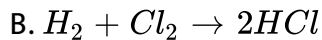
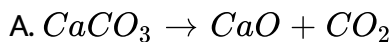
C. hydrogen

D. lead chloride

Answer: B

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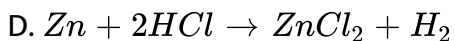
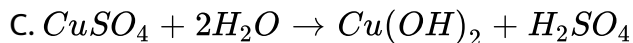
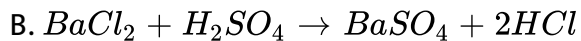
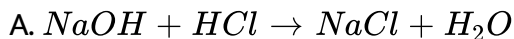
9. Which of the following is a redox reaction ?



Answer: B

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10. Which of the following is a redox reaction ?



Answer: A



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11. Conversion of sugar into CO_2 is an example of

A. oxidation

B. reduction

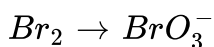
C. redox

D. none

Answer: A

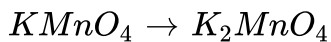
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12. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



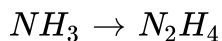
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13. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



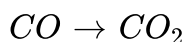
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14. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



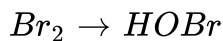
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15. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



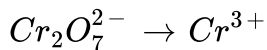
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16. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



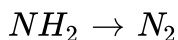
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17. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



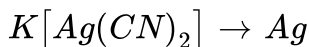
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18. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



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19. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



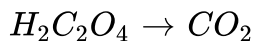
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20. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



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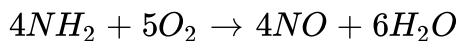
21. Indicated number of electrons involved in following change & identify the process as reduction or oxidation.



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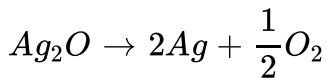
Mandatory Exercise Exercise Set Iii

1. Identify the oxidised and reduced components in the following reactions :

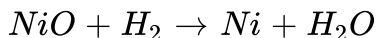


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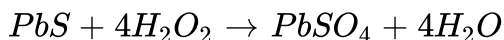
2. Identify the oxidised and reduced components in the following reactions :

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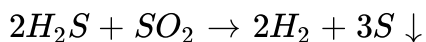
3. Identify the oxidised and reduced components in the following reactions :

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4. Identify the oxidised and reduced components in the following reactions :

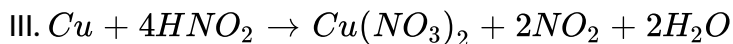
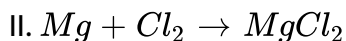
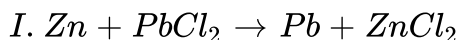
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5. Identify the oxidised and reduced components in the following reactions :



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6. Consider these reactions and answer the questions listed below in each case:



A. Which reactant is oxidised to what ?

B. Which reactant is oxidiser ?

C. Which reactant is reduced to what ?

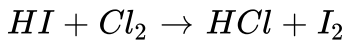
D. Which reactant is reducer ?

Answer:



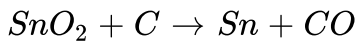
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7. Balance the redox reaction by the oxidation number method :



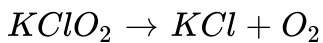
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8. Balance the redox reaction by the oxidation number method :



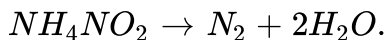
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9. Balance the redox reaction by the oxidation number method :



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10. Select the correct statement in the following reaction :



A. Oxidation number of N is changed from -2 to $+2$.

B. Oxidation number of N in NH_4^+ is changed from -3 to 0 and that in NO_2^- is changed from $+3$ to 0 .

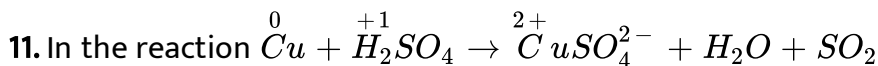
C. Oxidation number of N in NH_4^+ is changed from $+1$ to 0 and that in NO_2^- is changed from -1 to 0 .

D. No change

Answer: B



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A. H^+ is the oxidising agent

B. SO_4^{2-} is the oxidising agent

C. both are correct

D. none is correct

Answer: B

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12. In the reaction $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$, the substance oxidised is

A. H_2S

B. SO_2

C. S

D. H_2O

Answer: A

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13. In the reaction $3Cl_3 + 6NaOH \rightarrow NaClO_3 + 5NaCl + 3H_2O$, which element loses as well as gains electrons ?

A. Na

B. O

C. Cl

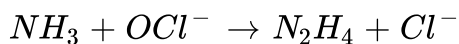
D. None

Answer: D



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14. For the reaction



Occuring in basic medium, the coefficient of N_2H_4 in the balanced equation will be

A. 1

B. 2

C. 3

D. 4

Answer: A



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15. In the reaction $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$, the substance oxidised is

A. H_2S

B. SO_2

C. S

D. H_2O

Answer: A



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16. Conversion of methanol into methanoic acid is

- A. Oxidation
- B. reduction
- C. Combustion
- D. All

Answer: A



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17. In the equation $CrO_4^{2-} + SO_3^{2-} \rightarrow Cr(OH)_4 + SO_4^{2-}$ the oxidation number of Cr changes from

- A. 6 to 4
- B. 6 to 3

C. 8 to 4

D. 4 to 3

Answer: A



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18. During reaction of SO_2 with $K_2Cr_2O_7$ in acidic medium, the oxidation state of S changed from

A. 4 to 0

B. 4 to 2

C. 4 to 6

D. 6 to 4

Answer: C



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19. The reaction

$P_4 + 3NaOH + 3H_2O \rightarrow 3NaH_2PO_2 + PH_3$ is an example of

- A. Pyrolytic reaction
- B. Disproportionation reaction
- C. neutralisation reaction
- D. double decomposition reaction

Answer: B



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20. In the Ionic equation

$BiO_3^- + 6H^{\oplus} + xe^- \rightarrow Bi^{3+} + 3H_2O$ the value of x is

- A. 6
- B. 2
- C. 4

D. 3

Answer: B

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21. In which of the following reaction , hydrogen acting as an oxidising agent ?

A. with Li to form Li H

B. with I_2 to give HI

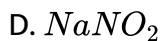
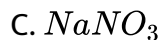
C. with S to given H_2S

D. None

Answer: A

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22. Which of the following acts as an oxidising as well as reducing agent ?

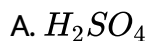


Answer: D



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23. Which of the following acts as oxidising agent ?



D. All

Answer: D

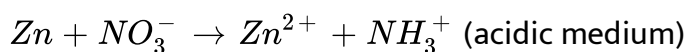
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Consolidated Exercise Comprehension

1. Balancing redox reaction by ion-electron method

Chemical reactions which involve oxidation and reduction (redox reactions) can also be balanced by using the ion-electron method or half-equation method. This method of balancing redox reactions is based upon the principle that electrons lost during oxidation halfreaction of any redox reaction are equal to the electrons gained during reduction half-reaction.

Balance the redox reaction ion-electron method:

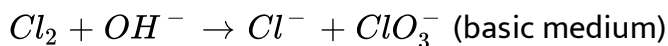


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2. Balancing redox reaction by ion-electron method

Chemical reactions which involve oxidation and reduction (redox reactions) can also be balanced by using the ion-electron method or half-equation method. This method of balancing redox reactions is based upon the principle that electrons lost during oxidation halfreaction of any redox reaction are equal to the electrons gained during reduction half-reaction.

Balance the redox reaction ion-electron method:



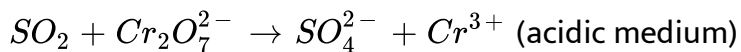
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3. Balancing redox reaction by ion-electron method

Chemical reactions which involve oxidation and reduction (redox reactions) can also be balanced by using the ion-electron method or half-equation method. This method of balancing redox reactions is based upon the principle that electrons lost during oxidation

halfreaction of any redox reaction are equal to the electrons gained during reduction half-reaction.

Balance the redox reaction ion-electron method:

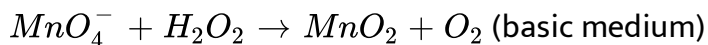


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4. Balancing redox reaction by ion-electron method

Chemical reactions which involve oxidation and reduction (redox reactions) can also be balanced by using the ion-electron method or half-equation method. This method of balancing redox reactions is based upon the principle that electrons lost during oxidation halfreaction of any redox reaction are equal to the electrons gained during reduction half-reaction.

Balance the redox reaction ion-electron method:

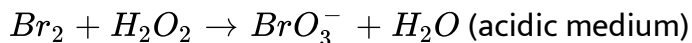


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5. Balancing redox reaction by ion-electron method

Chemical reactions which involve oxidation and reduction (redox reactions) can also be balanced by using the ion-electron method or half-equation method. This method of balancing redox reactions is based upon the principle that electrons lost during oxidation half-reaction of any redox reaction are equal to the electrons gained during reduction half-reaction.

Balance the redox reaction ion-electron method:



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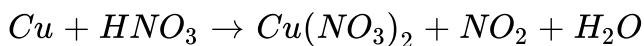
6. Match the following half-reaction in column A with the change in the oxidation number in column B.



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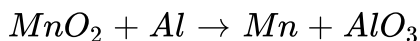
Challenging Exercise

1. Balance the following redox reactions by the oxidation number method:



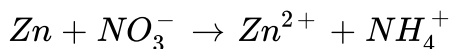
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2. Balance the following redox reactions by the oxidation number method:



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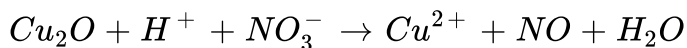
3. Balance the following redox reactions by the oxidation number method:



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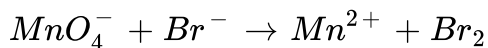
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4. Balance the following redox reactions by the oxidation number method:



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5. Balance the following redox reactions by the oxidation number method:



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Olympiad And Ntse Level Exercises

1. Match the process in column I with their respective names in column II.



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2. When copper is treated with a certain concentration of nitric acid, nitric oxide and nitrogen dioxide are liberated in equal volumes according to the equation



The coefficients x and y are

A. 2 and 3

B. 2 and 6

C. 1 and 3

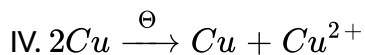
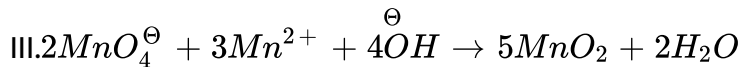
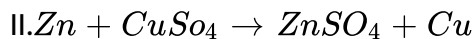
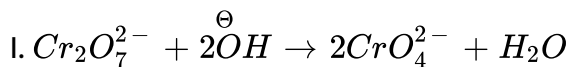
D. 3 and 8

Answer: B



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3. Which of the following represents redox reactions ?



A. I, II

B. I, III,

C. III, IV

D. II, III,

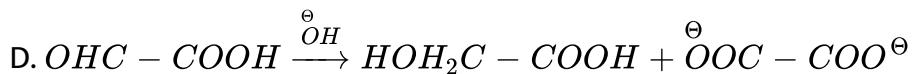
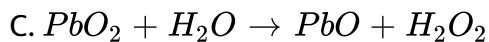
Answer: D



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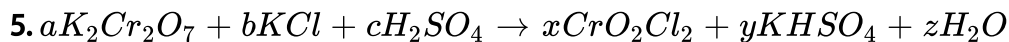
4. Which of the following is not a disproportionation reaction ?





Answer: C

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The above equation balance when

A. $a = 2, b = 4, c = 6$ and $x = 2, y = 6, z = 3$

B. $a = 4, b = 2, c = 6$ and $x = 6, y = 2, z = 3$

C. $a = 6, b = 4, c = 2$ and $x = 6, y = 3, z = 2$

D. $a = 1, b = 4, c = 6$ and $x = 2, y = 6, z = 3$

Answer: D

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6. The number of moles of $KMnO_4$ required to oxidise 1 mole of $Fe(C_2O_4)$ in acidic medium is

- A. 0.6
- B. 1.67
- C. 0.2
- D. 0.4

Answer: A



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7. The number of peroxide bonds in perxenate ion $[XeO_6]^{4-}$ is

- A. 0
- B. 2

C. 3

D. 1

Answer: A



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8. An element that never has a positive oxidation state in any of its compounds is

A. Boron

B. Oxygen

C. Chlorine

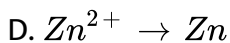
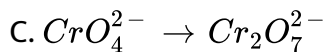
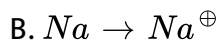
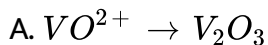
D. Fluorine

Answer: D



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9. Which of the following reactions does not involve either oxidation or reduction ?



Answer: C



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10. The oxidation number of phosphorous in

PO_4^{3-} , P_4O_{10} , and $P_2O_7^{4-}$ is

A. +5

B. +3

C. -3

D. +2

Answer: A



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