CHEMISTRY

BOOKS - OMEGA PUBLICATION

REDOX REACTIONS

Questions

1. Which of the following is redox reaction ?

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2. A number of phenomenon, both physical, chemical and biological are concerned with redox reactions. These reactions

find extensive use in pharmaceutical, industrial and agricultural areas.

Answer the following questions on the basis of above paragraph :

(a) What are redox reactions ?

(b) Give the application of redox reactions in photosynthesis.

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3. Define oxidation and reduction on the basis of electronic with examples.

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4. What is the value of n and l , if orbital of element is 4d

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5. What is Grove's process?

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6. Using s, p, d and f notations, describe the orbital with the quantum number. n = 5 , l = 3

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7. Using s, p, d and f notations, describe the orbital with the quantum number. n = 5 , l = 2

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8. Define oxidising agent and reducing agent on the basis of oxidation number concept.

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9. Calculate the oxidation number of the following compounds.

P in H_3PO_4

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10. Justify tht the reaction

$2Na(s) + H_2(g) \rightarrow 2NaH(s)$ is a redox reaction.

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11. Fluorine reacts with ice and results in the change :

$H_2O(s) + F_2(g) \rightarrow HF(g) + HOF(g)$

Justify that this reaction is a redox reaction.

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12. Calculate the oxidation number of the underlined elements in each of the following species.

(i) $NaH_2\underline{P}O_4$

(ii) $NaH\underline{S}O_4$

(iii) $\underset{4-2}{H\ P}\ O_7$

(iv) $K_2\underline{Mn}O_4$

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13. Find the oxidation number of Mn in MnO_4^{2-}.

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14. Calculate the oxidation number of Cr in $Cr_2O_7^{2-}$.

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15. Calculate the oxidation number of the following compounds.

Cr in $K_2Cr_2O_7$

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16. Calculate the oxidation number of Cl in

(i) $HClO_4$

(ii) ClF_3

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17. Deficiency of which vitamin cause the disease beri-beri?

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18. Calculate the oxidation number of C in

CCl_4

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19. Calculate the oxidation number of S and C respectively in,

(i) $S_2O_7^{-2}$

(ii) CO_2

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20. What is the oxidation number of S in H_2S and C in $C_6H_{12}O_6$.

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21. Calculate the oxidation number of K in K2CO3

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22. Calculate the oxidation number of Cl in

(i) $HClO_4$

(ii) ClF_3

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23. The compound AgF_2 is unstable compound However, if formed, the compound acts as a very strong oxidising agent. Why ?

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24. Which disease is caused by the deficiency of vitamin-C?

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25. Balance the following equation by oxidation number method.

$$Fe^{+2} + Cr_2O_7^{-2} + H^+ \rightarrow Fe^{+3} + Cr^{+3} + H_2O.$$

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26. Calculate the oxidation number of Mn in K M n O 4

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27. Calculate the oxidation number of C in

C_2H_5OH

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28. Balance the following equations by oxidation number method :

(i) $MnO_4^- + H_2S \rightarrow Mn^{2+} + S + H_2O$ (in acidic medium)

(ii) $CuO + NH_3 \rightarrow Cu + N_2 + H_2O$

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29. write formula for the following compound nickel (II) sulphate.

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30. Calculate the oxidation number of K in K C l

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31. Define electrochemical series.

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32. What are the applications of electrochemical series ?

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33. Write four differences between galvanic (or electrochemical) cell and electrolytic cell.

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34. List the value of n and l for the following orbitals : 2p

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35. Calculate the oxidation number of S in sulphate ion

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36. How many orbitals are present in d subshell.

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37. What is electrode potential ? Give its types.

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38. Write four differences between galvanic (or electrochemical) cell and electrolytic cell.

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39. What is salt bridge? give its functions.

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40. Define e.m.f of a cell. How can you compare the e.m.f of the cells using potentiometer.

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41. Calculate the oxidation number of O in H_2O

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42. Calculate the standard Gibbs energy for the cell :

$Zn(s)\left|Zn^{2+}(aq)\right|\left|Cd^{2+}(aq)\right|Cd(s)$

$E^{\circ}_{(Zn^{2+}/Zn)} = -0.76V, E^{\circ}_{(Cd^{2+}/Cd)} = -0.403V, F = 96500C$

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43. Distinguish between emf and potential difference.

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44. Calculate the emf of cell, $Al\left|Al^{3+}\right|\left|Cu^{2+}\right|CuGiven$: E^(@) (Al^(3)|Al) = - 1.66V and E^(@) (Cu^(2+)|Cu) = + 0.34 V`

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45. Give two differences between valency and oxidation number.

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46. Calculate the oxidation number of Al inAl_2O_3

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47. Can we store copper sulphate solution in an iron vessel ?

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48. Can we store copper sulphate solution in iron vessel? Give suitable explanation in support of your answer

$\left[E^{\circ}\left(Cu^{2+}/Cu\right) = +0.34V, E^{\circ}\left(Fe^{2+}/Fe\right) = -0.44V\right]$

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49. Can you store silver ions solution in copper vessel ? Whyor why not ?

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50. Can we store copper sulphate solution in a zinc vessel ?

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51. Distinguish between direct and indirect redox reactions.

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Multiple Choice Questions Mcqs

1. Electrolysis involves oxidation and reduction respectively at

A. anode and cathode

B. cathode and anode

C. at both the electrodes

D. none of the above

Answer: A

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2. The cathode in a galvanic cell and electrolytic cell is

A. negatively charged in both cases

B. positively charged in both cases

C. positively charged in galvanic cell but negatively charged in an electrolytic cell

D. negatively charged in a galvanic cell but positively charged in an electrolytic cell.

Answer: C

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3. In a galvanic cell,

A. chemical energy s converted into electricity

B. chemical energy is converted into heat

C. electrical energy is converted into heat

D. electrical energy is converted into chemical energy

Answer: A

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4. K, Ca and Li metals may be arranged in the decreasing order of their standard electrode potentials as

A. K, Ca, Li

B. Li, K, Ca

C. Li, Ca, K

D. Ca, K, Li

Answer: D

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5. The standard reduction potential of three metallic cations X, Y and Z are $+0.52$, -3.03 and -1.18 v respectively. The order of reducing power is:

A. Ag

B. H_2

C. Zn

D. Li

Answer: D

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6. Arrange the following in the decreasing order of their acidic strength and also give reason for it. HF,HBr,HCl

A. K, Ca, Ba, Mg

B. Ba, Ca, K, Mg

C. C, Mg, Ba, K

D. Mg, Ca, Ba, K

Answer: D

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7. Calculate the oxidation number of P in phosphate ion.

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8. Calculate the oxidation number of P in H_3PO_3

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9. Calculate the oxidation number of C in C_2H_6

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10. How many orbitals are present in f subshell.

A.

B.

C.

D.

Answer: B

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11. Galvanised iron sheets are coated with: C, Cu, Zn, Ni.

A. nickel

B. chromium

C. copper

D. zinc

Answer: D

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12. According to classical concept, oxidation is a process of

A. addition of oxygen

B. removal of hydrogen

C. removal of oxygen

D. addition of oxgyen or removal of hydrogen

Answer: D

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13. According to electronic concept, oxidation involves

A. loss of one or more electrons

B. gain of one or more electrons

C. no change in number of electrons

D. unpredictable

Answer: A

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14. Write down the values of azimuthal quantum number possible for electron present in 3rd shell .

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15. How many orbitals are present in p subshell .

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16. How many orbitals are present in s subshell.

A.

B.

C.

D.

Answer: D

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17. In case of oxidation, there is

A. increase in O.N.

B. decrease in O.N.

C. no change in O.N.

D. none of these

Answer: A

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18. Calculate mass of 2.7moles of $C_{12}H_{22}O_{11}$ (molar mass = 342 g/ mol)

A. 0

B. $+2$

C. $+6$

D. -6

Answer: A

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19. The most common oxidation state of an element is -2. The number of electrons present in the outermost shell is

A. 2

B. 4

C. 6

D. 8

Answer: C

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20. In the conversion of $K_2Cr_2O_7 \text{to} \, \mathrm{K}_2CrO_4$, the oxidation number of chromium

A. remain same

B. increases

C. decrease

D. none of these

Answer: A

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21. Calculate number of moles in 132g of PCl5

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22. In which of the following compounds, iron has the lowest oxidation number ?

A. $Fe(CO)_5$

B. Fe_2O_3

C. $K_4[Fe(CN)_6]$

D. None of these

Answer: A

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23. The oxidation number of P in $HP_2O_7^-$ ion is

A. $+5$

B. $+6$

C. $+7$

D. $+3$

Answer: B

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24. Write notation of orbital with n = 6 and l = 3.

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25. Oxidation number of Cr in $Cr(CO)_6$ is

A. -2

B. $+2$

C. $+6$

D. 0

Answer: D

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