CHEMISTRY

BOOKS - DISHA PUBLICATION CHEMISTRY (HINGLISH)

REDOX REACTIONS

Jee Main 5 Years At A Glance

1. The oxidation states of

Cr in $\left[Cr(H_2O)_6\right]Cl_3.$, $\left[Cr(C_6H_6)_2\right]$ and

$K_2\left[Cr(CN)_2(O_2)(NH_3)\right]$ respectively are
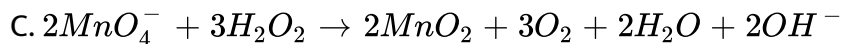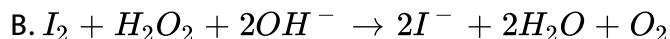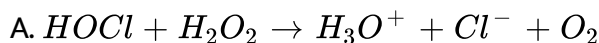
A. $+$ 3,+4,and+6

B. $+3$,+2,and+4

C. $+3$, 0,and+6

D. $+$ 3,0,and +4

Answer: C

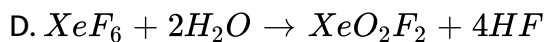**2.** In which of the following reactions, hydrogen peroxide acts as an oxidizing agent ?

A. $HOCl + H_2O_2 \rightarrow H_3O^+ + Cl^- + O_2$

B. $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$

C. $2MnO_4^- + 3H_2O_2 \rightarrow 2MnO_2 + 3O_2 + 2H_2O + 2OH^-$
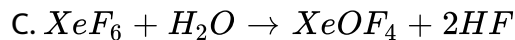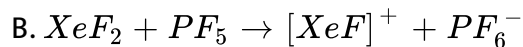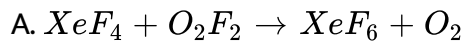
D. $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$
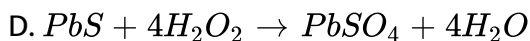
Answer: D

3. Which of the following reactions is an example of a redox reaction?

Hint: In above reaction. xenon is oxidised while oxygen is reduced i.e .. it is

redox reaction.)

A. $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$

B. $XeF_2 + PF_5 \rightarrow [XeF]^+ + PF_6^-$

C. $XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$

D. $XeF_6 + 2H_2O \rightarrow XeO_2F_2 + 4HF$

Answer: A

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4. Copper becomes green when exposed to moist air for a long period. This is due to:

A. the formation of a layer of cupric oxide on the surface of copper.

B. the formation of a layer of basic carbonate of copper on the surface of copper.
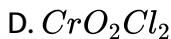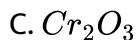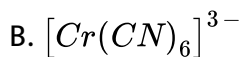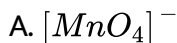
C. the formation of a layer of cupric hydroxide on the surface of copper.

D. the formation of basic copper sulphate layer on the surface of the metal.

Answer: B

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5. Among the following, identify the species with an atom in $+6$ oxidation state.

A. $[MnO_4]^-$

B. $[Cr(CN)_6]^{3-}$

C. Cr_2O_3

D. CrO_2Cl_2

Answer: D

6. How many electrons are involved in the following redox reaction?
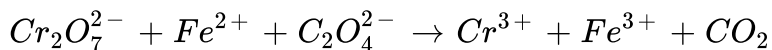
$$Cr_2O_7^{2-} + Fe^{2+} + C_2O_4^{2-} \rightarrow Cr^{3+} + Fe^{3+} + CO_2$$

A. 3

B. 4

C. 6

D. 7

Answer: A

7. Consider the reaction:

$$H_2SO_3(aq) + Sn^{4+}(aq) + H_2O(l) \rightarrow Sn^{2+}(aq) + HSO_4^-(aq) + 3H^+(aq$$
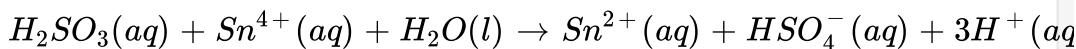
Which of the following statements is correct?

A. Sn^{4+} is the oxidizing agent because it undergoes oxidation.

B. Sn^{4+} is the reducing agent because it undergoes oxidation.

C. $H2SO_3$ is the reducing agent because it undergoes oxidation.

D. $H2SO_3$ is the reducing agent because it undergoes reduction.

Answer: C

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Exercise 1 Concept Builder Topicwise

1. Oxidation-Reduction Reactions

A. Charge only

B. Mass only

C. Both charges and mass

D. Neither charge nor mass

Answer: C

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2. In the reaction

$$H_2S + NO_2 \rightarrow H_2O + NO + S.\ H_2S \text{ is}$$
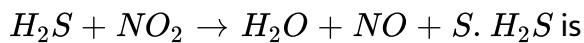
A. oxidised

B. reduced

C. precipitated

D. None of these

Answer: A

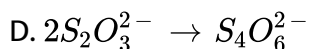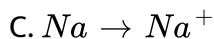**3.** The conversion of sugar $C_{12}H_{22}O_{11} \rightarrow CO_2$ is :

A. oxidation

B. reduction

C. Both oxidation and reduction

D. Neither oxidation nor reduction

Answer: A

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4. Which reaction involves neither oxidation nor reduction?

A. $CrO_4^{2-} \rightarrow Cr_2O_7^{2-}$

B. $Cr \rightarrow CrCl_3$

C. $Na \rightarrow Na^+$

D. $2S_2O_3^{2-} \rightarrow S_4O_6^{2-}$
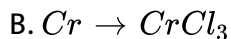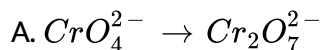
Answer: A

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5. In the following reaction, which is the species being oxidised ?

$$2Fe^{3+}(aq) + 2I^-(aq) \rightarrow I_2(aq) + 2Fe^{2+}(aq)$$
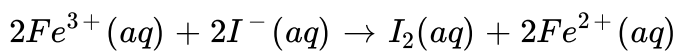
A. Fe^{3+}

B. I^-

C. I_2

D. Fe^{2+}

Answer: B

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6. The compound that canwork both as an oxidising as well as a reducing agent is

A. $KMnO_4$

B. H_2SO_4

C. BaO_2

D. H_2O_2

Answer: D

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7. Which of the following substances acts as an oxidising as well as a reducing agent?

A. Na_2O

B. $SnCI_2$

C. Na_2O_2

D. $NaNO_2$
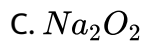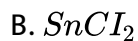
Answer: D

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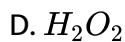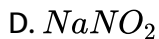**8.** In the reaction

$$2FeCl_3 + H_2S \rightarrow 2FeCl_2 + 2HCl + S$$
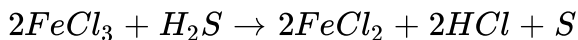
A. $FeCI_3$ acts as an oxidising agent.

B. Both H_2S and $FeCI_3$ are oxidised.

C. $FeCI_3$ is oxidised while H_2S is reduced.

D. H_2S acts as an oxidising agent.

Answer: A

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9. When iron is rusted, it is

A. oxidised

B. reduced

C. evaporated

D. decomposed

Answer: A

10. Which of the following is not an intermolecular redox reaction?

A. $MgCO_3 \rightarrow MgO + CO_2$

B. $O_2 + 2H_2 \rightarrow 2H_2O$

C. $K + H_2O \rightarrow KOH + \left(\dfrac{1}{2}\right) H_2$

D. $MnBr_3 \rightarrow MnBr_2 + \left(\dfrac{1}{2}\right) Br_2$
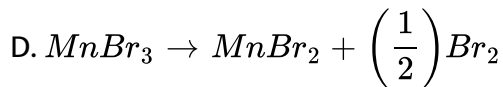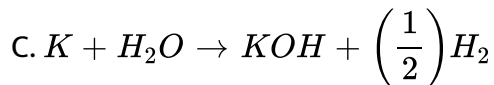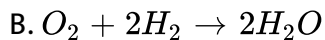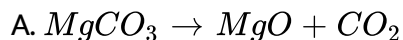
Answer: A

11. In the reaction $3Mg + N_2 \rightarrow Mg_3N_2$

A. magnesium is reduced

B. magnesium is oxidized

C. nitrogen is oxidized

D. None of these

Answer: B

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12. One gas bleaches the colour of flowers by reduction, while the other by oxidation, the two gases respectively are:

A. Co and Cl_2

B. SO_2 and CI_2

C. H_2S and Br_2

D. NH_3 and SO_2

Answer: B

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13. In reaction of $KMnO_4$ and Mohr's salt, $FeSO_4$ is oxidised to

A. Fe^{2+}

B. Fe^{3+}

C. Fe

D. All of these

Answer: B

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14. Match the columns
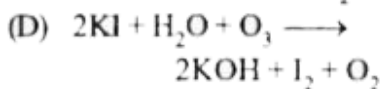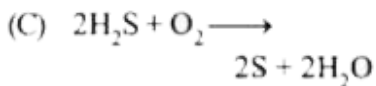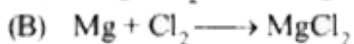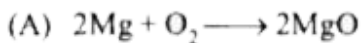
Column-I		Column-II	
(A)	$2Mg + O_2 \longrightarrow 2MgO$	(p)	Removal of hydrogen
(B)	$Mg + Cl_2 \longrightarrow MgCl_2$	(q)	Removal of electropositive element
(C)	$2H_2S + O_2 \longrightarrow$ $2S + 2H_2O$	(r)	Addition of oxygen
(D)	$2KI + H_2O + O_3 \longrightarrow$ $2KOH + I_2 + O_2$	(s)	Addition of electronegative element, chlorine

A. A -(s), B -(q), C -(p), D -(r)

B. A -(r),B -(s), C-(p),D -(q)

C. A -(s), B -(r),C -(q),D -(p)

D. A -(r),B -(p),C -(s),D -(q)

Answer: B

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15. Oxidation number of chromium in potassium dichromate is

A. 6

B. -5

C. -2

D. 2

Answer: A

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16. Phosphorus has the oxidation state $+3$ in

A. phosphorous acid

B. orthophosphoric acid

C. hypophosphorous acid

D. metaphosphoric acid.

Answer: A

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17. A compound contains atoms A, B and C. the oxidation number of A is $+2$, of B is $+5$ and of C is -2. The possible formula of the compound is

A. $A_2(BC_3)_2$

B. $A_3(BC_4)_2$

C. $A_3(B_4 - 2$

D. ABC_2

Answer: B

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18. The brown - ring complex compound of iron is formulated as $[Fe(H_2O)_5(NO)]SO_4$. The oxidation state of iron is :

A. l

B. 2

C. 3

D. O

Answer: B

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19. The oxidation number of sulphur in S_2F_2, H_2S respectively, are

A. + 1 and - 2

B. +1 and-2

C. +1 and +2

D. +1 and-2

Answer: A

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20. The oxidation number of cobalt in $K[Co(CO)_4]$ is

A. +I

B. 3

C. -1

D. -3

Answer: C

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21. Oxidation number ofnitrogen in $(NH_4)_2SO_4$ is

A. -1/3

B. -1

C. +I

D. -3

Answer: D

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

A. $K_3[Fe(CN)_6]$

B. $K_4\left[Fe(CN)_6\right]$

C. $FeSO_4. (NH_4)_2SO_{4.6}H_2O$

D. $Fe(CO)_5$
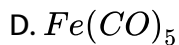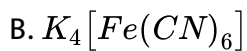
Answer: D

23. In which of the compounds does 'maganese' exhibit highest oxidation number ?

A. MnO_2

B. Mnp_4

C. K_2MnO_4

D. $MnSO_4$
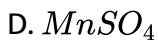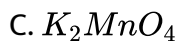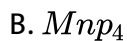
Answer: C

24. On reduction of $KMnO_4$ by oxalic acid in acidic medium, the oxidation number of Mn. What is the magnitude of is change?

A. From 7 to 2

B. From 6 to2

C. From 5 to 2

D. From 7 to 4

Answer: A

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25. Among the following, identify the species with an atom in +6 oxidation state.

A. MnO_4^-

B. $Cr(CN)_6^{3-}$

C. NiF_6^{2-}

D. CrO_2Cl_2
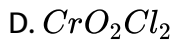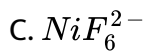
Answer: D

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

A. 3

B. 2

C. 6

D. 4

Answer: A

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27. in which of the following transition metal complexes does the metal exhibits zero oxidation state.

A. $[Co(NH_3)_6]Cl_3$

B. $[Fe(H_2O)_6]SO_4$

C. $Ni(CO)_4$

D. $[Fe(H_2O)_6]X_3$
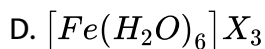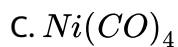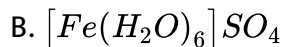
Answer: C

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28. In which of the following compounds , the oxidation number of iodine is fractional ?

A. IF_7

B. I_3

C. IF_5

D. IF_3

Answer: B

29. The oxide which cannot act as reducing agent is

A. NO_2

B. SO_2

C. CO_2

D. CIO_2

Answer: C

30. The oxidation number of an element in a compound is evaluated on the basis of certain rules. Which of the following rules is not correct in this respect ?

A. The oxidation number ofhydrogen is always+ 1.

B. The algebraic sum of aJ1 the oxidation numbers in a compound is zero.

C. An element in the free or the uncombined state bears oxidation number zero.

D. In all its compounds, the oxidation number offluorine is -1

Answer: A

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31. The oxidation states of the most electronegative elements in the products of the reaction between BaO_2 and H_2SO_4 are

A. 0 and-1

B. -1 and-2

C. -2and0

D. -2and+l

Answer: B

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32. Which of the following statements is not correct?

A. The oxidation number of S in $(NH_4)_2S_2O_8$ is + 6.

B. The oxidation number of Os in OsO_4 is +8.

C. The oxidation number of S in H_2SO_5 is +8 . .

D. The oxidation number of O in KO_2 is -1/2

Answer: C

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33. The $3ClO^-$ (aq.) $\rightarrow$ ClO_3^- (aq.) $+ 2Cl^-$ (aq.) is an example of

A. Oxidation reaction

B. Reduction reaction

C. Disproportionation reaction

D. Decomposition reaction

Answer: C

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34. For the reaction : $NH_3 + OCI^- \rightarrow N_2H_4 + Cl^-$ in basic medium, the coefficients of NH_3, OCI^- and N_2H_4 for the balanced equation are respectively

A. 2,2,2

B. 2,2, 1
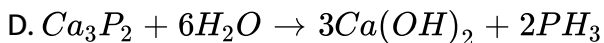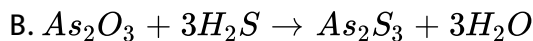
C. 2, 1, I

D. 4,4,2

Answer: C

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35. Which of the following reactions involve disproportionation ?

A. $2H_2SO_4 + Cu \rightarrow CuSO_4 + 2H_2O + SO_2$

B. $As_2O_3 + 3H_2S \rightarrow As_2S_3 + 3H_2O$

C. $2KOH + Cl_2 \rightarrow KCI + KOCI + H_2O$

D. $Ca_3P_2 + 6H_2O \rightarrow 3Ca(OH)_2 + 2PH_3$

Answer: C

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36. In a balanced equation $H_2SO_4 + xHI \rightarrow H_2S + YI_2 + zH_2O$, the value of x, y, z are

    A. x=3,y=5,z=2

    B. x=4,y=8,z=5

    C. x=8,y=4,z=4

    D. x=5,y=3,z=4

Answer: C

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37. $KMnO_4$ oxidises oxalic acid in acidic medium. The number of CO_2 molecules produced as per the balanced equation is

    A. 10

    B. 8

    C. 6

D. 3

Answer: A

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38. In the chemical reaction,

$$K_2Cr_2O_7 + xH_2SO_4 + ySO_2 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + zH_2O,$$ the

value of x, y and z respectively are :

A. 1,3,1

B. 4,1,4

C. 3,2,3

D. 2, 1,2

Answer: A

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39. Consider the following reaction

$5H_2O_2 + XCIO_2 + 2OH^- \rightarrow XCI^- - + YO_2 + 6H_2O$ The reaction is balanced if

A. X=5, Y=2

B. X=2, Y=5

C. X=4,Y=l0

D. X=5, Y=3

Answer: B

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40. Number of moles of $K_2Cr_2O_7$ reduced by one mole of Sn^{2+} ion is

A. 1/3

B. 3

C. 1/6

D. 6

Answer: A

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41. Which of the following statements is not correct?

    A. Potassium permanganate is a powerful oxidising substance.

    B. Potassium permanganate is a weaker oxidising agent than potassium dichromate.

    C. Potassium permanganate is a stronger oxidising agent than potassium dichromate.

    D. Potassium di chromate oxidises a secondary alcohol into a ketone

Answer: B

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42. The species that undergoes disproportionational is an alkaline medium are
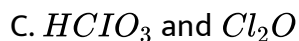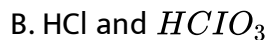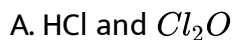
A. CI_2

B. $MnO_4(2-)$

C. NO_2
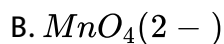
D. All of these

Answer: D

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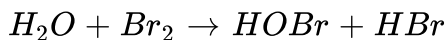**43.** What products are expected from the desproprtionation reactin of hypochorous acid ?

A. HCl and Cl_2O

B. HCl and $HCIO_3$

C. $HCIO_3$ and Cl_2O

D. $HCIO_2$ and $HCIO_4$

Answer: B

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44. Which is the best description of the behaviour of bromine in the reaction given below
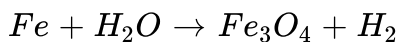
$$H_2O + Br_2 \rightarrow HOBr + HBr$$

A. Proton acceptor only

B. Both oxidised and reduced

C. Oxidised only

D. Reduced only

Answer: B

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45. The number of electrons lost in the following change is

$$Fe + H_2O \rightarrow Fe_3O_4 + H_2$$

A. 2

B. 4

C. 6

D. 8

Answer: D

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46. 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

$$xCu + yHNO_3 \rightarrow Cu(NO_3)_2 + NO + NO_2 + H_2O$$

The coefficients x and y are

A. 2 and 3

B. 2 and 6

C. 1 and 3
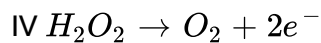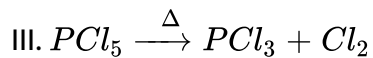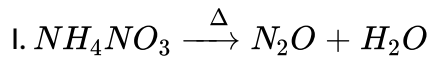
D. 3 and 8

Answer: B

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

I. $NH_4NO_3 \xrightarrow{\Delta} N_2O + H_2O$

II. $P_4 \xrightarrow{\Delta} PH_3 + HPO_2^-$

III. $PCl_5 \xrightarrow{\Delta} PCl_3 + Cl_2$

IV $H_2O_2 \rightarrow O_2 + 2e^-$

A. I, II

B. I,III,IV

C. II, IV

D. I, III

Answer: B

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48. Which fo the following statements are correct concerning redox propreties ?

(i) The reducing power of hydrogen halides increases from hydrogen chloride to hydrogen iodide.

(ii) The oxidizing power of halogens decreases from chlorine to iodine.

(iii) A metal M for which $E^{\ominus}$ for the half-reaction

$$M^{n+} + ne^- \Leftrightarrow M$$

is very negative will be a good reducing agent.

    A. (i), (ii) and(iii)

    B. (i) and (ii)

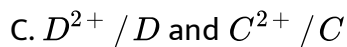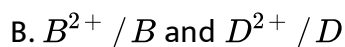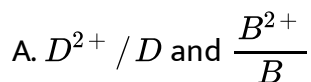   C. (i) only

    D. (ii) and (iii)

Answer: A

---

49. Standard electrode potentials of redox couples A^{2+}/A, B^{2+}/B, C/C^{2+} and D^{2+}/D are 0.3 V, -0.5 V, -0.75 V and 0.9 V respectively. Which of these is best oxidising agent and reducing agent respectively?

A. D^{2+}/D and $\dfrac{B^{2+}}{B}$

B. B^{2+}/B and D^{2+}/D

C. D^{2+}/D and C^{2+}/C

D. C^{2+}/C and D^{2+}/D
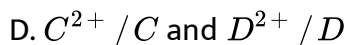
Answer: C

50. The standard electrode potential of four metallic elements (A, B, C and D) are + 0.80, –0.76, + 0.12 and +0.34 V respectively. Arrange them in order of decreasing electropositive character

A. A
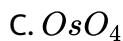
B. B

C. C

D. D

Answer: A

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Exercise 2 Concept Applicator

1. In which of the following is the highest oxidation state not possible?
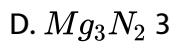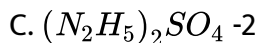
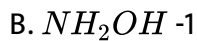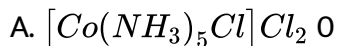A. $\left[XeO_6^4 \right]$

B. XeF_8

C. OsO_4

D. RuO_4

Answer: B

2. Oxidation state of nitrogen is incorrectly given for:

A. $[Co(NH_3)_5Cl]Cl_2$ 0

B. NH_2OH -1

C. $(N_2H_5)_2SO_4$ -2

D. Mg_3N_2 3

Answer: A

3. For the reaction

$$M^{x+} + MnO_4^{\ominus} \rightarrow MO_3^{\ominus} + Mn^{2+} + (1/2)O_2$$
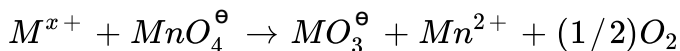
if 1mol of$MnO_4^{\ominus}$ oxidises 1.67mol of$M^{x+}$to$MO_3^{\ominus}$, then the value of x in the reaction is

A. 5

B. 3

C. 2

D. 1

Answer: C

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4. Arrange the following in the order of their decreasing electrode potentials:Mg, K, Ba,Ca

A. K, Ca, Ba, Mg

B. Ba, Ca, K, Mg

C. Ca, Mg, K, Ba

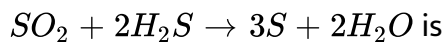D. Mg, Ca, Ba, K

Answer: D

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5. Equivalent mass of oxidizing agent in the reaction,

$SO_2 + 2H_2S \rightarrow 3S + 2H_2O$ is

A. 32

B. 64

C. 16

D. 8

Answer: C

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6. An unknown oxidising agent contains the element Y in + 5 state. If it takes 26.98 ml of 0.1326 N Na_2SO_3 to reduce 7.16×10^{-1} mole of $YO(OH)_2$, to a lower state, the final oxidation state of Y is-

A. -2

B. -1

C. Zero

D. 1

Answer: C

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7. For the red ox reaction :

$Cr_2O_7^{2-} + I^- + H^+ \rightarrow Cr^{3+} + I_2 + H_2O$ the correct coefficients of the reactants for the balanced equation are

	$Cr_2O_7^{2-}$	I^-	H^+
A.	1	3	14
B.	$Cr_2O_7^{2-}$	I^-	H^+
	1	6	14
C.	$Cr_2O_7^{2-}$	I^-	H^+
	2	6	14
D.	$Cr_2O_7^{2-}$	I^-	H^+
	1	6	7

Answer: B

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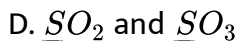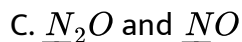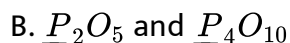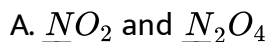**8.** The oxidation states of the most electronegative element in the products of the reaction between BaO_2 with dilute H_2SO_4 are

A. 0 and -1

B. -1 and -2

C. -2 and 0

D. -2 and-1

Answer: B

9. In which of the following pairs, there is greatest difference in the oxidation number of the underlined elements ?

A. $\underline{N}O_2$ and $\underline{N}_2O_4$

B. $\underline{P}_2O_5$ and $\underline{P}_4O_{10}$

C. $\underline{N}_2O$ and $\underline{N}O$

D. $\underline{S}O_2$ and $\underline{S}O_3$

Answer: D

10. The correct decreasing order ofoxidation number ofoxygen in compounds BaO_2, O_3, KO_2 and OF_2 is :

A. $BaO_2 > KO_2 > O_3 > OF_2$

B. $OF_2 > O_3 > KO_2 > BaO_2$

C. $KO_2 > OF_2 > O_3 > BaO_2$
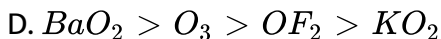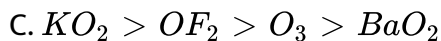
D. $BaO_2 > O_3 > OF_2 > KO_2$
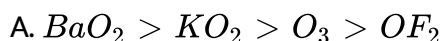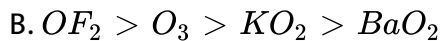
Answer: B

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11. When $KMnO_4$ acts as an oxidising agnet and ultimetely from MnO_4^{2-}, MnO_2, Mn_2O_3, and Mn^{2+}, then the number of electrons transferred in each case, respectively, are

A. 4,3, 1,5

B. 1,5,3, 7

C. 1,3,4,5

D. 3,5, 7, I

Answer: C

12. The oxidation state of iodine in $H_4IO_6^-$ is:

A. 7

B. -1

C. 5

D. 1

Answer: A

13. The reaction in which hydrogen peroxide acts as a reducting agent is .

A. $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_{20}$

B. $2KI + H_2O_2 \rightarrow 2KOH + l_2$

C. $2FeSO + 4 + H_2SO_4 + H_2O_2 \rightarrow Fe_2(SO_4)_3 + 2H_2O$

D. $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$
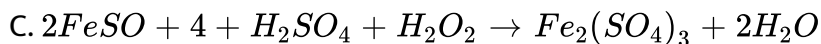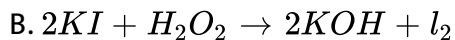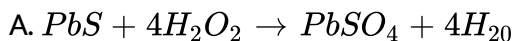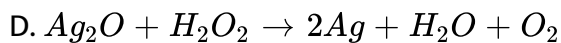
Answer: D

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14. The atomic number of an element is 22. The highest oxidation state exhibited by it in its compound is

A. +I

B. 2

C. 3

D. 4

Answer: D

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15. Consider the following statements Reaction

$$KIO_3 + 5Kl + 6HCl = 3I_2 + 6KCl + 3H_2O$$
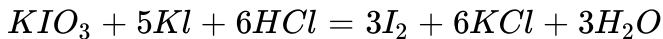
(a) Kl is oxidise in I_2

(b) KIO_3, is oxidise in I_2

(c) KIO_3, is reduced in I_2

(d) Oxidation number (- 1) of I in KI is increased up to zero in I_2

Of the following statements

    A. 1, 3 and 4 are correct

    B. 1, 2 and 4 are correct

    C. 3 and 4 are correct

    D. only 1 is correct

Answer: C

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16. The number of mole of $KMnO_4$ that will be needed to react completely with one mole of ferrous oxalate in acidic solution is:

A. 2/5

B. 3/5

C. 4/5

D. 1

Answer: B
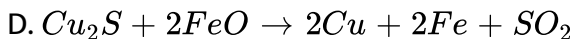
17. Which of the following is not a redox reaction ?

A. Reaction of H_2SO_4 with NaOH

B. Production of ozone from oxygen in the atmosphere by lightening

C. Production of nitrogen oxides from nitrogen and oxygen in the atmosphere by lightening

D. Evaporation of water

Answer: C

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18. Which of the following reactions is not a redox reaction?

A. $Ca(OH)_2 + 2HCI \rightarrow CaCl_2 + 2H_2O$

B. $BaCI_2 + MgSO_4 \rightarrow BaSO_4 + MgCl_2$

C. $2S_2O_7- + 2H_2O \rightarrow 4SO_4(2-) + 4H^+$

D. $Cu_2S + 2FeO \rightarrow 2Cu + 2Fe + SO_2$
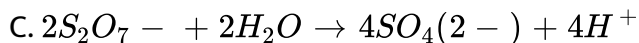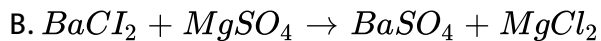
Answer: D

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19. Equivalent weight of $MnO_4^{\ominus}$ in acidic neutral and basic media are in ratio of:

  A. 3: 5: 15

  B. 5: 3 : 1

  C. 5: 1 : 3

  D. 3 : 5 : 5

Answer: D

20. If equal volumes of 1 M $KMnO_4$ and 1M $K_2Cr_2O_7$ solutions are allowed to oxidise Fe(II) to Fe(III) in acidic medium, then Fe(II) oxidised will be

  A. more by $KMnO_4$
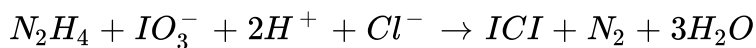
  B. more by K_2, Cr_2O_7

C. equal in both cases

D. can't be determined

Answer: B

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21. Hydrazine reacts with KIO_3 in presence of HCl as :

$$N_2H_4 + IO_3^- + 2H^+ + Cl^- \rightarrow ICI + N_2 + 3H_2O$$

The equivalent masses of N_2H_4 and KIO_3 respectively are :

A. 16 and 87

B. 16 and 53.5

C. 8 and 53.5

D. 8 and 87

Answer: C

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22. The equivalent weight of iron in Fe_2O would be:

A. 28

B. 56

C. 18.6

D. 112

Answer: C

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23. E^θ values of some redox couples are given below. On the basis of these values choose the correct option.

E^θ values: $Brt_2 / Br^- = +1.90$

$Ag^+ / Ag(s) = +0.80$

$Cu^{2+} / Cu(s) = +0.34, I_2(s)/I^- = +0.54$

A. Cu will reduce Br_-

B. Cu will reduce Ag

C. Cu will reduce I^-

D. Cu will reduce Br_2

Answer: D

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24. A solution contains Fe^{2+}, Fe^{3+} and T^- ions. This solution was treated with iodine at $35°C$. $E°$ for Fe^{3+}, Fe^{2+} is 0.77V and $E°$ for $I_2/2I^-$ = 0.536 V. The favourable redox reaction is:

A. I_2 will be reduced to I^-

B. There will be no redox reaction.

C. (I^- will be oxidised to I_2.

D. Fe^{2+} will be oxidised to Fe^{3+}.

Answer: C

25. In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, th
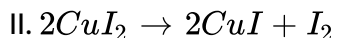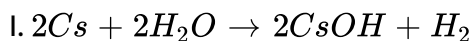
equivalent weight of K_2Cr_2O is
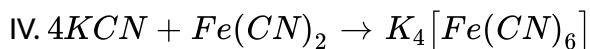
A. M/2

B. M/6

C. M/3

D. M

Answer: B
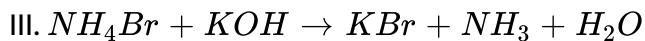
26. Which of the following reactions do not involve oxidation reduction ?

I. $2Cs + 2H_2O \rightarrow 2CsOH + H_2$

II. $2CuI_2 \rightarrow 2CuI + I_2$

III. $NH_4Br + KOH \rightarrow KBr + NH_3 + H_2O$

IV. $4KCN + Fe(CN)_2 \rightarrow K_4\left[Fe(CN)_6\right]$

A. I, II

B. I,III

C. I,III,IV

D. III,IV

Answer: D

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27. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. S

B. H

C. Cl

D. C

Answer: C

28. Zn gives H_2 gas with H_2SO_4 and HCl but not with HNO_3 because

    A. Zn acts as an oxidising agent when it reacts with HNO_3

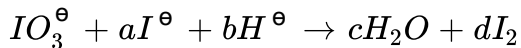   B. HNO_3 is weaker acid than H_2OSO_4 and HCl

    C. In electrochemical series, Zn is above hydrogen

    D. NO^3 is reduced in preference to hydronium ion

Answer: D

29. In the balanced chemical reaction

$$IO_3^{\ominus} + aI^{\ominus} + bH^{\ominus} \rightarrow cH_2O + dI_2$$

a, b, c, and d, respectively, correspond to

A. 5, 6, 3, 3

B. 5,3,6,3

C. 3, 5,3,6

D. 5, 6, 5, 5

Answer: A

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

A. $2PhCHO \xrightarrow{Al\,(Oet)_3} PhCOOCH_2Ph$

B. $\begin{matrix} CHO \\ | \\ COOH \end{matrix} + OH^- \longrightarrow \begin{matrix} CH_2OH \\ | \\ COO^- \end{matrix} + \begin{matrix} COO^- \\ | \\ COO^- \end{matrix}$

C. $NaH + H_2O \rightarrow NaOH + H_2$
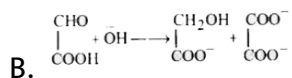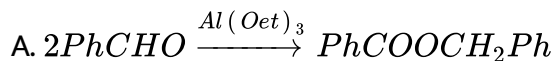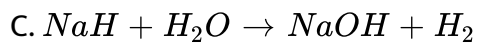
D. All of the above.

Answer: A

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