CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

THE D- AND F-BLOCK ELEMENT

Level I

1. Which of the following transition metal is present in misch metal?

A. La

B. Sc

C. Ni

D. Cr

Answer: A

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2. Maximum oxidation states of Cr, Mn and Os are respectively

A. +3, +5, and + 6

B. +6, +5, +7

C. +6, +7, +8

D. +6, +5, +8

Answer: C

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3. The atomic radii of the elements are almost same of which series

A. Fe - Co - Ni

B. Na - K - Rb

C. F-CI - Br

D. Li - Be-B

Answer: A

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4. Which of the following element has maximum first ionisation potential? 1)V 2)Ti 3)Cr 4)Mn

A. V

B. Ti

C. Cr

D. Mn

Answer: D

5. The catalytic activity of transition metals and their compounds is mainly due to: a)their magnetic behaviour b)their unfilled d-orbitals c)their ability to adopt variable oxidation state d)their chemical reactivity

A. their magnetic behaviour

B. their unfilled d-orbitals

C. their ability to adopt variable oxidation state

D. their chemical reactivity

Answer: C

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6. Which one of the following nitrates will leave behind a metal on strong heating?

A. Copper nitrate

B. Mangnese nitrated

C. Silver nitrate

D. Ferric nitrate

Answer: C

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7. Cuprous ion is colourless, while cupric ion is coloured because

A. both have half-filled p and d-orbitals

B. cuprous ion has a completed d-orbital and cupric ion has incompleted-orbital

C. cuprous ion has incomplete d-orbital and cupric ion has a completed-orbital

D. both have unpaired electrons in d-orbital

Answer: B

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8. Which of the following trivalent ion has the largest atomic radii in the lanthanide series?

A. Ce

B. Pm

C. La

D. Lu

Answer: B

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9. Which of the following pair will have effective magnetic moment equal?

A. Ti^{2+} and V^{2+}

B. Cr^{2+} and Fe^{2+}

C. Cr^{3+} and Mn^{2+}

D. V^{2+} and Sc^{3+}

Answer: C

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10. Which lanthanoid compound is used as a most powerful liquid lasers after dissolving it in selenium oxychloride?

a)Cerium oxide b)Neodymium oxide c)Promethium sulphate d)Ceric sulphate

A. Cerium oxide

B. Neodymium oxide

C. Promethium sulphate

D. Ceric sulphate

Answer: B

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11. The 3d metal ions are generally paramagnetic in nature because:

A. they form coloured salts

B. they have one or more unpaired delectrons

C. they have one or more paired s clectrons

D. they are reducing agents

Answer: B

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12. Which of the following ores contains both Cu and Fe?

A. Cuprite

B. Azurite

C. Chalcopyrite

D. Malachite

Answer: C

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13. Heating mixture of Cu_2O and Cu_2S will give:

A. $Cu + SO_2$

B. $Cu + SO_3$

C. CuO+CuS

D. Cu_2SO_3

Answer: A

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14. Brass, bronze and german silver have one metal in common. This is:

A. Ni

B. Fe

C. Cu

D. Sn

Answer: C

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15. Which of the following pairs of ions is colourless?

A. Ti^{3+}, Cu^{2+}

B. Sc^{3+}, Zn^{2+}

C. Co^{2+}, Fe^{3+}

D. Ni^{2+}, V^{3+}

Answer: B

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16. For successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization enthalpy?

A. Vanadium (Z=23)

B. Manganese (Z=25)

C. Chromium (Z=24)

D. Iron (Z=26)

Answer: B

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17. Which of the following forms with an excess of CN", a complex having coordination number two?

A. Cu^+

B. Ag^+

C. Ni^{2+}

D. Fe^{2+}

Answer: B

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18. In the first transition series, the highest oxidation state is exhibited by:

A. Mn

B. Ni

C. Fe

D. Cr

Answer: A

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19. How many unpaired electrons are present in the central metal ion of $[CoCl_4]^{2-}$?

A. 5

B. 4

C. 3

D. 2

Answer: C

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20. Europium is

A. f-block element

B. d-block element

C. p-block element

D. s-block element

Answer: A

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21. When KI (excess) is added to a.CuSO4 b.HgCl2 c.Pb(NO3)2 1)a white ppt. of CuI in I, an orange ppt. H g I 2 , in II and a yellow ppt. P b I 2 , in III 2)a white ppt. of CuI in I, an orange ppt. dissoloving to H g I 2 − 4 in II, and an yellow ppt. of P b I 2 in III 3)a white ppt. of C u I , H g I 2 and P b I 2 in each case 4)none of the above is correct

A. a white ppt. of CuI in I, an orange ppt. HgI_2, in II and a yellow ppt. PbI_2, in III

B. a white ppt. of CuI in I, an orange ppt. dissoloving to HgI_4^{2-} in II, and an yellow ppt. of PbI_2 in III

C. a white ppt. of CuI, HgI_2 and PbI_2 in each case

D. none of the above is correct

Answer: B

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22. The yellow colour of chromates changes to orange on acidification due to formation of

A. Cr^{3+}

B. Cr_2O_3

C. $Cr_2O_7^{2+}$

D. CrO_4^-

Answer: C

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23. What is the magnetic moment of $K_3[FeF_6]$

A. 5.91 B.M

B. 4.89 B.M

C. 3.87 B. M

D. 6.92 B.M

Answer: A

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24. When copper is placed in the atmosphere for sufficient time, a green crust is formed on its surface. The composition of the green crust is:

A. $Cu(OH)_2$

B. CuO

C. $CuCO_3$

D. $CuCO_3 . Cu(OH)_2$

Answer: D

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25. When a cupric salt is heated with metallic copper and conc. HCl, a colourless solution is obtained because of the formation of

A. $CuCl_2$

B. Cu_2I

C. $KCuI_2$

D. $H[CuCl_2]$

Answer: C

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26. In the reaction between $CuSO_4$" and " ` KI, a white precipitate is obtained. The precipitate has the composition:

A. CuI_2

B. Cu_2I

C. $KCuI_2$

D. Cu_2I_2

Answer: D

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27. From a solution of copper sulphate, the metal used to recover copper, is 1)Na 2)Ag 3)Hg 4)Zn

A. Na

B. Ag

C. Hg

D. Zn

Answer: D

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28. When NH_4 OH is added to copper sulphate solution, blue colour is obtained due to formation of

A. Cu^{2+}

B. $Cu(NH_4SO_4)$

C. $\left[Cu(NH_3)_4\right]^{2+}$

D. $Cu(OH)_2$

Answer: C

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29. The solubility of silver bromide in hypo solution is due to the formation of

A. Ag_2SO_3

B. $Ag_2S_2O_3$

C. $\left[Ag(S_2O)_3\right]$

D. $\left[Ag(S_2O_3)_3\right]^{3-}$

Answer: D

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30. Identify the statement which is not correct regarding $CuSO_4$:

A. It reacts with KI to give iodine

B. It reacts with NaOH to give $Cu(OH)_2$

C. It reacts with NH_4OH to give Cu_2O

D. It gives CuO on strong heating

Answer: C

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31. Amongst 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_2CI_2

Answer: D

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32. Which one of the following is the correct configuration of $Fe^{3+}(Z = 26)$?

A. $[Ar]4s^23d^6$

B. $[Ar]s^23d^3$

C. $[Ar]3d^5$

D. $[Ar]4s^2 3d^4$

Answer: C

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33. Which of the following pairs of ions have same paramagnetic moment?

A. Mn^{2+}, Cu^{2+}

B. Cu^{2+}, Ti^{3+}

C. Ti^{4+}, Cu^{2+}

D. Ti^{3+}, Ni^{2+}

Answer: B

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34. In $K_2Cr_2O_7$ every Cr is linked to:

A. two C-atoms

B. three O-atoms

C. four O-atoms

D. five O-atoms

Answer: C

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35. Of the following outer shell electronic configurations of atoms, the highest oxidation state is achieved by which one of them?

A. $(n-1)d^8ns^2$

B. $(n-1)d^5ns^2$

C. $(n-1)d^3ns^2$

D. $(n-1)d^5ns^1$

Answer: B

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36. A red solid is insoluble in water. However, it becomes soluble if some Kl is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of a metal appear on the cooler parts of test tube. The red solid is

A. $(NH_4)_2Cr_2O_7$

B. HgI_2

C. HgO

D. Pb_2O_4

Answer: B

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

A. 4

B. 6

C. 2

D. 3

Answer: D

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38. The purple colour of $KMnO_4$, will not be discharged by which of the following reagents? 1)M n S O 4 / Z n 2 + 2)H 2 O 2 / H + 3)K N O 3 4)K 2 S / H +

A. $MnSO_4 / Zn^{2+}$

B. H_2O_2 / H^+

C. KNO_3

D. K_2S / H^+

Answer: C

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39. The actinoids exhibit more number of oxidation states in general than the lanthanoids. This is because

A. the 5forbitals extend farther from the nucles than 4f orbitals.

B. the 5f orbitals are more buried than the 4f orbitals.

C. there is similarity between 4f and 5f orbitals in their angular part of the wave function

D. the actinoids are more reactive than the lanthanoids.

Answer: A

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40. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statements is incorrect? a)Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character. b)The ionic sizes of Ln (III) decrease in general with increasing atomic number. c)Ln(III) compounds are generally colourless. d)Ln(III) hydroxides are mainly basic in character..

A. Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character.

B. The ionic sizes of Ln (III) decrease in general with increasing atomic number.

C. Ln(III) compounds are generally colourless.

D. Ln(III) hydroxides are mainly basic in character..

Answer: C

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41. Which of the following actinoids does not have any electron in 6d orbital in its ground state? 1)Lr 2)Cm 3)Pa 4)Cf

A. Lr

B. Cm

C. Pa

D. Cf

Answer: D

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42. Which of the following configurations will have the same number of unpaired electrons as that of a lanthanoid ion having configuration of $4f^n$: $5f^n$, $5f^{14-n}$, $4f^{14-n}$, $4f^{14-(n+1)}$,

A. A) $5f^n$

B. B) $5f^{14-n}$

C. C) $4f^{14-n}$

D. D) $4f^{14-(n+1)}$

Answer: C

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43. The colour of light absorbed by an aqueous solution of $CuSO_4$, is

A. orange-red

B. blue-green

C. yellow

D. violet

Answer: A

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44. The basic character of the transition metal monoxides follows the order (Atomic numbers of Ti, V, Crand Fe are 22, 23, 24 and 26 respectively).

A. CrO $>$ VO $>$ FeO $>$ Tio

B. TiO $>$ FeO $>$ VO $>$ Cro

C. TiO $>$ VO $>$ CrO $>$ Feo

D. VO $>$ CrO $>$ TiO $>$ Feo

Answer: C

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45. Ce (Z-58) and Yb (Z=70) exhibit stable +4 and +2 oxidation states, respectively. This is because

A. Ce^{4+} and Yb^{2+} acquire f^7 configurations

B. Ce^{4+} and Yb^{2+} acquire f^0 configurations

C.

Ce^{4+} and Yb^{2+} acquire f^0 and f^{14} configurations

D.

Ce^{4+} and Yb^{2+} acquire f^7 and f^{14} configurations

Answer: C

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46. How many gases are evolved when potassium permaganate and potassium dichromate are heated, respectively?

A. Barium

B. Strontim

C. Calcium

D. Radium

Answer: C

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47. When Cu^{2+} solution reacts with excess KI, which of the following statements is correct?

A. Blue precipitate is obtained.

B. Clear brown solution is obtained.

C. Dark brown appearance in which precipitate of Cu_2I_2, is invisible.

D. Blue solution is obtained.

Answer: C

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48. Ionization enthalpy values of lanthanoids are quite comparable to which of the following alkaline earth elements?

A. Barium

B. Strontium

C. Calcium

D. Radium

Answer: C

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49. Four successive members of the first series of the transition metals are listed below. For which one of them, the standard potential value has a positive sign?

A. Cu(z=29)

B. Fe(Z -26)

C. Co(Z=27)

D. Ni(Z=28)

Answer: A

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50. Out of TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and NiCl4^(2-)(ZofTi=22, Co=27, cu=29, Ni=28)` the colourless species are

A. Cu_2Cl_2 and $NiCl_4^{2-}$

B. TiF_6^{2-} and Cu_2Cl_2

C. CoF_6^3 and $NiCl_4^{2-}$

D. TiF_6^{2-} and CoF_6^{3-}

Answer: B

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51. Which of the following transition metal is present in misch metal?

A. La

B. Sc

C. Ni

D. Cr

Answer: A

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52. Maximum oxidation states of Cr, Mn and Os are respectively

A. +3, +5, and + 6

B. +6, +5, +7

C. +6, +7, +8

D. +6, +5, +8

Answer: C

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53. The atomic radii of the elements are almost same of which series

A. Fe - Co - Ni

B. Na - K - Rb

C. F-Cl - Br

D. Li - Be-B

Answer: A

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54. Which of the following element has maximum first ionisation potential? 1)V 2)Ti 3)Cr 4)Mn

A. V

B. Ti

C. Cr

D. Mn

Answer: D

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55. The catalytic activity of transition metals and their compounds is mainly due to: a)their magnetic behaviour

b)their unfilled d-orbitals c)their ability to adopt variable oxidation state d)their chemical reactivity

A. their magnetic behaviour

B. their unfilled d-orbitals

C. their ability to adopt variable oxidation state

D. their chemical reactivity

Answer: C

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56. Which one of the following nitrates will leave behind a metal on strong heating?

A. Copper nitrate

B. Mangnese nitrated

C. Silver nitrate

D. Ferric nitrate

Answer: C

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57. Cuprous ion is colourless, while cupric ion is coloured because

A. both have half-filled p and d-orbitals

B. cuprous ion has a completed d-orbital and cupric ion has incompleted-orbital

C. cuprous ion has incomplete d-orbital and cupric ion has a completed-orbital

D. both have unpaired electrons in d-orbital

Answer: B

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58. Which of the following trivalent ion has the largest atomic radii in the lanthanide series?

A. Ce

B. Pm

C. La

D. Lu

Answer: B

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59. Which of the following pair will have effective magnetic moment equal?

A. Ti^{2+} and V^{2+}

B. Cr^{2+} and Fe^{2+}

C. Cr^{3+} and Mn^{2+}

D. V^{2+} and Sc^{3+}

Answer: C

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60. Which lanthanoid compound is used as a most powerful liquid lasers after dissolving it in selenium oxychloride? a)Cerium oxide b)Neodymium oxide c)Promethium sulphate d)Ceric sulphate

A. Cerium oxide

B. Neodymium oxide

C. Promethium sulphate

D. Ceric sulphate

Answer: B

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61. The 3d metal ions are generally paramagnetic in nature because:

A. they form coloured salts

B. they have one or more unpaired delectrons

C. they have one or more paired s clectrons

D. they are reducing agents

Answer: B

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62. Which of the following ores contains both Cu and Fe?

A. Cuprite

B. Azurite

C. Chalcopyrite

D. Malachite

Answer: C

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63. Heating mixture of Cu_2O and Cu_2S will give:

A. $Cu + SO_2$

B. $Cu + SO_3$

C. CuO+CuS

D. Cu_2SO_3

Answer: A

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64. Brass, bronze and german silver have one metal in common. This is:

A. Ni

B. Fe

C. Cu

D. Sn

Answer: C

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65. Which of the following pairs of ions is colourless?

A. Ti^{3+}, Cu^{2+}

B. Sc^{3+}, Zn^{2+}

C. Co^{2+}, Fe^{3+}

D. Ni^{2+}, V^{3+}

Answer: B

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66. For successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization enthalpy?

A. Vanadium (Z=23)

B. Manganese (Z=25)

C. Chromium (Z=24)

D. Iron (Z=26)

Answer: B

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67. Which of the following forms with an excess of CN", a complex having coordination number two?

A. Cu^{2+}

B. Ag^{+}

C. Ni^{2+}

D. Fe^{2+}

Answer: B

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68. In the first transition series, the highest oxidation state is exhibited by:

A. Mn

B. Ni

C. Fe

D. Cr

Answer: A

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69. How many unpaired electrons are present in the central metal ion of $[CoCl_4]^{2-}$?

A. 5

B. 4

C. 3

D. 2

Answer: C

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70. Europium is

A. f-block element

B. d-block element

C. p-block element

D. s-block element

Answer: A

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71. When KI(excess) is added to I:CuSO 4 II:HgCl 2 III:Pb(NO 3) 2

A. a white ppt. of CuI in I, an orange ppt. HgI_2, in II and a yellow ppt. PbI_2, in III

B. a white ppt. of CuI in I, an orange ppt. dissoloving to HgI_4^{2-} in II, and an yellow ppt. of PbI_2 in III

C. a white ppt. of CuI, HgI_2 and PbI_2 in each case

D. none of the above is correct

Answer: B

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72. The yellow colour of chromates changes to orange on acidification due to formation of

A. Cr^{3+}

B. Cr_2O_3

C. $Cr_2O_7^{2+}$

D. CrO_4^-

Answer: C

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73. What is the magnetic moment of $K_3[FeF_6]$

A. 5.91 B.M

B. 4.89 B.M

C. 3.87 B. M

D. 6.92 B.M

Answer: A

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74. When copper is placed in the atmosphere for sufficient time, a green crust is formed on its surface. The composition of the green crust is:

A. $Cu(OH)_2$

B. CuO

C. $CuCO_3$

D. $CuCO_3.Cu(OH)_2$

Answer: D

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75. When a cupric salt is heated with metallic copper and conc. HCl, a colourless solution is obtained because of the

formation of

A. $CuCl_2$

B. Cu_2I

C. $KCuI_2$

D. $H[CuCl_3]$

Answer: C

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76. In the reaction between $CuSO_4$" and " ` KI, a white precipitate is obtained. The precipitate has the composition:

A. CuI_2

B. Cu_2I

C. $KCuI_2$

D. Cu_2I_2

Answer: D

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77. From a solution of copper sulphate, the metal used to recover copper, is 1)Na 2)Ag 3)Hg 4)Zn

A. Na

B. Ag

C. Hg

D. Zn

Answer: D

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78. When NH_4OH is added to copper sulphate solution, blue colour is obtained due to formation of

A. Cu^{2+}

B. $Cu(NH_4SO_4)$

C. $\left[Cu(NH_3)_4\right]^{2+}$

D. $Cu(OH)_2$

Answer: C

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79. The solubility of silver bromide in hypo solution is due to the formation of

A. Ag_2SO_3

B. $Ag_2S_2O_3$

C. $\left[Ag(S_2O)_3\right]$

D. $\left[Ag(S_2O_3)_2\right]^{3-}$

Answer: D

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80. Identify the statement which is not correct regarding $CuSO_4$:

A. It reacts with KI to give iodine

B. It reacts with NaOH to give $Cu(OH)_2$

C. It reacts with NH_4OH to give Cu_2O

D. It gives CuO on strong heating

Answer: C

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81. Amongst 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_2CI_2

Answer: D

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82. Which one of the following is the correct configuration of $Fe^{3+}(Z = 26)$?

A. $[Ar]4s^2 3d^6$

B. $[Ar]s^2 3d^3$

C. $[Ar]3d^5$

D. $[Ar]4s^2 3d^4$

Answer: C

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83. Which of the following pairs of ions have same paramagnetic moment?

A. Mn^{2+}, Cu^{2+}

B. Cu^{2+}, Ti^{3+}

C. Ti^{4+}, Cu^{2+}

D. Ti^{3+}, Ni^{2+}

Answer: B

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84. In $K_2Cr_2O_7$ every Cr is linked to:

A. two C-atoms

B. three O-atoms

C. four O-atoms

D. five O-atoms

Answer: C

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85. Of the following outer shell electronic configurations of atoms, the highest oxidation state is achieved by which one of them?

A. $(n-1)d^8ns^2$

B. $(n-1)d^5ns^2$

C. $(n-1)d^3ns^2$

D. $(n-1)d^5ns^1$

Answer: B

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86. A red solid is insoluble in water. However, it becomes soluble if some Kl is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of a metal appear on the cooler parts of test tube. The red solid is

A. $(NH_4)_2Cr_2O_7$

B. HgI_2

C. HgO

D. Pb_2O_4

Answer: B

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

A. 4

B. 6

C. 2

D. 3

Answer: D

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88. The purple colour of $KMnO_4$, will not be discharged by which of the following reagents? 1)M n S O 4 / Z n 2 + 2)H 2 O 2 / H + 3)K N O 3 4)K 2 S / H +

A. $MnSO_4 / Zn^{2+}$

B. H_2O_2 / H^+

C. KNO_3

D. K_2S / H^+

Answer: C

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89. The actinoids exhibit more number of oxidation states in general than the lanthanoids. This is because

A. the 5forbitals extend farther from the nucles than 4f orbitals.

B. the 5f orbitals are more buried than the 4f orbitals.

C. there is similarity between 4f and 5f orbitals in their angular part of the wave function

D. the actinoids are more reactive than the lanthanoids.

Answer: A

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90. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statements is incorrect? a)Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character. b)The ionic sizes of Ln (III) decrease in general with increasing atomic number. c)Ln(III) compounds are generally colourless. d)Ln(III) hydroxides are mainly basic in character..

A. Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character.

B. The ionic sizes of Ln (III) decrease in general with increasing atomic number.

C. Ln(III) compounds are generally colourless.

D. Ln(III) hydroxides are mainly basic in character..

Answer: C

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91. Which of the following actinoids does not have any electron in 6d orbital in its ground state? 1)Lr 2)Cm 3)Pa 4)Cf

A. Lr

B. Cm

C. Pa

D. Cf

Answer: D

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92. Which of the following configurations will have the same number of unpaired electrons as that of a lanthanoidion having configuration of 4f".

A. $5f^{13}$

B. $5f^{14}$

C. $4f^3$

D. $4f^7$

Answer: C

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93. The colour of light absorbed by an aqueous solution of $CuSO_4$, is

A. orange-red

B. blue-green

C. yellow

D. violet

Answer: A

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94. The basic character of the transition metal monoxides follows the order (Atomic numbers of Ti, V, Crand Fe are 22, 23, 24 and 26 respectively).

A. CrO $>$ VO $>$ FeO $>$ Tio

B. TiO $>$ FeO $>$ VO $>$ Cro

C. TiO $>$ VO $>$ CrO $>$ Feo

D. VO $>$ CrO $>$ TiO $>$ Feo

Answer: C

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95. Ce (Z-58) and Yb (Z=70) exhibit stable +4 and +2 oxidation states, respectively. This is because

A. Ce^{4+} and Yb^{2+} acquire f^7 configurations

B. Ce^{4+} and Yb^{2+} acquire f^0 configurations

C.

Ce^{4+} and Yb^{2+} acquire f^0 and f^{14} configurations

D.

Ce^{4+} and Yb^{2+} acquire f^7 and f^{14} configurations

Answer: C

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96. How many gases are evolved when potassium permaganate and potassium dichromate are heated, respectively?

A. Barium

B. Strontim

C. Calcium

D. Radium

Answer: C

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97. When Cu^{2+} solution reacts with excess KI, which of the following statements is correct?

A. Blue precipitate is obtained.

B. Clear brown solution is obtained.

C. Dark brown appearance in which precipitate of Cu_2, I_2, is invisible.

D. Blue solution is obtained.

Answer: C

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98. Ionization enthalpy values of lanthanoids are quite comparable to which of the following alkaline earth elements?

A. Barium

B. Strontium

C. Calcium

D. Radium

Answer: C

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99. Four successive members of the first series of the transition metals are listed below. For which one of them, the standard potential value has a positive sign?

A. Cu(z=29)

B. Fe(Z -26)

C. Co(Z=27)

D. Ni(Z=28)

Answer: A

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100. Out of TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and NiCl4^(2-) (ZofTi=22, Co=27, cu=29, Ni=28)` the colourless species are

A. Cu_2Cl_2 and $NiCl_4^{2-}$

B. TiF_6^{2-} and Cu_2Cl_2

C. CoF_6^3 and $NiCl_4^{2-}$

D. TiF_6^{2-} and CoF_6^{3-}

Answer: B

Watch Video Solution

Level Ii

1. Potassium permanganate acts as an oxidant in neutral, alkaline as well as acidic medium. The final products obtained from it in the three conditions are, respectively

A. MnO_{2+}, MnO_2, Mn^{2+}

B. $MnO_4^{2-}, MnO^{3+}, Mn^{2+}$

C. $MnO_{2+}, MnO_4^{2-}, Mn^{3+}$

D. MnO, MnO_4^{2-}, Mn^{2+}

Answer: A

Watch Video Solution

2. Which of the following statements regarding basicity of lanthanide 3^+ ions is correct? 1)Basicity decreases with increase in ionic radius 2)Basicity decreases with decrease in ionic radius 3)More basic oxo-salt decomposes more readily that the less basic 'oxo-salt 4)More basic ion hydrolyse more readily

A. Basicity decreases with increase in ionic radius

B. Basicity decreases with decrease in ionic radius

C. More basic oxo-salt decomposes more readily that the less basic 'oxo-salt

D. More basic ion hydrolyse more readily

Answer: B

Watch Video Solution

3. The correct order of magnetic moments (spin only values in B.M.) among is

A. $\left[Fe(CN)_6\right]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$

B. $[MnCl_4]^{2-} > \left[Fe(CN)_6\right]^{4-} > [CoCl_4]^{2-}$

C. $[MnCl_4]^{2-} > [CoCl_4]^{2-} > \left[Fe(CN_6\right]^{4-}$

D. $\left[Fe(CN_6\right]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$

Answer: C

Watch Video Solution

4. Cerium (Z 58) is an important member of the lanthanoids. Which of the following statements about cerium is incorrect? 1)The common oxidation states of cerium are +3 and 4 2)The +3 oxidation state of cerium is more stable than +4 oxidation state. 3)The +4 oxidation state of cerium is not known in solutions, 4)Cerium (IV) acts as an oxidizing agent.

A. The common oxidation states of cerium are +3 and 4

B. The +3 oxidation state of cerium is more stable than +4 oxidation state.

C. The +4 oxidation state of cerium is not known in solutions,

D. Cerium (IV) acts as an oxidizing agent.

Answer: C

Watch Video Solution

5. Ammonia forms the complexion $\left[Cu(NH_3)_4\right]^{2+}$ with copper ions in alkaline solutions but not in acidic solutions. What is the reason for it?

A. In acidic solutions protons coordinate with ammonia molecules forming NH_4 ions and NH_3, molecules are not available

B. In alkaline solutions in soluble $Cu(OH)_2$, is precipitated which is soluble in excess of any alkali

C. Copper hydroxide is an amphoteric substance

D. In acidic solutions hydration protects copper ions

Answer: A

Watch Video Solution

6. Magnetic moment of $Cr(Z-24), Mn^+(Z=25)$ and $Fe^+(Z=26)$ are x, y, z

. They are in order

A. $x < y < z$

B. $x = y < z$

C. $z < x = z$

D. $x = y = z$

Answer: C

Watch Video Solution

7. HCl is not used to make the medium acidic in oxidation reactions of $KMnO_4$, in acidic medium. Why?

A. Both HCl and $KMnO_4$ act as oxidising agents

B. $KMnO_4$ oxidises HCl into Cl_2, which is also an oxidising agent

C. $KMnO_4$, is a weaker oxidising agent than HCl

D. $KMnO_4$, acts as a reducing agent in the presence of HCl.

Answer: B

Watch Video Solution

8. 'Which of the following statement is not correct?

A. $La(OH)_3$ is less basic than $Lu(OH)_3$

B. In lanthanide series ionic radius of ln^{3+} ions decreases

C. Zn, Cd, Hg are colourless and are diamagnetic

D. Mn shows maximum oxidation state+7

Answer: A

Watch Video Solution

9. The number of moles of acidified $KMnO_4$ required to convert one mole of sulphite ion into sulphate ionis:

A. $2/5$

B. $3/5$

C. $4/5$

D. 1

Answer: A

Watch Video Solution

10. The correct order of ionic radii of Ce, La, Pm and Yb in+3 oxidation state is:

A. $La^{3+} < Pm^{3+} < Ce^{3+} < Yb^{3+}$

B. $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$

C. $Yb^{3+} < Ce^{3+} < Pm^{3+} < La^{3+}$

D. $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

Answer: D

Watch Video Solution

11. All Cu(II) halides are known except iodide. The reason for this is that

A. iodide ion is a bulky ion

B. Cu^{2+} oxidizes iodide to iodine

C. Cu^{2+}(aq) has much more negative hydration enthalpy

D. Cu^{2+} ion has smaller size

Answer: B

Watch Video Solution

12. When Hg_2Cl_2, ionizes, the ions produced and the unpaired electrons present on the cation respectively are

A. $2Hg^+$ and $2Cl^-$ two

B. Hg_2^{2+} and $2CI^-$ ', two

C. Hg_2^{2+} and $2Cl^-$, one

D. Hg_2^{2+} and $2Cl^-$, zero .

Answer: D

Watch Video Solution

13. What is the effect of shaking dilute H_2SO_4, with a small quantity of anhydrous $CuSO_4$,?.

A. The white soild dissolves to form a colourless solution

B. The white soild dissolves to form a green solution

C. The white soild dissolves to form a blue solution '

D. The white soild turns blue but' does not dissolve

Answer: C

Watch Video Solution

14. Philosopher's wool when heated with Bao at 1100°C gives the compound:

A. $BaCdO_2$

B. $Ba + ZnO_2$

C. $BaO_2 + Zn$

D. $BaZnO_2$

Answer: D

Watch Video Solution

15. Which one of the following statements is correct?

A. Hg_2Cl_2, is called corrosive sublimate

B. Hg_2Cl_2, gives white ppt, with aminonium hydroxide

C. Hg_2Cl_2, is used as a purgative

D. Hg_2Cl_2, is soluble in water

Answer: C

Watch Video Solution

16. Number of electrons transferred in each case when $KMnO_4$, acts as an oxidising agent to give MnO_2, Mn_2^{2+}, $Mn(OH)_3$, MnO_4^{2-} are respectively:

A. 3, 5, 4 and 1

B. 4, 3, 1 and 5

C. 1,3,4 and

D. 5, 4, 3 and 1

Answer: A

Watch Video Solution

17. The atomic numbers of vanadium(V), chromium (Cr), manganese (Mn) and iron (Fe) are 23, 24, 25 and 26 respectively. Which one of these may be expected to have the highest second ionisation enthalpy?

A. V

B. Cr

C. Mn

D. Fe

Answer: B

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18. The radius of La^3+. is 1.06 Å, which of the following given values will be closed to the radius of Lu^3+ (At. no. of Lu=71, La=57)?

A. 1.6 Å

B. 1.4 Å

C. 1.06 Å

D. 0.85 Å

Answer: D

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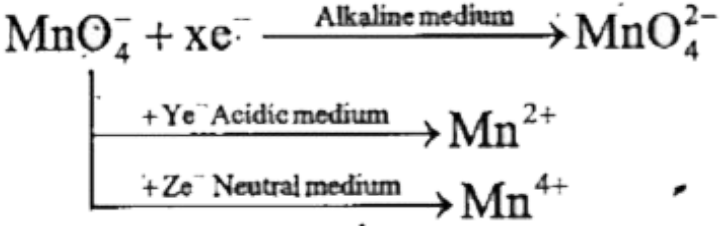
19. 

X, Y and Z are respectively :

A. 1,2,3

B. 1,5,3

C. 1,3,5

D. 5,3,1

Answer: B

Watch Video Solution

20. Zinc gives H_2 gas with H_2SO_4, and $conc.\ HCl$ but not with conc. HNO_3, because:

A. NO_3^- , ion is reduced in preference to hydronium ion

B. conc. HNO_3 is a weaker acid than conc. H_2, SO_4, and. conc. HCI

C. conc. HNO_3, acts as a reducing agent

D. Zinc is more reactive than H_2

Answer: A

Watch Video Solution

21. The highest magnetic moment is shown by the transition metal ion with outer electronic configuration:

A. $3d^2$

B. $3d^7$

C. $3d^9$

D. $3d^5$

Answer: D

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22. Number of moles of $K_2Cr_2O_7$, reduced by one mole of Sn^{2+} ions is:

A. $1/3$

B. 3

C. $1/6$

D. 6

Answer: A

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23. A blue solution of copper sulphate becomes darker when treated with excess of ammonia. This is because

A. ammonia molecules replace water molecules in the solution

B. ammonia is stronger ligand than water

C. ammonia forms a stable complexion $\left[Cu(NH_3)_4\right]^{2+}$ with Cu^{2+} ions

D. All are correct

Answer: D

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24. An inorganic compound (A) gave the following reactions:

The compound on heating gave a residue and a gaseous mixture of No_2 and O_{2+}

The aqueous solution of (A) gave a white,precipitate with sodiụm chloride solution. The precipitate dissolves in NH_4OH : The compound (A) is:

A. $Pb(NO_3)_2$

B. $Ba(NO_3)_2$

C. $AgNO_3$

D. AgCl

Answer: C

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25. In context with the transition elements, which of the following statements is incorrect?

A. In addition to the normal oxidation states, the zero oxidation state is also shown by these elements in complexes.

B. In the highest oxidation state, the transition metal show.basic character and form cationic complexes.

C. In the highest oxidation state of the first five transition elements (Sc to Mn), all the 4s and 3d electrons are

used for bonding.

D. Once the d configuration is exceeded, the tendency to involve all the 3d electrons in bonding decreases.

Answer: B

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26. Iron exhibits +2 and +3 oxidation states. Which of the following about iron is incorrect?

A. Ferrous oxide is more basic in nature than the ferric oxide.

B. Ferrous compounds are relatively more ionic than corresponding ferric compounds.

C. Ferrous compounds are less volatile than the corresponding ferric compounds.

D. Ferrous compounds are more easily hydrolyzed than corresponding ferric compounds.

Answer: D

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27. Which of the following arrangements does not represent the correct order of the property stated against it? a)N i 2 + < C o 2 + < F e 2 + < M n 2 + : Ionic size b)C o 3 + < F e 3 + < C r 3 + < S c 3 + Stability in aqueous solution c)Sc < Ti < Cr < Mn: Number of oxidation states d)V 2 + < C r 2 + < M n 2 + < Fe^(2+)`: Paramagnetic behaviour

A. $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: Ionic size

B. $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$ Stability in aqueous solution

C. Sc $<$ Ti $<$ Cr $<$ Mn: Number of oxidation states

D. $V^{2+} < Cr^{2+} < Mn^{2+} <$ Fe^(2+)`: Paramagnetic behaviour

Answer: D

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28. Chloro compound of vanadium has only spin magnetic moment of 1.73 BM. This vanadium chloride has the formula: (at.no. of V=23)

A. VCl_2,

B. VCl_4,

C. VCl_3,

D. VCl_5

Answer: B

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29. Which of the following is not formed when H_2S , reacts with acidic $K_2Cr_2O_7$, solution?

A. $CrSO_4$,

B. $Cr_2(SO_4)3$

C. K_2SO_4

D. S

Answer: A

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30. Which of the following reaction(s) can be used for the complete conversion of $K_2Mno_4, \quad \text{to} \quad KMnO_4$,?

A. A.

$$3K_2MnO_4 + 2H_2O \Leftrightarrow 2KMnO_4 + MnO_2 + 4KOH$$

B. B.$2K_2MnO_4 + Cl_2 \rightarrow 2KMnO_4 + 2KCl$

C. C.$2K_2MnO_4 + O_3 + H_2O \rightarrow 2MnO_4 + 2KOH + O_2$

D. D.All are correct

Answer: D

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31. Consider the following complex ions P, Q and R:

$P = [FeF_6]^{3-}, Q = [V(H_2O_6)]^{2+}, R = \left[Fe(H_2O)_6\right]^{2+}$

The correct order of the complex ionis, according to their spin-only magnetic moment values (in BM)is

A. R $<$ Q $<$ P

B. Q $<$ R $<$ P

C. R $<$ P $<$ Q

D. Q $<$ P $<$ R .

Answer: B

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32. Which one of the following does not correctly represent the correct order of the property indicated against?

A. A.$Ti < V < Cr < Mn$: increasing melting points

B.

C. B.$Ti < V < Cr < Mn$: increasing number of oxidation state's

D. C.$Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$ increasing magnetic moment

Answer: A

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33. Consider the following statements in respect of lanthanides:

The basic strength of hydroxides of lanthanides increases from $La(OH)_3$, to Lu $(OH)_3$,

The lanthanide ions $Lu^{3+}, Yb(2+)$ and Ce^{4+} are diamagnetic.

Which of the statement(s) given above is/are correct?

A. 1 only

B. 2 only

C. both 1 and 2

D. Neither 1 nor 2

Answer: B

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34. The electronic configuration of Cu(II)is $3d^9$ whereas that of Cu(I) is $3d^{10}$". Which of the following is correct?

A. Cu(II) is more stable

B. Cu(I) and Cu(II) are equally stable

C. Cu(II) is less stable

D. Stability of Cu(I) and Cu(II) depends on nature of copper salts

Answer: A

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35. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds?

A. They have high melting points in comparison to pure metals .

B. They are very hard

C. They retain metallic conductivity

D. They are chemically very reactive

Answer: D

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36. Although Zirconium belongs to 4d transition series and Hafnium to 5d transition series even then they show similar physical and chemical properties because...

A. both belong to d-block

B. both have same number of electrons

C. both have similar atomic radius

D. both belong to the same group of the periodic table

Answer: C

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37. Anhydrous cobalt(II) chloride is blue in colour but on dissolving in water it changes to pink in colour because

A. Its oxidation state changes

B. Its magnetic character changes

C. Its coordination number changes .

D. In water it shows fluorescence

Answer: C

Watch Video Solution

38. Which of the following statements is correct when SO_2, is passed through acidified $K_2Cr_2O_7$,solution?

A. Green $Cr_2(SO_4)_3$, is formed

B. The solution turns blue

C. The solution is decolourised

D. SO_2, is reduced

Answer: A

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39. The maximum oxidation state shown by, V(Z=23), Cr (Z=24), Co(z=27), Sc(Z=21) are respectively a)+5, +6, +4, +3 b)+3, +4, +5, +2 c)+5, +3, +2, +1 d)+4 in each case

A. +5, +6, +4, +3

B. +3, +4, +5, +2

C. +5, +3, +2, +1

D. +4 in each case

Answer: A

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40. Which of the following compounds is used as the starting material for the preparation of potassiumi dichromate?

A. $K_2SO_4Cr_3(SO_4)_324H_2O(\text{Chrome alum})$

B. $PbCrO_4(\text{Chrome yellow})$

C. $FeCr_2O_4(chromite)$

D. $PbCrO_4PbO(\text{Chrome red})$

Answer: C

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41. An aqueous solution of 'FeSO4.Al2(SO4)3' and chrome alum is heated with excess of Na2O2 and filtered. The materials obtained are

A. A colourless filtrate and a green residue

B. A yellow filtrate and a green residuc

C. A yellow filtrate and a brown residue

D. A green filtrate and a brown residue

Answer: C

Watch Video Solution

42. A solution of a metal ion when treated with KI gives a red precipitate which dissolves in excess KI to give a colourless

solution. Moreover, the solution of metal ion on treatment with a solution of cobalt(II) thiocyanate gives rise to a deep-blue crystalline precipitate. The metal'ion is

A. Pb^{2+}

B. Hg^{2+}

C. Cu^{2+}

D. Co^{2+}

Answer: B

Watch Video Solution

43. Which of the following statements is wrong?

A. An acidified solution of $K_2Cr_2O_7$, liberates iodine from iodides .

B. In acidic solution dichromate ions are converted to chromate ions

C. Ammonium' dichromato on heating undergo exothermic deomposition to give Cr_2O_3,

D. Potassium dichromate is used as a titrant for Fe^{2+} ions

Answer: B

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44. Which of the following statements is incorrect?

A. Basic copper carbonate is $CuCO_3.Cu(OH)_2$

B. On strong heating potassium dichromate decomposes with evolution of oxygen

C. CuS is white in colour

D. $KMnO_4$, exists as dark purple black prismatic crystals

Answer: C

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45. Which is not true statement about FeO ?

A. It is non-stoichiometric and is metal deficient :

B. It is basic oxide

C. Its aqueous solution changes to $Fe(OH)_2$, and then to $Fe_2O_3.(H_2O)$ by atmospheric oxygen

D. it gives red colour with KCNS

Answer: D

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46. Paramagnetism is given by the relation $\mu = 2\sqrt{s(s+1)}$ magnetons where 's' is the total spin. On this basis, the paramagnetism of Cu^+ ion is .

A. 3.88 magnetons

B. 2.83 magnetons

C. 1.41 magnetons

D. zero

Answer: D

47. The oxygen carrying pigment, oxy-hảemocyanin, containing two copper ions is diamagnetic, because

A. the two copper ions are in +l oxidation state

B. one of the copper ions' is in+1 oxidation state and the other is in+2 oxidation state

C. there are strong anti-ferromagnetic interactions between the two copper ions

D. there are ferromagnetic interactions between the two copper ions

Answer: A

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48. Which one of the following statements is not correct?

A. Zinc dissolves in sodium hydroxide solution

B. Carbon monoxide reduces iron (II)oxide to iron .

C. Mercury(II) iodide dissolves in excess of potassium iodide solution

D. Tin (IV) chloride is made by dissolving tin solution in concentrated hydrochloric acid

Answer: D

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49. Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as indicator. The number of moles of Mohr's salt required per mole of dichromate' is

A. 3

B. 4

C. 5

D. 6

Answer: D

Watch Video Solution

50. `K_3 [Fe(CN)_6] is used as an external indicator in the dichromate estimation of Fe. Following change is observed

A. colourless to blue

B. blue to red

C. colourless to red

D. blue to colourless

Answer: D

Watch Video Solution

51. Potassium permanganate acts as an oxidant in neutral, alkaline as well as acidic medium. The final products obtained from it in the three conditions are, respectively

A. MnO_{2+}, MnO_2, Mn^{2+}

B. $MnO_4^{2-}, MnO^{3+}, Mn^{2+}$

C. $MnO_{2+}, MnO_4^{2-}, Mn^{3+}$

D. MnO, MnO_4^{2-}, Mn^{2+}

Answer: A

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52. Which of the following statements regarding basicity of lanthanide 3^+ ions is correct? 1)Basicity decreases with

increase in ionic radius 2)Basicity decreases with decrease in ionic radius 3)More basic oxo-salt decomposes more readily that the less basic 'oxo-salt 4)More basic ion hydrolyse more readily

A. Basicity decreases with increase in ionic radius

B. Basicity decreases with decrease in ionic radius

C. More basic oxo-salt decomposes more readily that the less basic 'oxo-salt

D. More basic ion hydrolyse more readily

Answer: B

 Watch Video Solution

53. The correct order of magnetic moments (spin only values in B.M.) among is

A. $\left[Fe(CN)_6\right]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$

B. $[MnCl_4]^{2-} > \left[Fe(CN)_6\right]^{4-} > [CoCl_4]^{2-}$

C. $[MnCl_4]^{2-} > [CoCl_4]^{2-} > \left[Fe(CN_6\right]^{4-}$

D. $\left[Fe(CN_6\right]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$

Answer: C

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54. Cerium (Z 58) is an important member of the lanthanoids. Which of the following statements about cerium is incorrect? 1)The common oxidation states of cerium are +3 and 4 2)The

+3 oxidation state of cerium is more stable than +4 oxidation state. 3)The +4 oxidation state of cerium is not known in solutions, 4)Cerium (IV) acts as an oxidizing agent.

A. The common oxidation states of cerium are +3 and 4

B. The +3 oxidation state of cerium is more stable than +4 oxidation state.

C. The +4 oxidation state of cerium is not known in solutions,

D. Cerium (IV) acts as an oxidizing agent.

Answer: C

Watch Video Solution

55. Ammonia forms the complexion $\left[Cu(NH_3)_4\right]^{2+}$ with copper ions in alkaline solutions but not in acidic solutions. What is the reason for it?

A. In acidic solutions protons coordinate with ammonia molecules forming NH_4 ions and NH_3, molecules are not available

B. In alkaline solutions in soluble $Cu(OH)_2$, is precipitated which is soluble in excess of any alkali

C. Copper hydroxide is an amphoteric substance

D. In acidic solutions hydration protects copper ions

Answer: A

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56. Magnetic moment of $Cr(Z-24), Mn^{+}(Z=25)$ and $Fe^{+}(Z=26)$ are x, y, z. They are in order

A. $x < y < z$

B. $x = y < z$

C. $z < x = z$

D. $x = y = z$

Answer: C

Watch Video Solution

57. HCl is not used to make the medium acidic in oxidation reactions of $KMnO_4$, in acidic medium. Why?

A. Both HCl and $KMnO_4$ act as oxidising agents

B. $KMnO_4$ oxidises HCl into Cl_2, which is also an oxidising agent

C. $KMnO_4$, is a weaker oxidising agent than HCl

D. $KMnO_4$, acts as a reducing agent in the presence of HCl.

Answer: B

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A. $La(OH)_3$ is less basic than $Lu(OH)_3$

B. In lanthanide series ionic radius of ln^{3+} ions decreases

C. Zn, Cd, Hg are colourless and are diamagnetic

D. Mn shows maximum oxidation state+7

Answer: A

Watch Video Solution

59. The number of moles of acidified $KMnO_4$ required to convert one mole of sulphite ion into sulphate ionis:

A. $2/5$

B. $3/5$

C. $4/5$

D. 1

Answer: A

Watch Video Solution

60. The correct order of ionic radii of Ce, La, Pm and Yb in+3 oxidation state is:

A. $La^{3+} < Pm^{3+} < Ce^{3+} < Yb^{3+}$

B. $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$

C. $Yb^{3+} < Ce^{3+} < Pm^{3+} < La^{3+}$

D. $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

Answer: D

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61. All Cu(II) halides are known except iodide. The reason for this is that

A. iodide ion is a bulky ion

B. Cu^{2+} oxidizes iodide to iodine

C. Cu^{2+}(aq) has much more negative hydration enthalpy

D. Cu^{2+} ion has smaller size

Answer: B

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62. When Hg_2Cl_2, ionizes, the ions produced and the unpaired electrons present on the cation respectively are

A. $2Hg^{+}$ and $2Cl^{-}$ two

B. Hg_2^{2+} and $2CI^{-}$ ', two

C. Hg_2^{2+} and 2 Cl^{-} , one

D. Hg_2^{2+} and 2 Cl^{-} , zero .

Answer: D

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63. What is the effect of shaking dilute H_2SO_4, with a small quantity of anhydrous $CuSO_4$,?.

A. The white soild dissolves to form a colourless solution

B. The white soild dissolves to form a green solution

C. The white soild dissolves to form a blue solution '

D. The white soild turns blue but' does not dissolve

Answer: C

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64. Philosopher's wool when heated with Bao at 1100°C gives the compound:

A. $BaCdO_2$

B. $Ba + ZnO_2$

C. $BaO_2 + Zn$

D. $BaZnO_2$

Answer: D

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65. Which one of the following statements is correct?

A. Hg_2Cl_2, is called corrosive sublimate

B. Hg_2Cl_2, gives white ppt, with aminonium hydroxide

C. Hg_2Cl_2, is used as a purgative

D. Hg_2Cl_2, is soluble in water

Answer: C

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66. Number of electrons transferred in each case when $KMnO_4$, acts as an oxidising agent to give MnO_2, Mn_2^{2+}, $Mn(OH)_3$, MnO_4^{2-} are respectively:

A. 3, 5, 4 and 1

B. 4, 3, 1 and 5

C. 1,3,4 and

D. 5, 4, 3 and 1

Answer: A

67. The atomic numbers of vanadium(V), chromium (Cr), manganese (Mn) and iron (Fe) are 23, 24, 25 and 26 respectively. Which one of these may be expected to have the highest second ionisation enthalpy?

A. V

B. Cr

C. Mn

D. Fe

Answer: B

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68. The radius of La^3+. is 1.06 Å, which of the following given values will be closed to the radius of Lu^3+ (At. no. of Lu=71, La=57)?

A. 1.6 Å

B. 1.4 Å

C. 1.06 Å

D. 0.85 Å

Answer: D

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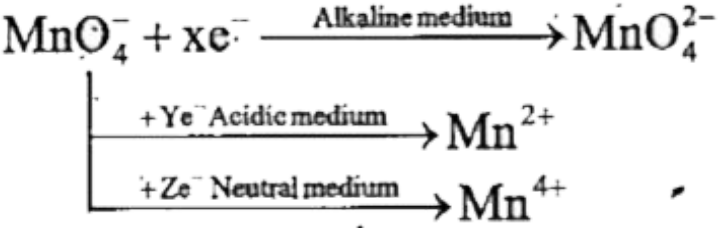
69.



X, Y and Z are respectively :

A. 1,2,3

B. 1,5,3

C. 1,3,5

D. 5,3,1

Answer: B

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70. Zinc gives H_2 gas with H_2SO_4, and $conc.\ HCl$ but not with conc. HNO_3, because:

A. NO_3^- , ion is reduced in preference to hydronium ion

B. conc. HNO_3 is a weaker acid than conc. H_2, SO_4, and. conc. HCl

C. conc. HNO_3, acts as a reducing agent

D. Zinc is more reactive than H_2

Answer: A

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71. The highest magnetic moment is shown by the transition metal ion with outer electronic configuration:

A. $3d^2$

B. $3d^7$

C. $3d^9$

D. $3d^5$

Answer: D

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72. Number of moles of $K_2Cr_2O_7$, reduced by one mole of Sn^{2+} ions is:

A. $1/3$

B. 3

C. $1/6$

D. 6

Answer: A

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73. A blue solution of copper sulphate becomes darker when treated with excess of ammonia. This is because

A. ammonia molecules replace water molecules in the solution

B. ammonia is stronger ligand than water

C. ammonia forms a stable complexion $\left[Cu(NH_3)_4\right]^{2+}$ with Cu^{2+} ions

D. All are correct

Answer: D

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74. An inorganic compound (A) gave the following reactions:

The compound on heating gave a residue and a gaseous mixture of No_2 and O_{2+}

The aqueous solution of (A) gave a white,precipitate with sodiụm chloride solution. The precipitate dissolves in NH_4OH : The compound (A) is:

A. $Pb(NO_3)_2$

B. $Ba(NO_3)_2$

C. $AgNO_3$

D. AgCl

Answer: C

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75. In context with the transition elements, which of the following statements is incorrect?

A. In addition to the normal oxidation states, the zero oxidation state is also shown by these elements in complexes.

B. In the highest oxidation state, the transition metal show.basic character and form cationic complexes.

C. In the highest oxidation state of the first five transition elements (Sc to Mn), all the 4s and 3d electrons are used for bonding.

D. Once the d configuration is exceeded, the tendency to involve all the 3d electrons in bonding decreases.

Answer: B

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76. Iron exhibits +2 and +3 oxidation states. Which of the following about iron is incorrect?

A. Ferrous oxide is more basic in nature than the ferric oxide.

B. Ferrous compounds are relatively more ionic than corresponding ferric compounds.

C. Ferrous compounds are less volatile than the corresponding ferric compounds.

D. Ferrous compounds are more easily hydrolyzed than corresponding ferric compounds.

Answer: D

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77. Which of the following arrangements does not represent the correct order of the property stated against it? a)N i 2 + < C o 2 + < F e 2 + < M n 2 + : Ionic size b)C o 3 + < F e 3 + < C r 3 + < S c 3 + Stability in aqueous solution c)Sc < Ti < Cr < Mn: Number of oxidation states d)V 2 + < C r 2 + < M n 2 + < Fe^(2+)`: Paramagnetic behaviour

A. $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: Ionic size

B. $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$ Stability in aqueous solution

C. Sc $<$ Ti $<$ Cr Mn: Number of oxidation states

D. $V^{2+} < Cr^{2+} < Mn^{2+} Fe^{2+}$: Paramagnetic behaviour

Answer: D

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78. Chloro compound of vanadium has only spin magnetic moment of 1.73 BM. This vanadium chloride has the formula: (at.no. of V=23)

A. VCl_2,

B. VCl_4,

C. VCl_3,

D. VCl_5

Answer: B

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79. Which of the following is not formed when H_2S , reacts with acidic $K_2Cr_2O_7$, solution?

A. $CrSO_4$,

B. $Cr_2(SO_2)$

C. K_2SO_4

D. S

Answer: A

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80. Which of the following reaction(s) can be used for the complete conversion of K_2Mno_4, to $KMnO_4$,?

A. $3K_2MnO_4 + 2H_2O \Leftrightarrow 2KMnO_4 + MnO_2 + 4KOH$

B. $2K_2MnO_4 + Cl_2 \rightarrow 2KMnO_4 + 2KCl$

C. $2K_2MnO_4 + O_3 + H_2O \rightarrow 2MnO_4 + 2KOH + O_2$

D. Both (B) and (C)

Answer: D

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81. Consider the following complex ions P, Q and R:

$P = [FeF_6]^{3-}, Q = [V(H_2O_6)]^{2+}, R = \left[Fe(H_2O)_6\right]^{2+}$

The correct order of the complex ionis, according to their spin-only magnetic moment values (in BM)is

A. R $<$ Q $<$ P

B. Q $<$ R $<$ P

C. R $<$ P $<$ Q

D. Q $<$ P $<$ R .

Answer: B

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82. Which one of the following does not correctly represent the correct order of the property indicated against?

A. $Ti < V < Cr < Mn$: increasing melting points

B. $Ti < V < Mn < Cr$: increasing 2nd ionization enthalpy

C. $Ti < V < Cr < Mn$: increasing number of oxidation state's

D. $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$ increasing magnetic moment

Answer: A

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83. Consider the following statements in respect of lanthanides:

The basic strength of hydroxides of lanthanides increases from $La(OH)_3$, to $\mathrm{Lu}\ (OH)_3$,

The lanthanide ions $Lu^{3+}, Yb(2+)$ and Ce^{4+} are

diamagnetic.

Which of the statement(s) given above is/are correct?

A. 1 only

B. 2 only

C. both 1 and 2

D. Neither 1 nor 2

Answer: B

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84. The electronic configuration of Cu(II)is $3d^9$ whereas that of Cu(I) is $3d^{10}$". Which of the following is correct?

A. Cu(II) is more stable

B. Cu(I) and Cu(II) are equally stable

C. Cu(II) is less stable

D. Stability of Cu(I) and Cu(II) depends on nature of copper salts

Answer: A

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85. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds?

A. They have high melting points in comparison to pure metals .

B. They are very hard

C. They retain metallic conductivity

D. They are chemically very reactive

Answer: D

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86. Although Zirconium belongs to 4d transition series and Hafnium to 5d transition series even then they show similar physical and chemical properties because...

A. both belong to d-block

B. both have same number of electrons

C. both have similar atomic radius

D. both belong to the same group of the periodic table

Answer: C

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87. Anhydrous cobalt(II) chloride is blue in colour but on dissolving in water it changes to pink in colour because

A. Its oxidation state changes

B. Its magnetic character changes

C. Its coordination number changes .

D. In water it shows fluorescence

Answer: C

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88. Which of the following statements is correct?

A. Green $Cr_2, (SO_4)_3$, is formed

B. The solution turns blue

C. The solution is decolourised

D. SO_2, is reduced

Answer: A

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89. The maximum oxidation state shown by, V(Z=23), Cr (Z=24), Co(z=27), Sc(Z=21) are respectively a)+5, +6, +4, +3 b)+3, +4, +5, +2 c)+5, +3, +2, +1 d)+4 in each case

A. +5, +6, +4, +3

B. +3, +4, +5, +2

C. +5, +3, +2, +1

D. +4 in each case

Answer: A

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90. Which of the following compounds is used as the starting material for the preparation of potassiumi dichromate?

A. $K_2SO_4Cr_3(SO_4)_324H_2O(\text{Chrome alum})$

B. $PbCrO_4(\text{Chrome yellow})$

C. $FeCr_2O_4(chromite)$

D. $PbCrO_4PbO(\text{Chrome red})$

Answer: C

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91. An aqueous solution of $FeSO_4.Al_2(SO_4)_3$ and chrome alum is heated with excess of Na2O2 and filtered. The materials obtained are

A. A colourless filtrate and a green residue

B. A yellow filtrate and a green residuc

C. A yellow filtrate and a brown residue

D. A green filtrate and a brown residue

Answer: C

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92. A solution of a metal ion when treated with KI gives a red precipitate which dissolves in excess KI to give a colourless solution. Moreover, the solution of metal ion on treatment with a solution of cobalt(II) thiocyanate gives rise to a deep-blue crystalline precipitate. The metal'ion is

A. Pb^{2+}

B. Hg^{2+}

C. Cu^{2+}

D. Co^{2+}

Answer: B

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93. Which of the following statements is wrong?

A. An acidified solution of K_2, Cr_2, O_7, liberates iodine from iodides .

B. In acidic solution dichromate ions are converted to chromate ions

C. Ammonium' dichromato on heating undergo exothermic deomposition to give Cr_2, O_3,

D. Potassium dichromate is used as a titrant for Fe^{2+} ions

Answer: B

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94. Which of the following statements is incorrect?

A. Basic copper carbonate is $CuCO_3$, $Cu(OH)_2$

B. On strong heating potassium dichromate decomposes with evolution of oxygen

C. CuS is white in colour

D. $KMnO_4$, exists as dark purple black prismatic crystals

Answer: C

Watch Video Solution

95. Which is not true statement about FeO ?

A. It is nori-stoichiometric and is metal deficient :

B. It is basic oxide

C. Its aqueous solution changes to $Fe(OH)_3$, and then to $Fe_2O_3.(H_2O)$ by atmospheric oxygen

D. $KMnO_4$, exists as dark purple black prismatic crystals

Answer: D

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96. Paramagnetism is given by the relation $\mu = 2\sqrt{s(s+1)}$ magnetons where 's' is the total spin. On this basis, the paramagnetism of Cu^+ ion is .

A. 3.88 magnetons

B. 2.83 magnetons

C. 1.41 magnetons

D. zero

Answer: D

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97. The oxygen carrying pigment, oxy-håemocyanin, containing two copper ions is diamagnetic, because

A. the two copper ions are in +l oxidation state

B. one of the copper ions' is in+1 oxidation state and the other is in+2 oxidation state

C. there are strong anti-ferromagnetic interactions between the two copper ions

D. there are ferromagnetic interactions between the two copper ions

Answer: A

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98. Which one of the following statements is not correct?

A. Zinc dissolves in sodium hydroxide solution

B. Carbon monoxide reduces iron (II)oxide to iron .

C. Mercury(II) iodide dissolves in excess of potassium iodide solution

D. Tin (IV) chloride is made by dissolving tin solution in concentrated hydrochloric acid

Answer: D

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99. Consider a titration of potassium dichromate solution with acidified Mohr's salt solution using diphenylamine as

indicator. The number of moles of Mohr's salt required per mole of dichromate' is

A. 3

B. 4

C. 5

D. 6

Answer: D

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100. `K_3 [Fe(CN)_6] is used as an external indicator in the dichromate estimation of Fe. Following change is observed

A. colourless to blue

B. blue to red

C. colourless to red

D. blue to colourless

Answer: D

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Level Ii Assertion Reason Type

1. Assertion : Zn, Cd and Hg are not considered as transition metals.

Reason :d-orbitals in Zn, Cd and Hg are completely filled, both in ground state and in their available oxidation states.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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2. Assertion : Anhydrous copper (II) chloride is covalent while anhydrous copper (II) fluoride is ionic in nature.

Reason : In halides of transition metals, the ionic character decreases with increase in atomic mass of the halogen.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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3. Assertion : All the members of actinide series are radioactive in nature.

Reason : The electrons are gradually accomodated in 5f-energy subshell.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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4. Assertion : Transition metals show variable valency.

Reason : Transition metals have a large energy difference between the ns^2 and (n-1)d electrons.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

Watch Video Solution

5. Assertion : Silver fluoride is soluble in water.

Reason : Hydration energy of AgF is higher than its lattice energy:

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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6. Assertion : Magnetic moment values of actinides are lesser than the theoretically predicted values.

Reason : Actinide elements are strongly paramagnetic.

A. A.If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. B .If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. C.If(A) is correct, but (R) is incorrect.

D. D. If both (A) and (R) are incorrect.

Answer: B

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7. Assertion : MnO is basic whereas Mn_2O_7, is acidic.

Reason : Higher the oxidation state of a transition metal in its oxide, greater is the acidic character.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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8. Assertion . The reaction of oxalic acid with acidified $KMnO_4$ proceeds slowly in the beginning but speeds up after sometime.

Reason : $KMnO_2$, decomposes to give MnO, under the

influence of sunlight. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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9. Assertion : In transition elements, radii of 5d series are virtually the same as those of the corresponding members of 4d series.

Reason : The filling of 4f orbitals before 5d orbitals results in regular decrease in atomic radii.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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10. Assertion : The maximum oxidation state of chromium in its compounds is +6.

Reason : Chromium has only six electrons in ns and (n-1)d orbitals

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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11. Assertion : Magnetic moment of Mn^{2+} is less than that of Cr^{2+}.

Reason : Higher the atomic number smaller is the magnetic moment.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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12. Assertion : In the series Sc to Zn, the enthalpy of atomisation of zinc is the lowest.

Reason : Zinc has greater number of unpaired electrons.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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13. Assertion : In acidic medium, $K_2Cr_2O_7$ exists as $Cr_2O_7^{2-}$ (orange) while in basic medium it is converted to CrO_4^{2-} (yellow).

Reason : $K_2Cr_2O_7$ is hygroscopic in nature and changes colour on reaction with water.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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14. Assertion : Zr and Hf occur together in nature and are difficult to separate.

Reason : Zr and Hf have identical radii due to lanthanide contraction.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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15. Assertion : The second ionization energies $of \quad {}_{23}V, {}_{24}Cr \text{ and } , {}_{25}Mn$ are in the order $V < Cr < Mn$.

Reason : Ionization energies show a regular increase along a period with increase of atomic number. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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16. Assertion": Mn'atom loses ns electrons first during ionization as compared to (n-1)d electrons.

Reason : The effective nuclear charge experienced by (n-1)d electrons is greater than that by ns electrons,

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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17. Assertion : In $Cr_2O_7^{2-}$ ion, all the Cr-O bond lengths are equal. .

Reason : In $Cr_2O_7^{2-}$ ion, all the O-Cr-O bond angles are equal.

a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is

not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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18. Assertion : The purple colour of $KMnO_4$, is due to the charge transfer transition.

Reason : The colour of most of the transition metal complexes'is due to d-d transition. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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19. Assertion : Atomic size of silver is almost the same as that of gold.

Reason :d-subshell has low penetration power and produces poor shielding. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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20. Assertion : Actinoids show larger number of oxidation states than lanthanoids.

Reason : Highest oxidation state shown by lanthanoids is +4 while that of actinoids is +7. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A)

is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

View Text Solution

21. Assertion : Zn, Cd and Hg are not considered as transition metals.

Reason :d-orbitals in Zn, Cd and Hg are completely filled, both in ground state and in their available oxidation states.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

22. Assertion : Anhydrous copper (II) chloride is covalent while anhydrous copper (II) fluoride is ionic in nature.

Reason : In halides of transition metals, the ionic character decreases with increase in atomic mass of the halogen.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

23. Assertion : All the members of actinide series are radioactive in nature.

Reason : The electrons are gradually accomodated in 5f-energy subshell.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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24. Assertion : Transition metals show variable valency.

Reason : Transition metals have a large energy difference between the ns^2 and (n-1)d electrons.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

Watch Video Solution

25. Assertion : Silver fluoride is soluble in water.

Reason : Hydration energy of AgF is higher than its lattice energy:

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

26. Assertion : Magnetic moment values of actinides are lesser than the theoretically predicted values.

Reason : Actinide elements are strongly paramagnetic.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

 Watch Video Solution

27. Assertion : MnO is basic whereas Mn_2O_7, is acidic.

Reason : Higher the oxidation state of a transition metal in its oxide, greater is the acidic character.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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28. Assertion . The reaction of oxalic acid with acidified $KMnO_4$ proceeds slowly in the beginning but speeds up after sometime.

Reason : $KMnO_2$, decomposes to give MnO, under the influence of sunlight. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

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B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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29. Assertion : In transition elements, radii of 5d series are virtually the same as those of the corresponding members of 4d series.

Reason : The filling of 4f orbitals before 5d orbitals results in regular decrease in atomic radii.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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30. Assertion : The maximum oxidation state of chromium in its compounds is +6.

Reason : Chromium has only six electrons in ns and (n-1)d orbitals

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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31. Assertion : Magnetic moment of Mn^{2+} is less than that of Cr^{2+}.

Reason : Higher the atomic number smaller is the magnetic moment.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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32. Assertion : In the series Sc to Zn, the enthalpy of atomisation of zinc is the lowest.

Reason : Zinc has greater number of unpaired electrons.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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33. Assertion : In acidic medium, $K_2Cr_2O_7$ exists as $Cr_2O_7^{2-}$ (orange) while in basic medium it is converted to CrO_4^{2-} (yellow).

Reason : $K_2Cr_2O_7$ is hygroscopic in nature and changes colour on reaction with water.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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34. Assertion : Zr and Hf occur together in nature and are difficult to separate.

Reason : Zr and Hf have identical radii due to lanthanide contraction.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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35. Assertion : The second ionization energies of $_{23}V$, $_{24}Cr$ and , $_{25}Mn$ are in the order $V < Cr < Mn$.

Reason : Ionization energies show a regular increase along a

period with increase of atomic number. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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36. Assertion": Mn'atom loses ns electrons first during ionization as compared to (n-1)d electrons.

Reason : The effective nuclear charge experienced by (n-1)d electrons is greater than that by ns electrons,

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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37. Assertion : In $Cr_2O_7^{2-}$ ion, all the Cr-O bond lengths are equal. .

Reason : In $Cr_2O_7^{2-}$ ion, all the O-Cr-O bond angles are equal.

a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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38. Assertion : The purple colour of $KMnO_4$, is due to the charge transfer transition.

Reason : The colour of most of the transition metal complexes'is due to d-d transition. a)If both (A) and (R) are correct and (R) is the correct explanation of(A). b)If both (A) and (R) are correct, but(R) is not the correct explanation of (A). c)If(A) is correct, but (R) is incorrect. d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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39. Assertion : Atomic size of silver is almost the same as that of gold.

Reason :d-subshell has low penetration power and produces poor shielding.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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40. Assertion : Actinoids show larger number of oxidation states than lanthanoids.

Reason : Highest oxidation state shown by lanthanoids is +4 while that of actinoids is +7.

A. If both (A) and (R) are correct and (R) is the correct explanation of(A).

B. If both (A) and (R) are correct, but(R) is not the correct explanation of (A).

C. If(A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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