



CHEMISTRY

BOOKS - UNIVERSAL BOOK DEPOT 1960 CHEMISTRY (HINGLISH)

D & P-BLOCK ELEMENTS

Ordinary Thinking (General Characteristics)

1. The general configuration of transition element is

A. $(n - 1)d^{1-5}$

B. $(n - 1)d^{1-10}ns^1$

C. $(n - 1)d^{1-10}ns^{1-2}$

D. $ns^2(n - 1)d^{10}$

Answer: C



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2. Highest (+ 7) oxidation state is shown by

A. Co

B. Cr

C. V

D. Mn

Answer: D



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3. Mercury is the only metal which is liquid at $0^{\circ}C$.this is due to

A. Very high iionisation enrgy and weak metallic bond

B. Low ionisation potential

C. High atomic weight

D. High vapour pressure

Answer: A

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4. A transition element X has a configuration $[Ar]3d^4$ in its $+3$ oxidation state. Its atomic number is

A. 25

B. 26

C. 22

D. 19

Answer: A

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5. The lanthanide contraction is responsible for the fact that

- A. Zr and Y have about the same radius
- B. Zr and Nb have similar oxidation state
- C. Zr and Hf have about the same radius
- D. Zr and Zn have the same oxidation state

Answer: C



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6. Which one of the following ionic species will impart colour to an aqueous solution?

- A. Ti^{4+}
- B. Cu^{+}
- C. Zn^{2+}
- D. Cr^{3+}

Answer: D

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7. Which of the following has the maximum number of unpaired d-electron?

A. Zn

B. Fe^{2+}

C. Ni^{3+}

D. Cu^{+}

Answer: B

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8. The aqueous solution containing which one of the following ions will be colourless

(Atomic number $Sc = 21$, $Fe = 26$, $Ri = 22$, $Mn = 25$)

- A. Sc^{3+}
- B. Fe^{2+}
- C. Ti^{3+}
- D. Mn^{2+}

Answer: A



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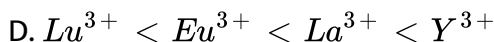
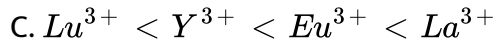
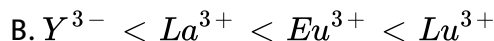
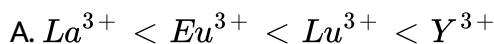
9. Which one of the following characteristics of the transition metals is associated with their catalytic activity?

- A. Variable oxidation states
- B. High enthalpy of atomization
- C. Paramagnetic behaviour
- D. Colour of hydrated ions

Answer: A

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10. The correct order of ionic radii Y^{3+} , La^{3+} , Eu^{3+} and Lu^{3+} is
(AT. No: $Y = 39$, $La = 57$, $Eu = 63$, $Lu = 71$)

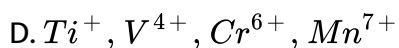
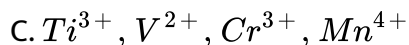
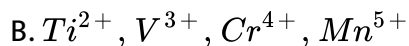
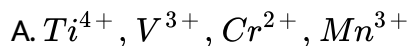


Answer: C

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11. Among the following series of transition metal ions, the one in which all metal ions have $3d^2, 3p^6$ electronic configuration is (Atomic no. of

$Ti = 22, V = 23, Cr = 24, Mn = 25$)



Answer: B



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12. Lanthanoids are-

A. 14 elements in the sixth period (atomic no. = 58 to 71) that are filling

4f sublevel

B. 14 elements in the seventh period (atomic no. 58 to 71) that are

filling 4f sublevel

C. 14 elements in the sixth period (atomic no. = 90 to 103) that are filling 4f sublevel

D. 14 elements in the seventh period (atomic no. 90 to 103) that are filling 4f sublevel

Answer: A

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13. The main reason for larger number of oxidation states exhibited by the actinoids than the corresponding lanthanoids, is :-

A. Lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals

B. Larger atomic size of actinoids than the lanthanoids

C. More energy difference between 5f and 6d orbitals than between 4f and 5d orbitals

D. Greater reactive nature of the actinoids than the lanthanoids

Answer: A

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14. Four successive members of the first row transition elements are listed below with their atomic number. Which one of them is expected to have the highest third ionisation enthalpy ?

A. Vanadium ($Z = 23$)

B. Chromium ($Z = 24$)

C. Iron ($Z = 26$)

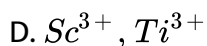
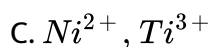
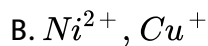
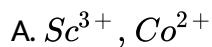
D. Manganese ($z = 25$)

Answer: D

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15. In which of the following pairs both the ions are coloured in aqueous solution? (Atomic number,

$Sc = 21, Ti = 22, Ni = 28, Cu = 29, Co = 27$)



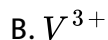
Answer: C

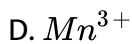
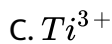


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16. Which of the following ions is the most stable in aqueous solution ?

(At. No. $Ti = 22, V = 23, Cr = 24, Mn = 25$)





Answer: A



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17. Identify the incorrect statement among the following

A. There is decrease in the radii of atoms or ion as one proceeds from
La to Lu

B. Lanthanoid contraction is the accumulation of successive
shrinkages

C. As a result of lanthanide contraction, the properties of the 4th
series of the contraction element have no similarities with the 5d
series of elements

D. Shielding power of 4f element of electron is quite weak

Answer: C

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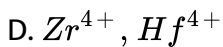
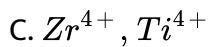
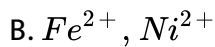
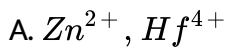
18. Which one of the following does not correctly represent the correct order of the property indicated against it

- A. Ti It V It Cr It Mn, increasing number of oxidation states
- B. $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$, increasing magnetic moment
- C. Ti It V It Cr It Mn, increasing melting points
- D. Ti It V It Mn It Cr , increasing 2^{nd} ionization enthalpy

Answer: C

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19. Which of the following pairs has the same size ?



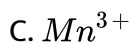
Answer: D



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20. Which one of the following ions has electronic configuration $[Ar]3d^6$

? (*At. Nos. Mn = 25, Fe = 26, Co = 27, Ni = 28*)



Answer: A

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21. Which of the following oxidation states is the most common among the lanthanoids ?

A. 4

B. 2

C. 5

D. 3

Answer: D

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22. For the four successive transition elements (Cr, Mn, Fe, and Co), the stability of +2 oxidation state will be there in which of the following order ?

(*At. Nos. Cr = 24, Mn = 25, Fe = 26, Co = 27*)

A. Cr gt Mn gt Co gt Fe

B. Mn gt Fe gt Cr gt Co

C. Fe gt Mn gt Co gt Cr

D. Co gt Mn gt Fe gt Cr

Answer: B

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23. Which of the following exhibits only +3 oxidation state?

A. U

B. Th

C. Ac

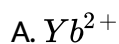
D. Pa

Answer: C

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24. Which of the following lanthanoid ions is diamagnetic ?

(At nos . `Ce = 58 , Sm = 62, Eu = 63 , Yb =70)

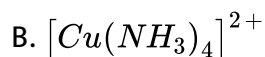


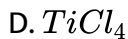
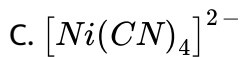
Answer: A



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25. A magnetic moment of 1.73 B.M. will be shown by one among the following:





Answer: B

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26. Sc (Z = 21) is a transition element but Zn (Z = 30) is not because

- A. Both Sc^{3+} and Zn^{2+} ions are colourless and form white compounds
- B. In case of Sc, 3d orbitals are partially filled but in Zn these are filled
- C. Last electron is assumed to be added to 4s level in case of Zn
- D. Both Sc and Zn do not exhibit variable oxidation states

Answer: B

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27. Reason of lanthanoid contraction is

- A. Decreasing nuclear charge
- B. Decreasing screening effect
- C. Negligible screening effect of 'f' orbitals
- D. Increasing nuclear charge

Answer: C

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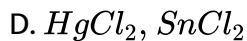
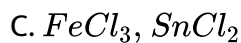
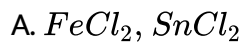
28. Magnetic moment $2.83BM$ is shown by which of the following ions?

- A. Cr^{3+}
- B. Mn^{2+}
- C. Ti^{3+}
- D. Ni^{2+}

Answer: D

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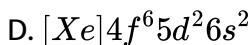
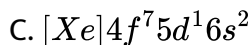
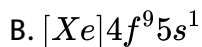
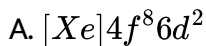
29. The pair of compounds that can exist together is:



Answer: A

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30. Gadolinium belongs to 4f series. It's atomic number is 64. which of the following is the correct electronic configuration of gadolinium ?

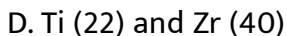
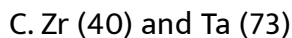
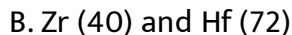
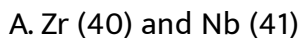


Answer: C



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31. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii ? (Number in the parenthesis are atomic numbers)



Answer: B

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

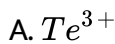
- A. Decolourization of blue $CuSO_4$ solution by iron
- B. Formation of $Fe(CO)_5$ from Fe
- C. Liberation of H_2 from steam by iron at high temperature
- D. Rusting of iron sheets

Answer: B

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33. Magnetic moments $2.84B$. M is given by :

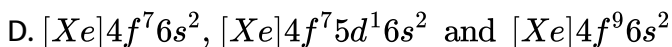
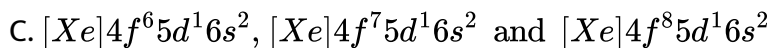
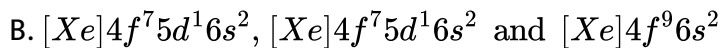
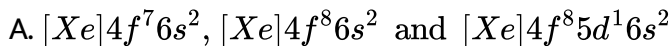
(At. nos. ni = 28, Ti = 22, Cr = 24, Co = 27).



Answer: D

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34. The electronic configuration of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are:



Answer: D

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35. Zinc can be coated on iron to produce galvanized iron but the reverse is not possible it is because

- A. Zinc has higher negative electrode potential than iron
- B. Zinc is lighter than iron
- C. Zinc has lower melting point than iron
- D. Zinc has lower negative electrode potential than iron

Answer: A

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36. Which one of the following statements related to lanthanons is incorrect ?

- A. $Ce(+4)$ solution are widely used as oxidizing agent in volumetric analysis
- B. Europium shown $+2$ oxidation state
- C. The basicity decreases as the ionic radius decreases from Pr to Lu
- D. All the lanthanous are much more reactive than aluminium

Answer: D

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37. Which ion has the maximum magnetic moment ?

- A. V^{+3}
- B. Mn^{+3}
- C. Fe^{+3}
- D. Cu^{+2}

Answer: C



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38. Which one of the following statement is true for transition elements

- A. They exhibit diamagnetism
- B. They exhibit inert pair effect
- C. They do not form alloys
- D. They show variable oxidation states

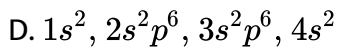
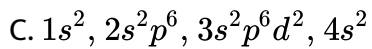
Answer: D



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39. Which of the following electronic configuration is that of a transitional element?

- A. $1s^2, 2s^2p^6, 3s^2, p^6d^{10}, 4s^2, p^6$
- B. $1s^2, 2s^2p^6, 3s^2p^6d^{10}, 4s^2p^1$



Answer: C

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40. Which of the following does not have valence electron in 3d-series ?

A. Fe (III)

B. Mn (II)

C. Cr (I)

D. P (0)

Answer: D

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41. Lanthanide for which +II and +III oxidation states are common is

A. La

B. Nd

C. Ce

D. Eu

Answer: A



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42. Which one of the following organisation's iron and steel plant was built to use charcoal as a source of power, to start with, but later switched over to hydroelectricity

A. The Tata Iron and Steel Company

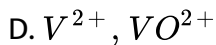
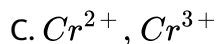
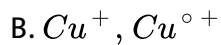
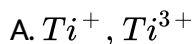
B. The Indian Iron and Steel Company

C. Mysore Iron and Steel Limited

Answer: A

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43. Among the following pairs of ions the lower oxidation state in aqueous solution is more stable than the other in



Answer: A

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44. Which is most reactive metal

A. Fe

B. Pt

C. Ni

D. Co

Answer: A



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45. When an acidified solution of ferrous ammonium sulphate is treated with potassium permanganate solution, the ion which is oxidised is

A. MnO_4^-

B. NH_4^+

C. Fe^{++}

D. SO_4^{2-}

Answer: C

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46. A hard and resistant metal (alloy) generally used in tip of nib of fountain pen is

A. Os. Ir

B. Pt.Cr

C. V.Fe

D. Fe.Cr

Answer: B

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47. which forms interstitial compounds?

A. Fe

B. Co

C. Ni

D. All of these

Answer: D



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48. Which of the following elements does not belong to the first transition series?

A. Fe

B. V

C. Ag

D. Cu

Answer: C

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49. Which of the following metals make the most efficient catalyst

- A. Transition
- B. Alkali
- C. Alkaline earth
- D. Coloured metals

Answer: A

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50. Which of the following ions is coloured

- A. Cu^+
- B. Cu^{2+}
- C. Ti^{4+}

D. V^{5+}

Answer: B



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51. The metal present in vitamin B_{12} is

A. Magnesium

B. Iron

C. Cobalt

D. Manganese

Answer: C



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

- A. La
- B. Ce
- C. Pm
- D. Lu

Answer: A



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53. Cuprous ion is colourless, while cupric ion is colored because

- A. Both have unpaired electrons in d-orbital
- B. Cuprous ion has a completed d-orbital and cupric ion has an incomplete d-orbital
- C. Both have half-filled p and d-orbitals

D. Cuprous ion has incomplete d-orbital and cupric ion has a completed d-orbital

Answer: B

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54. The higher number of unpaired electrons are in

A. Fe

B. Fe^+

C. Fe^{+2}

D. Fe^{+3}

Answer: D

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55. All the metals or iron family have a strong magnetic property commonly referred as

- A. Diamagnetism
- B. Paramagnetism
- C. Ferromagnetism
- D. none of these

Answer: C



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56. Transition metals show paramagnetism

- A. Due to characteristic configuration
- B. High lattice energy
- C. Due to variable oxidation states
- D. Due to unpaired electrons

Answer: D



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57. The colour imparted by $Co(II)$ compound to glass is

- A. Green
- B. Deep-blue
- C. Yellow
- D. Red

Answer: B



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58. The element with an atomic number 26 is

- A. A non-metal

B. Krypton

C. Iron

D. Manganese

Answer: C



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59. Platinum, palladium, iridium, etc., are called noble metals because

A. Alfred Noble discovered them

B. They have inert towards many common reagents

C. They have shining lustrous and pleasing to look at

D. They are found in active state

Answer: B



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60. Which element belongs to d - block

A. Na

B. Ca

C. Cu

D. Ar

Answer: C



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61. Zn and Hg do not show variable valency like d – block elements because-

A. They are soft

B. Their d- shells are complete

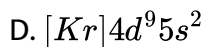
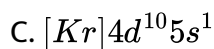
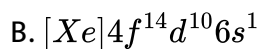
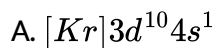
C. They have only two electrons in the outermost subshell

D. Their d-shells are incomplete

Answer: B

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62. The electronic configuration of Ag atom is



Answer: C

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63. In a reaction the ferrous (Fe^{++}) ion is oxidized to ferric (Fe^{+++}) ion. The equivalent weight of the ion in the above reaction is equal to

A. Half of the atomic weight

B. $\frac{1}{5}$ of the atomic weight

C. The atomic weight

D. Twice the atomic weight

Answer: C

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64. Which is heaviest among the following

A. Iron

B. Copper

C. Gold

D. Silver

Answer: C

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65. The main reason for not using a mercury electrolytic cell in $NaOH$ manufacture is that

- A. Hg is toxic
- B. Hg is a liquid
- C. Hg has a high vapour pressure
- D. Hg is a good conductor of electricity

Answer: D



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66. Which of the following statement is not true about Mohr's salt

- A. It decolourises $KMnO_4$
- B. It is a primary standard
- C. It is a double salt

D. Oxidation state of iron is +3 in this salt

Answer: D

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67. Which metal among following has strongest tendency to undergo oxidation

A. Zn

B. Cu

C. Mg

D. Al

Answer: C

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68. Essential constituent of amalgam is

- A. Iron
- B. An alkali metal
- C. Silver
- D. Mercury

Answer: D



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69. Which metal represents more than one oxidation state

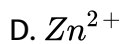
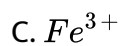
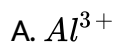
- A. Al
- B. Na
- C. Mg
- D. Fe

Answer: D



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70. Which is not amphoteric?



Answer: C



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71. Transition metals are related to which block

A. s-block

B. p-block

C. d-block

D. none of these

Answer: C



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72. The number of unpaired electrons in Cr^{3+} ion is

A. 3

B. 5

C. 4

D. 1

Answer: A



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73. Number of unpaired electrons in Mn^{3+} is

A. 3

B. 5

C. 4

D. 1

Answer: B



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74. Complex ion is shown by

A. Ag

B. Au

C. Cu

D. All of these

Answer: D



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75. Which of the following transition metal is used as a catalyst

A. Nickel

B. Cobalt

C. Gold

D. Both (a) and (b)

Answer: D



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76. Which one of the following properties is not a transition elements

A. Colour

- B. Paramagnetism
- C. Fixed valency
- D. None of the above

Answer: C

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77. What is the name of element with atomic number 105

- A. Kurchatovium
- B. Dubnium
- C. Nobelium
- D. Holmium

Answer: B

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78. How many unpaired electrons are present in chromium (Cr)

A. 0

B. 3

C. 2

D. 6

Answer: D



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79. What is the electronic configuration of Mn^{2+}

A. $[Ne]3d^54s^0$

B. $[Ar]3d^54s^2$

C. $[Ar]3d^54s^0$

D. $[Ne]3d^54s^2$

Answer: C

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80. Which does not form amalgam

A. Fe

B. Co

C. Ag

D. Zn

Answer: A

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81. The test of of zone O_3 can be done by

A. Ag

B. Hg

C. Au

D. Cu

Answer: B



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82. Lanthanides and actinides resemble in

A. Electronic configuration

B. Oxidation state

C. Ionization energy

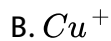
D. Formation of complexes

Answer: B



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83. Which of the following ion is colourless?



Answer: B



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84. Which of the following is not an actinide?

A. Curium

B. Californium

C. Uranium

D. Terbium/Erbium

Answer: D



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85. Which of the following is not a ferromagnetic substance

- A. Cobalt
- B. Nickel
- C. Manganese
- D. Iron

Answer: C



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86. Which of the following is paramagnetic

- A. Ni^{++}

B. Cu^+

C. Zn^{++}

D. Sc^{+++}

Answer: A

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87. Which of the following is the correct sequence of atomic weights of given elements?

A. Fe > Co > Ni

B. Ni > Co > Fe

C. Co > Ni > Fe

D. Fe > Ni > Co

Answer: C

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88. Which of the following element has maximum, first ionisation potential?

A. V

B. Ti

C. Cr

D. Mn

Answer: D



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89. Ce-58 is a member of

A. s-block

B. p-block

C. d-block

D. f-block

Answer: D



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90. The transition metals mostly are

A. Diamagnetic

B. Paramagnetic

C. Neither diamagnetic nor paramagnetic

D. Both diamagnetic and paramagnetic

Answer: B



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91. All the following statements about the transitional elements are true except that

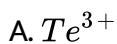
- A. All of the transitional elements are predominatly metallic
- B. In aqueous solution many of their simple ions are coloured
- C. Most of the transitional elements show pronounced catalytic activity
- D. Most of the trasitional elements show only one valence state

Answer: D



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92. Which of the following ions has the highest magnetic moment ?



D. Zn^{2+}

Answer: C

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93. The lanthanide contraction relates to

- A. Atomic radii
- B. Atomic as well as M^{3+} radii
- C. Valence electrons
- D. Oxidation state

Answer: B

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94. Which one of the following d-block elements has half-filled penultimate d-subshell as well as half-filled valence s-subshell

A. Cr

B. Pd

C. Pt

D. Cu

Answer: A



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95. Which one of the following transition metal ions shows magnetic moment of 5.92 BM

A. Mn^{2+}

B. Ti^{3+}

C. Cr^{3+}

D. Cu^{2+}

Answer: A



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96. Which of the following transition elements does not exhibit variable oxidation states ?

A. Cu

B. Fe

C. Ni

D. Sc

Answer: D



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97. Match list I with list II and select the correct answer using the codes given below the lists.

	List I Metal ion		List II Magnetic moment(BM)
A.	Cr^{3+}	1.	$\sqrt{35}$
B.	Fe^{2+}	2.	$\sqrt{30}$
C.	Ni^{2+}	3.	$\sqrt{24}$
D.	Mn^{2+}	4.	$\sqrt{15}$
		5.	$\sqrt{8}$

A. A-1, B-3, C-5, D-4

B. A-2, B-3, C-5, D-1

C. A-4, B-3, C-5, D-1

D. A-4, B-5, C-3, D-1

Answer: C



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98. Pick out the correct statements from the following

1. Cobalt (III) is more stable in octahedral complexes
2. Zinc forms coloured complexes
3. Most of the d-block elements and their compounds are ferromagnetic
4. Osmium show (VIII) oxidation state
5. Cobalt (II) is more stable in octahedral complexes

A. 1 and 2

B. 1 and 3

C. 2 and 4

D. 1 and 4

Answer: D



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99. Mark the correct statements(s)

(1) Manganese exhibits +7 oxidation state

(2) Zinc forms coloured ions

(3) $[CoF_6]^{3-}$ is diamagnetic

(4) Sc forms +4 oxidation state

(5) Zn exhibits only +2 oxidation state

A. 1 and 2

B. 1 and 5

C. 2 and 4

D. 3 and 4

Answer: B



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100. The maximum oxidation state exhibited by actinide ions is

A. +5

B. +4

C. +7

D. +8

Answer: C

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101. Consider the following statements:

(I) $\text{La}(\text{OH})_3$ is the least basic among the hydroxides of lanthanoids.

(II) Zr^{4+} and Hf^{4+} possess almost same ionic radii.

(III) Cr^{4+} can act as an oxidising agent .

which of the above statement is/ are true?

A. (I) and (III)

B. (II) and (III)

C. (II) only

D. (I) and (II)

Answer: B

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102. Which of the following is a transition element

A. Al

B. As

C. Ni

D. Rb

Answer: C



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103. Mercury is transported in metal containers made of

A. Silver

B. Lead

C. Iron

D. Aluminium

Answer: C



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104. In transition elements, the orbitals partially filled by electrons are

A. s-orbitals

B. p-orbitals

C. d-orbitals

D. f-orbitals

Answer: C



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105. The substance used in cancer therapy is

A. Rn

B. Ni

C. Fe

D. Co

Answer: D

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106. Europium is

A. s-block element

B. p-block element

C. d-block element

D. f-block element

Answer: D

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107. Which of the following statements is not true in regard to transition elements

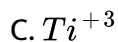
- A. They readily form complex compounds
- B. They show variable valency
- C. All their ions are colourless
- D. Their ions contain partially filled d-electron levels

Answer: C



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108. Which of the following is a colourless ion?



D. Zn^{+2}

Answer: D



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109. Which of the following set of elements does not belong to transitional element set

A. Fe, Co, Ni

B. Cu, Ag, Au

C. Ti, Zr, Hf

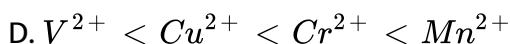
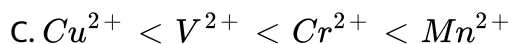
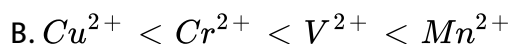
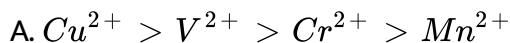
D. Ga, In, Tl

Answer: D



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110. Which one of the following sets correctly represents the increase in the paramagnetic property of ions



Answer: C



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111. Lanthanum is grouped with f-block elements because

A. It has partially filled f-orbitals

B. It is just before Ce in the periodic table

C. It has both partially filled f and d-orbitals

D. The properties of Lanthanum are very similar to the elements of 4f block

Answer: D



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112. Number of unpaired electron in Cu^{2+} is

A. 1

B. 2

C. 3

D. 0

Answer: A



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113. Transitional elements exhibit variable valencies because they release electrons from the following orbits

- A. ns orbit
- B. ns and np orbits
- C. $(n - 1)d$ and ns orbits
- D. $(n - 1)d$ orbit

Answer: C



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114. Which of the following statements is correct

- A. Iron belongs to 3rd transition series of the periodic table
- B. Iron belongs to f-block of the periodic table
- C. Iron belongs to second transition series of the periodic table
- D. Iron belongs to group VIII of the periodic table

Answer: D

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115. In first transition series, the melting point of Mn is low because

- A. Due to d^{10} configuration, metallic bonds are weak
- B. Due to d^7 configuration, metallic bonds are weak
- C. Due to d^5 configuration, metallic bonds are weak
- D. None of these

Answer: C

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116. Chloride of which of the following elements will be coloured

- A. Silver

B. Mercury

C. Zinc

D. Cobalt

Answer: D



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117. Which of the following has highest ionic radii

A. Cr^{+3}

B. Mn^{+3}

C. Fe^{+3}

D. Co^{+3}

Answer: A



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118. Which elements gives maximum balanced oxide

A. V

B. Cr

C. Mn

D. Fe

Answer: C



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119. The electroplating of chromium is undertaken because

A. Electrolysis of chromium is easier

B. Chromium can form alloys with other metals

C. Chromium gives protective and decorative coating to the base metal

D. Of the high reactivity of metallic chromium

Answer: C

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

A. 1

B. 2

C. 3

D. 4

Answer: D

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121. The tendency of 3d-metal ions to form stable complexes is due to their

- A. Variable oxidation state
- B. Strong electronegative nature
- C. High charge/size ratio and vacant d-orbitals
- D. Very low ionization energies

Answer: C



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122. Which one of the following is an example of non-typical transition elements?

- A. Li, K, Na
- B. Be, Al, Pb
- C. Zn, Cd, Hg

D. Ba, Ca, Sr

Answer: C



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123. Zn is related to which group

A. IIB

B. IIA

C. IA

D. IB

Answer: A



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124. Which of the following element doesnot show variable valency

A. Ni

B. Zn

C. Cu

D. Mn

Answer: B



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125. Which one belongs to 3d-transition series

A. Copper

B. Gold

C. Cobalt

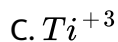
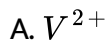
D. Silver

Answer: A:C



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126. The diamagnetic ion is

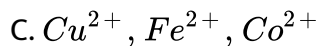


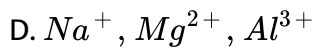
Answer: D



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127. Which of the following set has all the coloured ions ?

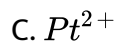
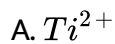




Answer: C

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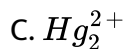
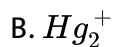
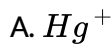
128. Which of the following ions has the smallest radius



Answer: B

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129. The formula of mercurous ion is



D. None of these

Answer: C



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130. Which of the following is not true for transition metals

A. They are malleable and ductile

B. They have high boiling and melting points

C. They crystallize with body centred cubic and hexagonal close-packed structures only

D. They show variable oxidation states although not always

Answer: C



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131. Which of the following statements is not correct about the electronic configuration of gaseous chromium atom

- A. It has 5 electrons in 3d and one electron in 4s orbitals
- B. The principal quantum numbers of its valence elements are 3 and 4
- C. It has 6 electrons in 3d orbital
- D. Its valence electrons have quantum number 'l' 0 and 2

Answer: C



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132. Of the ions Zn^{2+} , Ni^{2+} and Cr^{3+} [atomic number of $Zn = 30$, $Ni = 28$, $Cr = 24$]

- A. Only Zn^{2+} is colourless and Ni^{2+} and Cr^{3+} are coloured

B. All three are colourless

C. All three are coloured

D. Only Ni^{2+} is coloured and Zn^{2+} and Cr^{3+} are colourless

Answer: A



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133. Common oxidation state of Scandium, a transition element is /are

(At. No =21)

A. +4

B. +1

C. +2 and +3

D. +4 and +1

Answer: C



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134. The number of the following metallic bond is strongest

(Ti = 22, V=23, Cr= 24, Fe=26)

A. Cr

B. Fe

C. V

D. Sc

Answer: A



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135. The number of the following metallic bond is strongest

(Ti = 22, V=23, Cr= 24, Fe=26)

A. Fe

B. Sc

C. V

D. Cr

Answer: D



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136. For which element of first transition series the oxidation potential value ($M \rightarrow M^{2+} + 2e^{-}$) is lowest

A. Mn

B. Fe

C. Ni

D. Cu

Answer: D



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137. The total number of elements present in f-block of the periodic table is

- A. 20
- B. 28
- C. 30
- D. 26

Answer: B



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138. The transition metals have a less tendency to form ions due to

- A. High ionisation energy
- B. Low heat of hydration of ion
- C. High heat of sublimation
- D. All of these

Answer: D



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139. Oxidation number of Mn in K_2MnO_4 and in $KMnO_4$ are respectively

A. +6 and +7

B. +6 and +6

C. +7 and +7

D. +7 and +6

Answer: A



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140. Which of the following transition metal shows the highest oxidation state:

A. Cr

B. Co

C. Ni

D. Cu

Answer: A



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141. A reduction in atomic size the increases in atomic number is a charactersitic of elements of:

A. High atomic masses

B. d-block

C. f-block

D. Radioactive series

Answer: C

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142. Cerium ($Z = 58$) is an important member of the lanthanoids . Which of the following statements about cerium is incorrect ?

- A. The +4 oxidation state of cerium is not known in solutions
- B. The +3 oxidation state of cerium is more stable than the +4 oxidation state
- C. The common oxidation states of cerium are +3 and +4
- D. Cerium (IV) acts as an oxidizing agent

Answer: A

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143. Which of the following factors may be regarded as the main cause of lanthanide contraction ?

- A. Poor shielding of one of 4f electron by another in the subshell
- B. Effective shielding of one of 4f electrons by another in the subshell
- C. Poorer shielding of 5d electrons by 4f electrons
- D. Greater shielding of 5d electrons by 4f electrons

Answer: A

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

- A. The 5f orbitals are more buried than the 4f orbitals
- B. There is a similarity between 4f and 5f orbitals in their angular part of the wave function
- C. The actnoids are more reactive than the lanthanoids
- D. The 5f orbitals extend further from the nucleus than the 4f orbitals

Answer: D

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145. Identify the incorrect statements among the following

- A. d-block elements show irregular and erratic chemical properties among themselves
- B. La and Lu have partially filled d orbitals and no other partially filled orbitals
- C. The chemistry of various lanthanoids is very similar
- D. 4f and 5f orbitals lanthanoids is very similar

Answer: D

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146. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statement 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

Answer: C

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147. 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 states, the transition metal show basic character and form cationic complexes
- C. In the highest oxidation states of the first five transition elements (Sc to Mn), all the 4s and 3d electrons are used for bonding
- D. Once the d^5 configuration is exceeded, the tendency to involve all the 3d electrons in bonding decreases

Answer: B



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148. In context of the lanthanoids, which of the following statements is not correct?

- A. There is a gradual decrease in the radii of the members with increasing atomic number in the series
- B. All the number exhibit +3 oxidation state
- C. Because of similar properties the separation of lanthanoids is not easy
- D. Availability of 4f electrons results in the formation of compound in +4 state for all the members of the series

Answer: D

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149. Which of the following is not a characteristic of transition elements?

- A. Variable oxidation state
- B. Formation of coloured compounds
- C. Formation of interstitial compounds

D. Natural radioactivity

Answer: D



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150. Which metal does not give the following reaction $M + \text{water or steam} \rightarrow \text{oxide} + H \downarrow$

A. Mercury

B. Iron

C. Sodium

D. Magnesium

Answer: A



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151. Ionisation potential values of d-block elements as compared to ionization potential potential value of f-block elements are

- A. Higher
- B. Equal
- C. lower
- D. All of these

Answer: A



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152. The number of incomplete shells in transition elements are

- A. 2
- B. 3
- C. 4
- D. 1

Answer: B



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153. Which one is wrong in the following statements

- A. Gold is considered to be the king of metals
- B. Gold is soluble in mercury
- C. Copper is added to gold to make it hard
- D. None of these

Answer: D



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154. Super alloys are usually

- A. Iron based

B. Nickel based

C. Cobalt based

D. Based on all of these

Answer: D



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155. In solution of $AgNO_3$ if Cu is added solution become blue due to

A. Oxidation of Ag

B. Oxidation of Cu

C. Reduction of Ag

D. Reduction of Cu

Answer: B



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156. Which belongs to the actinides series

A. Ce

B. Cf

C. Ca

D. Cs

Answer: B



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157. The coordination number in a/an..... Complex may increase to 8.

A. Cobalt

B. Osmium

C. Nickel

D. Iron

Answer: B

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158. The magnetic moment (in BM) of Zn^{2+} ion according to spin-only formula is

- A. Zero
- B. 1, 73
- C. 2.84
- D. 3.87

Answer: A

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159. The atom of which of the following elements has the highest number of unpaired electrons

A. ${}_{25}\text{Mn}$

B. ${}_{24}\text{Cr}$

C. ${}_{96}\text{Cm}$

D. ${}_{26}\text{Fe}$

Answer: C

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160. Among the following lanthanoid ions, the paramagnetic ion is

A. Ca^{4+}

B. Yb^{2+}

C. Lu^{3+}

D. Eu^{2+}

Answer: D

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161. A metal having electronic configuration

$1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2$ is in

- A. s-block element
- B. d-block elements
- C. p-block elements
- D. None of these

Answer: B



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162. All the metals form oxides of the type MO except

- A. Copper
- B. Barium
- C. Silver

D. Lead

Answer: C

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163. The number of unpaired electrons in gaseous species of Mn^{3+} , Cr^{3+} and V^{3+} respectively are.....and most stable species is.....

- A. 4, 3 and 2 V^{3+} is most stable
- B. 3, 3 and 2 and Cr^{3+} is most stable
- C. 4, 3 and 2 Cr^{3+} is most stable
- D. 3, 3 and 3 and Mn^{3+} is most stable

Answer: C

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164. Which is not the correct statement about the chemistry of 3d and 4f series elements

- A. 3d elements show more oxidation states than 4f series elements
- B. The energy difference between 3d and 4s orbitals is very little
- C. Europium (II) is more stable than Ce(II)
- D. The paramagnetic character in 3d series elements increases from scandium to copper

Answer: D



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165. Which of the following pairs of elements cannot form an alloy

- A. Zn, Cu
- B. Fe, Hg
- C. Fe, C

D. Hg, Na

Answer: B



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166. The atomic numbers of *Ni* and *Cu* are 28 and 29 respectively. The electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$ represent

A. Cu^+

B. Cu^{2+}

C. Ni^{2+}

D. *Ni*

Answer: A



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167. A transition metal ion exists in its highest oxidation state. It is expected to behave as

- A. A chelating agent
- B. A central metal in a coordination compound
- C. An oxidizing agent
- D. A reducing agent

Answer: C



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168. Which one of the following has a magnetic moment of 1.75 BM?

- A. Ti^{3+}
- B. V^{3+}
- C. Cr^{3+}
- D. Fe^{3+}

Answer: A



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169. The electronic configuration $1s^2 2s^2 2p^6 3s^2 3d^9$ represents a

- A. Metal atom
- B. Non-metal atom
- C. Non-metallic anion
- D. Metallic cation

Answer: D



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170. Which statement is incorrect about complexes formed by the lanthanoid

- A. Hard donor ligands are favoured
- B. High coordination number (more than six) are often observed
- C. The 4f atomic orbitals do not play a significant part in metal-ligand bonding
- D. Aqueous ions are typically 6-coordinate

Answer: D

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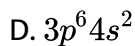
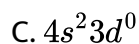
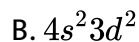
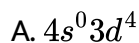
171. What is the general electronic configuration for second row transition series?

- A. $[Ne]3d^{1-10}, 4s^2$
- B. $[Ar]3d^{1-10}, 4s^{1-2}$
- C. $[Kr]4d^{1-10}, 5s^{1-2}$
- D. $[Xe]5d^{1-10}, 5s^{1-2}$

Answer: C

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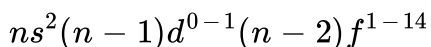
172. The valence shell electronic configuration of Cr^{2+} ion is



Answer: A

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173. The element having electronic configuration belongs to



A. s-block

B. p-block

C. d-block

D. f-block

Answer: D

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174. Which of the following pairs involves isoelectronic ions

A. Mn^{3+} and Fe^{2+}

B. Mn^{2+} and Fe^{3+}

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

D. Fe^{2+} and Co^{2+}

Answer: B

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175. An element in +3 oxidation state has the electronic configuration $(Ar)3d^3$. Its atomic number is

- A. 24
- B. 23
- C. 22
- D. 21

Answer: A



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176. In which of the following ions, d-d transition is not possible

- A. Ti^{4+}
- B. Cr^{3+}
- C. Mn^{2+}

D. Cu^{2+}

Answer: A

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177. Cigarette or gas lighter is made up of

A. Misch metal

B. Alkali metal

C. Noble metal

D. None

Answer: A

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178. Which of the following is a transition element as per the ground state electronic configuration

A. Au

B. Hg

C. Cd

D. Zn

Answer: A



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179. Transitional elements are named transition elements because their characters are

A. In between s and p - block elements

B. Like that of p and d - block elements

C. They are members of I A group

D. They are like inactive elements

Answer: A

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180. Fe, Co and Ni have valuable catalytic properties in process involving

- A. Organic compound
- B. Oxidation
- C. Hydrogenation
- D. Compounds of hydrogen

Answer: C

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181. Which of the following statements is not correct

- A. Metals contribute their valency electrons to the common sea of electrons
- B. Metals have high co-ordination number
- C. Metals tend to adopt closely packed structures
- D. Metals have high lattice energy

Answer: A

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182. The hardness Cr is due to And metallic lusture is due to

- A. Covalent bond, metallic bond
- B. Covalent bond, hydrogen bond
- C. Metallic bond, covalent bond
- D. Metallic bond, hydrogen bond

Answer: A



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183. Which has the maximum ferromagnetic character?

A. Fe

B. Co

C. Ni

D. Pt

Answer: A



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184. Which occurs in nature in free state

A. Fe

B. Co

C. Ni

D. Pt

Answer: D



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185. Which of the following metals adsorbs hydrogen ?

A. K

B. Al

C. Zn

D. Pd

Answer: D



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186. Which of the following pair of transitional elements exhibit highest and lowest density

- A. Os and Sc
- B. Os and Pt
- C. Hg and Sc
- D. Os and Ir

Answer: A



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187. Which of the following has highest paramagnetic character

- A. Mn (II)
- B. Fe (II)
- C. Co (II)
- D. Ni (II)

Answer: A

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188. The atomic radii from Cr to Cu is almost identical because of

- A. Increasing nuclear charge from Cr to Cu
- B. Repulsion among increased electrons
- C. Increased screening effect to nullify increased nuclear charge
- D. All the above

Answer: C

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189. Assertion: Transition metals show variable valence.

Reason : Due to a large energy difference between the ns^2 and $(n - 1)d$ electrons.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: C



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190. Assertion : Pure iron is not used for making tools and machines.

Reason : Pure iron is hard.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.

- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: C

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191. Assertion : Cuprous ion (Cu^+) has unpaired electrons while cupric ion (Cu^{++}) does not.

Reason : Cuprous ion (Cu^+) is colourless where as cupric ion (Cu^{+2}) is blue in the aqueous solution.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: D

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192. Assertion : Solution of Na_2CrO_4 in water is intensely electrons.

Reason : Oxidation state of Cr in Na_2CrO_4 is $+VI$.

A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: A

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193. Assertion : Copper metal gets readily corroded in an acidic aqueous solution.

Reason : Free energy change for this process is positive.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: D

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194. Assertion : The free gases Cr atom has six unpaired electrons.

Half-filled 's' orbital has greater stability.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: C

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195. Assertion : Extraction of iron metal from iron oxide ore is carried out by heating with coke.

Reason : The reaction $Fe_2O_3(s) \rightarrow Fe(s) + \frac{3}{2}O_2(g)$ is a spontaneous process.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: D



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196. Assertion : Cobalt-60 is useful in cancer therapy.

Reason : Cobalt-60 is source of γ -radiations capable of killing cancerous cell.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: A



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197. Assertion : Mercury vapour is shining silvery in appearance.

Reason : Mercury is a metal with shining silvery appearance.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.

- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

Answer: D

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198. The reason for greater range of oxidation state in actinoids is attributed to:

- A. Actinoid contraction
- B. 5f, 6d and 7s levels having comparable energies
- C. 4f and 5d levels being close in energies
- D. The radioactive nature of actinoids

Answer: B

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Ordinary Thinking (Compounds of d & f block elements)

1. Which of the following metals corrodes readily in moist air

- A. Gold
- B. Silver
- C. Nickel
- D. Iron

Answer: D

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2. Permanent magnet is made from

- A. Cast iron

B. Steel

C. Wrought from

D. All of these

Answer: B



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3. In nitriding process of steel

A. Steel is heated in an atmosphere of ammonia

B. Steel is made red hot and then cooled

C. Steel is made red hot and then plunged into oil for cooling

D. none of these

Answer: A



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4. While extracting an element from its ore, the ore is grind and leached with dil KCN solution to form the soluble product potassium argentocyanide. The element is

A. Lead

B. Chromium

C. Manganese

D. Silver

Answer: D



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5. Which of the following metals is obtained by leaching out process using a solution of $NaCN$ and then precipitating the metal by addition of zinc dust?

A. Copper

B. Silver

C. Nickel

D. Iron

Answer: B

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6. A blue colouration is not obtained when

A. Ammonium hydroxide dissolves in copper sulphate

B. Copper sulphate solution reacts with $K_4[Fe(CN)_6]$

C. Ferric chloride reacts with sodium ferrocyanide

D. Anhydrous $CuSO_4$ is dissolved in water

Answer: B

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7. Photographic films and plates have an essential ingredient of

- A. Silver nitrate
- B. Silver bromide
- C. Sodium chloride
- D. Oleic acid

Answer: B



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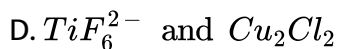
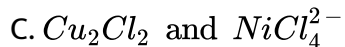
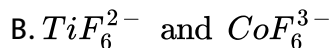
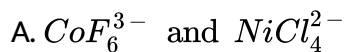
8. Parke's process is used to extract

- A. Silver using $NaCl$
- B. Copper using $CuFeS_2$
- C. Silver from argentiferrous lead
- D. Silver by forming amalgam

Answer: C

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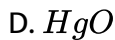
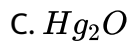
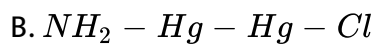
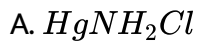
9. Amongst TiF_6^{2-} , CoF_6^{3-} , Cu_2Cl_2 and $NiCl_4^{2-}$ (Atomic number Ai = 22, Co = 27, Cu = 29, Ni = 28). The colourless species are



Answer: D

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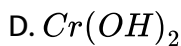
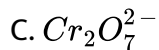
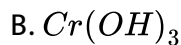
10. Calomel reacts with NH_4OH to give



Answer: A

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11. $K_2Cr_2O_7$ on heating with aqueous NaOH gives



Answer: A

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12. Reaction between the following pairs will produce H_2 except

A. Na + ethyl alcohol

B. Fe + steam

C. $Fe + H_2SO_4(aq.)$

D. $Cu + HCl(aq.)$

Answer: D



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13. Bell metal is an alloy of

A. Cu , Zn and Sn

B. Cu , Zn and Ni

C. Cu and Zn

D. *Cu* and *Sn*

Answer: D



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14. Percentage of silver in German silver is

A. 0 %

B. 1 %

C. 5 %

D. None of these

Answer: A



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15. The most convenient method to protect the bottom of the ship made of iron is

- A. White tin plating
- B. Coating with red lead oxide
- C. Connecting with 'Pb' block
- D. Connecting with 'Mg' block

Answer: A



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

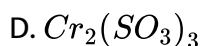
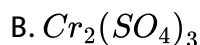
- A. NO_2 is reduced in preference of H_3O^+
- B. HNO_3 is weaker acid than H_2SO_4 and HCl
- C. Zn acts as oxidizing agent when reacts with HNO_3
- D. In electrochemical series Zn is placed above the hydrogen

Answer: B

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17. Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it.

This is due to the formation of



Answer: B

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18. which of the following elements is present as the impurity to the maximum extent in the pig iron?

A. Phosphorus

B. Manganese

C. Carbon

D. Silicon

Answer: C

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19. Which of the statements is not true ?

A. On passing H_2S through acidified $K_2Cr_2O_7$ solution, a milky colour is observed

B. $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis

C. $K_2Cr_2O_7$ solution in acidic medium is orange

D. $K_2Cr_2O_7$ solution becomes yellow on increasing the pH beyond 7

Answer: B



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20. Which of the following statements about the interstitial compounds is incorrect?

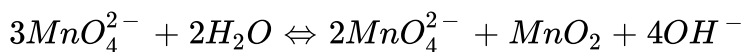
- A. They have higher melting points than the pure metal
- B. They retain metallic conductivity
- C. They are chemically reactive
- D. They are much harder than the pure metal

Answer: C



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21. $KMnO_4$ can be prepared from K_2MnO_4 as per the reaction



The reaction can go to completion by removing OH^- ions by adding.

A. SO_2

B. HCl

C. KOH

D. CO_2

Answer: D

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22. Which of the following does not give oxygen on heating?

A. $(NH_4)_2Cr_2O_7$

B. $KClO_3$

C. $Zn(ClO_3)_2$

D. $K_2Cr_2O_7$

Answer: A

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23. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives

A. Mn^{2+} and O_3

B. Mn^{4+} and MnO_2

C. Mn^{4+} and O_2

D. Mn^{2+} and O_2

Answer: D



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24. When copper is heated with conc. HNO_3 it produces

A. $Cu(NO_3)_2$ and NO_2

B. $Cu(NO_3)_2$ and NO

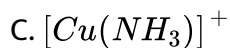
C. $Cu(NO_3)_2$, NO and NO_2

D. $Cu(NO_3)_2$ and N_2O

Answer: A

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25. On adding excess of NH_3 solution to $CuSO_4$ solution, the dark blue colour is due to

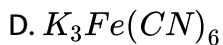
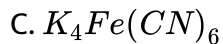


D. None of the above

Answer: A

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26. Which one of the following compounds is not colored?

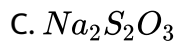
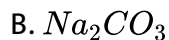
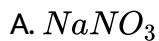


Answer: B



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27. Which of the following does not react with $AgCl$?



Answer: A



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28. The metal which is present in brass, bronze and German silver is

A. Zn

B. Mg

C. Cu

D. Al

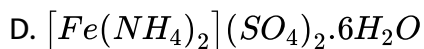
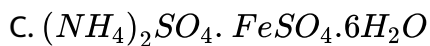
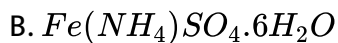
Answer: C



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29. Mohr's salt is

A. $FeSO_4 \cdot 7H_2O$



Answer: C

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30. The compound insoluble in water is

A. Mercurous nitrate

B. Mercuric nitrate

C. Mercurous chloride

D. Mercurous perchlorate

Answer: C

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31. F_2 is formed by reacting K_2MnF_6 with

- A. SbF_5
- B. MnF_3
- C. $KSbF_6$
- D. MnF_4

Answer: A

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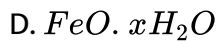
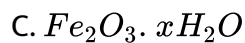
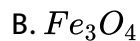
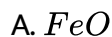
32. The colour of $(NH_4)_2SO_4Fe_2(SO_4)_3 \cdot 24H_2O$ is

- A. White
- B. Green
- C. Violet
- D. Blue

Answer: B

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33. Write the chemical formula of rust.



Answer: C

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34. Verdigris is

A. Basic copper acetate

B. Basic lead acetate

C. Basic lead

D. None of these

Answer: A



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35. Mac Arthur process is used for

A. *Hg*

B. *Fe*

C. *Cl*

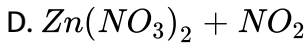
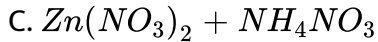
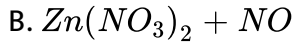
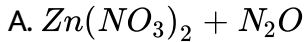
D. *O₂*

Answer: A



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36. Reduction of zinc with cold and very dilute nitric acid yields



Answer: C



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37. Best quality of steel is manufactured by

A. Siemen-Martin's open hearth process

B. Electrical process

C. Bessemer process

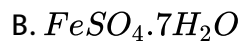
D. Blast furnace

Answer: B



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38. Green vitriol is

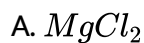


Answer: B



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39. Which of the following compounds volatilises on heating



B. $HgCl_2$

C. $CaCl_2$

D. $FeCl_3$

Answer: B



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40. Purest form of iron is

A. Cast iron

B. Wrought iron

C. Hot steel

D. Stainless steel

Answer: B



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41. Purple of Cassius is

- A. Gold sol
- B. Silver sol
- C. Copper sol
- D. Platinum sol

Answer: A



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42. Steel becomes soft and pliable by

- A. Annealing
- B. Nitriding
- C. Tempering
- D. Case hardening

Answer: A

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43. On heating copper nitrate strongly the compound obtained is

- A. Copper
- B. Copper oxide
- C. Copper nitrate
- D. Copper nitride

Answer: B

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44. Copper sulphate is commercially made from copper scraps by

- A. Dissolving in hot conc. H_2SO_4

B. The action of dil. H_2SO_4 and air

C. Heating with sodium sulphate

D. Heating with sulphur

Answer: B

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45. From aqueous solution of $ZnSO_4$, normal zinc carbonate may be precipitated by

A. Boiling with $CaCO_3$

B. Adding Na_2CO_3

C. Adding $NaHCO_3$

D. Passing CO_2

Answer: C

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46. Blood haemoglobin contains the metal

A. Al

B. Mg

C. Cu

D. Fe

Answer: D



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47. Which of the following metals will not react with a solution of $CuSO_4$

A. Fe

B. Zn

C. Mg

D. Hg

Answer: D



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48. $AgCl$ when heated with Na_2CO_3 gives

A. Ag_2O

B. Ag

C. Ag_2CO_3

D. $NaAgCO_3$

Answer: B



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49. A copper coin is completely covered with a gold film and is placed in dilute HNO_3 . This will result in formation of

- A. Gold nitrate
- B. Copper nitrate
- C. Nond of these
- D. Purple of cassius

Answer: C

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50. When copper turnings and concentrated HCl is heated with copper sulphate the compound formed is

- A. Cupric chloride
- B. Cuprous chloride
- C. Copper sulphate
- D. SO_2

Answer: B

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51. The compound of copper which turns green on keeping in air is

A. Copper sulphate

B. Copper nitrate

C. Cupric chloride

D. Cuprous chloride

Answer: D

 [Watch Video Solution](#)

52. $CuCl_2$ with HCl in the presence of oxidising agents gives

A. $CuCl_2$

B. H_2CuCl_2

C. Hydrogen gas

D. Chlorine gas

Answer: A

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53. Silver nitrate is prepared by

A. The action of only conc. HNO_3 on silver

B. Heating silver oxide with NO_2

C. The action of hot dil. HNO_3 on silver

D. Dissolve Ag in aqua-regia

Answer: C

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54. Which one of the following is known as lunar caustic when in fused state

- A. Silver nitrate
- B. Silver sulphate
- C. Silver chloride
- D. Sodium sulphate

Answer: A



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55. Silver nitrate is supplied in coloured bottles because it is

- A. Oxidising in air
- B. Decomposes in sunlight
- C. Explosive in sunlight
- D. Reactive towards air in sunlight

Answer: B

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56. A nitrate when mixed with common salt gives a white precipitate which is soluble in dilute NH_4OH . It is the nitrate of

- A. Copper
- B. Mercury
- C. Silver
- D. Gold

Answer: C

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57. Blister copper is

- A. Pure copper
- B. Ore of copper
- C. Alloy of copper
- D. 1 % impure copper

Answer: D

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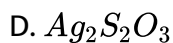
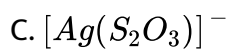
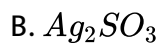
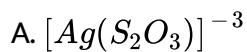
58. The process of zinc-plating on iron sheet is known as

- A. Aneling
- B. Roasting
- C. Galvanization
- D. Smelting

Answer: C

 [View Text Solution](#)

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



Answer: A



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60. Most stable oxidation state of iron is

A. +2

B. +3

C. -2

D. - 3

Answer: B



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61. Spelter is

A. Impure Cu

B. Impure Zn

C. Zn O

D. CuO

Answer: B



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62. Silver nitrate is mainly used

- A. In photography
- B. In model formation
- C. As reducing agent
- D. As dehydrating agent

Answer: A

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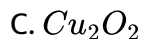
63. The form of iron obtained from blast furnace is:

- A. Wrough iron
- B. Cast iron
- C. Pig iron
- D. Steel

Answer: C

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64. An extremely hot copper wire reacts with steam to give



Answer: B



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65. What is the effect of shaking dil. H_2SO_4 with small quantity of anhydrous $CuSO_4$

A. The white solid dissolves to form a colourless solution

B. The white solid dissolves to form a green solution

C. The white solid turns blue but does not dissolve

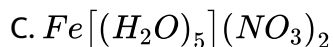
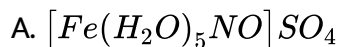
D. The white solid dissolves to form a blue solution

Answer: D

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66. When concentrated sulphuric acid is added slowly to a solution of ferrous sulphate containing nitrate ion, a brown colour ring is formed.

The compositionn of the ring is

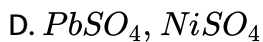
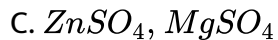
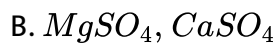
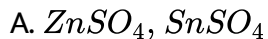


D. None of these

Answer: A

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67. Crystals of which pair are isomorphous



Answer: C



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68. From a solution of $CuSO_4$ the metal used to recover copper is

A. Sodium

B. Iron

C. Silver

D. Hg

Answer: B

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69. Which of the following imparts green colour to the glass

- A. Cu_2O
- B. CdS
- C. MnO_2
- D. Cr_2O_3

Answer: D

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70. Correct formula of calomel is

- A. Hg_2Cl_2

B. $HgCl_2$

C. $HgCl_2 \cdot H_2O$

D. $HgSO_4$

Answer: A

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71. Hydrogen is not obtained when zinc reacts with

A. Cold water

B. Dilute H_2SO_4

C. Dilute HCl

D. Hot 20 % $NaOH$

Answer: A

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72. Zinc when reacted with excess of NaOH gives

- A. Zinc hydroxide
- B. Zinc oxide
- C. Di sodium zincate
- D. Sodium zincate

Answer: D



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73. The metal which is the best conductor of electricity is

- A. Iron
- B. Copper
- C. Silver
- D. Aluminium

Answer: C



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74. When silver nitrate is heated to red hot, what is formed

A. Ag

B. Ag_2O

C. Ag_2O_3

D. AgO_2

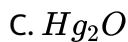
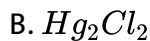
Answer: A



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75. The formula of corrosive sublimate is

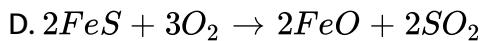
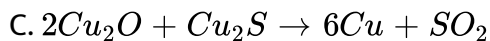
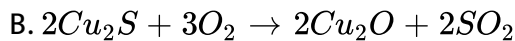
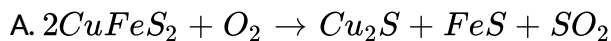
A. $HgCl_2$



Answer: A

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76. In the extraction of Cu the reaction takes place Bessemer converter is:



Answer: C

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77. When Cu reacts with $AgNO_3$ solution, the reaction takes place is

- A. Oxidation of Cu
- B. Reduction of Cu
- C. Oxidation of Ag
- D. Reduction of NO_3^-

Answer: A



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78. KI and $CuSO_4$ solution when mixed give .

- A. $CuI_2 + K_2SO_4$
- B. $Cu_2I_2 + K_2SO_4$
- C. $K_2SO_4 + Cu_2I_2 + I_2$
- D. $K_2SO_4 + CuI_2 + I_2$

Answer: C

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79. Which of the following dissolves in hot concentrated NaOH solution?

A. Fe

B. Zn

C. Sn

D. Ag

Answer: B::C

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80. In *Mac Arthur Forest* method, silver is extracted from the solution of

$Na[Ag(CN)_2]$ by the use of

A. Fe

B. Mg

C. Cu

D. Zn

Answer: D

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81. Blue vitriol is :-

A. $CuSO_4$

B. $CuSO_4 \cdot 5H_2O$

C. Cu_2SO_4

D. $CuSO_4 \cdot H_2O$

Answer: B

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82. Aqueous solution of ferric chloride is

- A. Acidic
- B. Basic
- C. Neutral
- D. Amphoteric

Answer: A



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83. Reaction of solid $KMnO_4$ with conc. H_2SO_4 produces manganese heptoxide (Mn_2O_7) in

- A. Solution state
- B. Solid state
- C. Fine powder

D. None of these

Answer: A



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84. Which is mild oxidising agent?

A. Ag_2O

B. $KMnO_4$

C. $K_2Cr_2O_7$

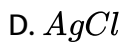
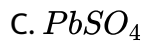
D. Cl_2

Answer: A



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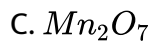
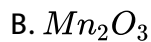
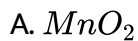
85. A white powder soluble in NH_4OH but insoluble in water is



Answer: D

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86. Which of the oxide of manganese is amphoteric



Answer: A

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87. In the electrolytic purification of copper some gold is found in the

- A. Cathode
- B. Cathode mud
- C. Anode mud
- D. Electrolyte

Answer: C



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88. For making Ag from $AgNO_3$, Which of the following is used?

- A. PH_3
- B. AsH_3
- C. Na_2CO_3

D. NH_3

Answer: A

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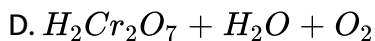
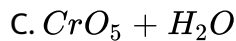
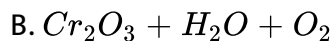
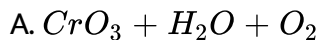
89. Emery consists of

- A. Impure corundum
- B. Impure carborundum
- C. Impure graphite
- D. Purest form of iron

Answer: A

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90. Acidified solution of chromic acid on treatment with hydrogen peroxide yields



Answer: C



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91. In the metallurgy of Zn the Zn dust obtained from roasting and reduction of zinc sulphide contains some ZnO. It is removed by

A. Absorbance of ultraviolet light and re-emission of white light is employed

B. Shock cooling by contact with a shower of molten lead is done

C. X-ray method is used

D. Smelting is employed

Answer: D



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92. Annealing is

A. Heating steel in nitrogen and cooling

B. Heating steel to bright redness and then cooling slowly

C. Heating wrought iron with carbon to redness

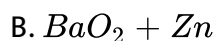
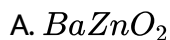
D. Heating steel to high temperature and cooling suddenly by plunging in water

Answer: B



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93. ZnO when heated with BaO at $1100^{\circ}C$ gives a compound. Identify the compound



Answer: A



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94. When metallic copper comes in contact with moisture, a green powdery/pasty coating can be seen over it. This is chemically known as

A. Copper sulphide - Copper carbonate

B. Copper carbonate - Copper sulphate

C. Copper carbonate - Copper hydroxide

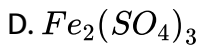
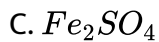
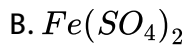
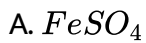
D. Copper Sulphate - Copper sulphide

Answer: C



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95. Formula of ferric sulphate is



Answer: D



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96. When $CuSO_4$ is hydrated, then it becomes

A. Acidic

B. Basic

C. Neutral

D. Amphoteric

Answer: D

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97. Silvering of mirror is done by

A. $AgNO_3$

B. Ag_2O_3

C. Fe_2O_3

D. Al_2O_3

Answer: A

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98. Mond's process is used for

A. Ni

B. Al

C. Fe

D. Cu

Answer: A



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99. Hydroxide soluble in ammonia is

A. $Al(OH)_3$

B. $Fe(OH)_3$

C. $Cr(OH)_3$

D. $Cu(OH)_2$

Answer: D

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100. Stainless steel is an alloy steel of the following metals

A. Fe only

B. Cr and Ni

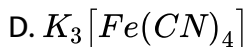
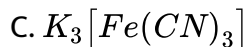
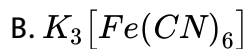
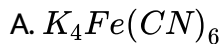
C. W and Cr

D. Ni and Be

Answer: B

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101. Correct formula of potassium ferricyanide is

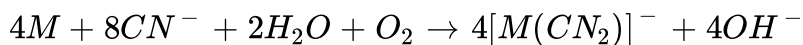


Answer: B



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102. In the equation



The metal M is

A. Copper

B. Iron

C. Gold

D. Zinc

Answer: C

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103. How many moles of iodine are liberated when 1 mole potassium dichromate reacts with potassium iodide?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: C

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104. A developer used in photography is-

- A. A weak acid
- B. A weak base
- C. A mild reducing agent
- D. An oxidizing agent

Answer: C

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105. In acidic medium, CrO_4^{2-} changes to

- A. $Cr_2O_7^{2-}$
- B. Cr^{3+}
- C. $Cr(IV)$
- D. Cr_2O_3

Answer: A

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106. Which of the following metal gives hydrogen gas, when heated with hot concentrated alkali

A. Cu

B. Ag

C. Zn

D. Ni

Answer: C



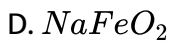
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107. When ferric oxide reacts with $NaOH$, the product formed is

A. NaF

B. $FeCl_3$

C. $Fe(OH)_3$

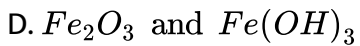
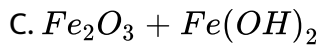
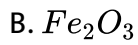
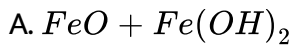


Answer: C



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108. Rust is



Answer: C



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109. $[Sc(H_2O)_6]^{3+}$ ion is

- A. Colourless and diamagnetic
- B. Coloured and octahedral
- C. Colourless and paramagnetic
- D. Coloured and paramagnetic

Answer: A

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110. Invar, an alloy of Fe and Ni is used in watches and meter scale, its characteristic property is

- A. Small coefficient of expansion
- B. Resistance to corrosion
- C. Hardness and elasticity
- D. Magnetic nature

Answer: A

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111. Super conductors are derived from compound of:

- A. p-block elements
- B. Lanthanides
- C. Actinides
- D. Transition elements

Answer: D

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112. The compound $ZnFe_2O_4$ is

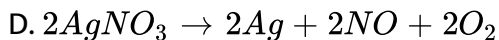
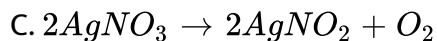
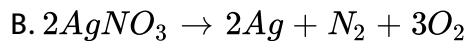
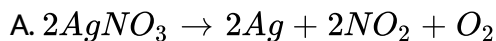
- A. A normal spinel compound
- B. Interstitial compound
- C. Covalent compound

D. Co-ordination compound

Answer: A

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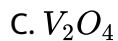
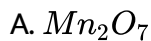
113. Which one of the following reactions will occur on heating $AgNO_3$ above its melting point?



Answer: C

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114. Which one of the following is an amphoteric oxide ?



Answer: C::D



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115. The term plating is

A. Platinum painting

B. Flat sheet of platinum

C. Platinum manufacturing

D. Platinum used as a catalyst

Answer: C



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116. If steel is heated to a temperature well below red hot and is then cooled slowly, the process is called

- A. Tempering
- B. Hardening
- C. Softening
- D. Annealing

Answer: A



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117. Ferrosilicon is used in steel industry as

- A. A flux
- B. Scavenger of hydrogen
- C. A reducing agent
- D. Alloying agent

Answer: D

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118. In the reaction,

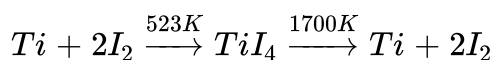
$2KMnO_4 + 16HCl \rightarrow 5Cl_2 + 2MnCl_2 + 2KCl + 8H_2O$ the reduction product is

- A. Cl_2
- B. $MnCl_2$
- C. H_2O
- D. KCl

Answer: B

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119. Which method of purification is represented by the following equations

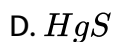
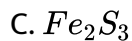


- A. Cupellation
- B. Poling
- C. Electrolytic refining
- D. Van-Arkel process

Answer: D

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120. Which of the following sulphides when heated strongly in air gives the corresponding metal?

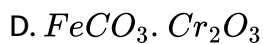
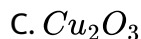
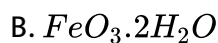
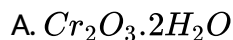


Answer: D



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121. Guignet's green is known as



Answer: A

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122. Vanadium (III) oxide is a strong

- A. Drying agent
- B. Oxidising agent
- C. Reducing agent
- D. Wetting agent

Answer: C

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123. When excess ammonia is added to $CuSO_4$ solution the deep blue complex obtained is

- A. Tetrahedral and Paramagnetic
- B. Tetrahedral and Diamagnetic
- C. Square Planar and Diamagnetic
- D. Tetrahedral and Ferromagnetic

Answer: D

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124. The following is known as "Bordeaux mixture"

- A. Borax and copper sulphate
- B. Orthoboric acid and ferrous sulphate
- C. Sodium borate and zinc sulphate
- D. Copper sulphate and lime

Answer: D

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125. A transition metal A has 'spin-only' magnetic moment value of 1.8 Bm. When it is reacted with dilute sulphuric acid in the presence of air, its compound B is formed. B reacts with compound C to give compound D with the liberation of iodine. Then the metal A and compounds B, C and D are respectively

A. *Ti, TiSO₄, KI and TiI₂*

B. *Zn, ZnSO₄, KI and Zn₂I₂*

C. *Cu, CuSO₄, KI and Cu₂I₂*

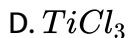
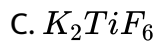
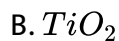
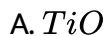
D. *Cu, CuSO₄, Cu₂I₂ and CuI₂*

Answer: C



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126. The titanium (atomic number 22) compound that does not exist is

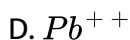
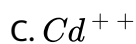
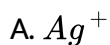


Answer: D



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127. Ammonia is a Lewis base. It forms complexes with cations. Which one of the following cations does not form complex with ammonia



Answer: D

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128. In the laboratory, manganese (II) salt is oxidized to permanganate ion in aqueous solution by

- A. Hydrogen peroxide
- B. Conc. Nitric acid
- C. Peroxy disulphate
- D. Dichromate

Answer: C

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129. An alloy which does not contain copper is

- A. Solder
- B. Bronze

C. Brass

D. Bell metal

Answer: A



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130. Which silver halide is used in medicine

A. $AgNO_3$

B. $AgCl$

C. $AgBr$

D. AgF

Answer: A



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131. Which can be reduced to the metal by heating it in a stream of hydrogen

- A. Copper (II) oxide
- B. Magnesium oxide
- C. Aluminium oxide
- D. Calcium oxide

Answer: A



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132. Oxygen gas can be prepared from solid $KMnO_4$ by

- A. Strongly heating the solid
- B. Treating the solid with H_2 gas
- C. Dissolving the solid in dil. H_2SO_4
- D. Dissolving the solid in dil. HCl

Answer: A



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133. Soil containing both Al and Fe is called

- A. Laterite
- B. Bauxite
- C. Pedalfers
- D. Clay

Answer: C



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134. The form of iron having the highest carbon content is

- A. Cast iron

B. Wrought iron

C. Strain steel

D. Mild steel

Answer: A

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135. Which of the following is more soluble in ammonia ?

A. $AgCl$

B. $AgBr$

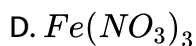
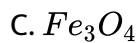
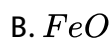
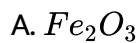
C. AgI

D. None of these

Answer: A

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136. Pure conc. HNO_3 makes iron passive as the surface is covered with protective layer of



Answer: C



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137. Which one of the following reacts with concentrated sulphuric acid



Answer: B::D

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138. $AgCl$ dissolved in excess of NH_3 , KCN and $Na_2S_2O_3$ solutions the complex produces ions

- A. $[Ag(NH_3)_2]^+$, $[Ag(CN)_2]^+$ and $[Ag(S_2O_3)_2]^{3-}$
- B. $[Ag(NH_3)_2]^{2+}$, $[Ag(CN)_2]^{3-}$ and $[Ag(S_2O_3)_2]^{2-}$
- C. $[Ag(NH_3)_4]^{2+}$, $[Ag(CN)_2]^{3-}$ and $[Ag(S_2O_3)_2]^{2-}$
- D. $[Ag(NH_3)_2]^+$, $[Ag(CN)_2]^-$ and $[Ag(S_2O_3)_2]^{3-}$

Answer: D

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139. Which of the following statements is corrected about equivalent weight of $KMnO_4$?

- A. It is one third of its molecular weight in alkaline medium
- B. It is one fifth of its molecular weight in alkaline medium
- C. It is equal to its molecular weight in acidic medium
- D. It is one third of its molecular weight in acidic medium

Answer: A

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140. The reddish brown gas produced by heating KCl with solid $K_2Cr_2O_7$ and conc. H_2SO_4 is

- A. Cl_2
- B. CrO_2Cl_2
- C. CrO_3
- D. H_2CrO_4

Answer: B

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141. $AgCl$ dissolves in a solution of NH_3 but not in water because

- A. NH_3 is a better solvent than H_2O
- B. Ag^+ forms a complex ion with NH_3
- C. NH_3 is a stronger base than H_2O
- D. The dipole moment of water is higher than NH_3

Answer: B

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142. The most stable oxidation state of copper is

- A. +1
- B. +2
- C. +3

D. +4

Answer: B

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143. Which of the following property is not expected to be shown by copper

- A. High thermal conductivity
- B. Low electrical conductivity
- C. Ductility
- D. Malleability

Answer: B

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144. Nickel steel contain % of Ni

A. 1 – 5 %

B. 3 – 5 %

C. 6 – 5 %

D. 8 – 5 %

Answer: B



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145. The chief constituents of steel made in India are

A. Mn and Cr

B. Al and Zn

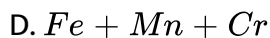
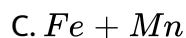
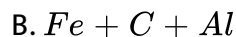
C. V and Co

D. Ni and Mg

Answer: A

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146. Steel contains



Answer: A

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147. Silver halides are used in photography because they are

A. They are photosensitive

B. Soluble in hypo

C. Soluble in NH_4OH

D. Soluble in acids

Answer: A

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148. The alloy of steel that is used in making automobile parts and utensils

A. Stainless steel

B. Nickel steel

C. Tungsten steel

D. Chromium steel

Answer: A

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149. The colour of $K_2Cr_2O_7$ changes from red-orange to lemon-yellow on treatment with $KOH_{(aq.)}$, because of:

- A. The readuction of Cr^{VI} to Cr^{III}
- B. The formation of chromium hydroxide
- C. The conversion of dichromate to chromate
- D. The oxidation of potassium hydroxide to potassium peroxide

Answer: C



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150. In the cyanide process for the extraction of silver, sodium cyanide is used to

- A. Convert silver into a soluble silver complex
- B. Reduce silver

C. Precipitate silver

D. Oxidise silver

Answer: A

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151. The passivity of iron in concentrated nitric acid is due to

A. Ferric nitrate coating on the metal

B. Ammonium coating on the metal

C. A thin oxide layer coating on the metal

D. A hydride coating on the metal

Answer: C

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152. Rusting on iron needs

- A. Dry air
- B. Air and water
- C. Distilled water and carbon dioxide
- D. Oxygen and carbon dioxide

Answer: B



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153. MnO_4^{2-} on reduction in acidic medium forms

- A. MnO_2
- B. Mn^{++}
- C. MnO_4^-
- D. Mn

Answer: B

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154. $AgNO_3$ gives red ppt. with.

A. KI

B. $NaBr$

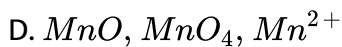
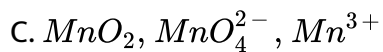
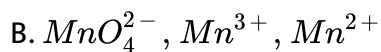
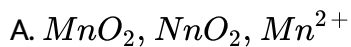
C. $NaNO_3$

D. K_2CrO_4

Answer: D

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155. Potassium permanganate acts as an oxidant in neutral, alkaline as well as acidic media. The final product obtained from it in three condition are respectively:



Answer: A



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156. In acidic medium one mole of MnO_4^- accepts how many moles of electrons in a redox process?

A. 1

B. 3

C. 5

D. 6

Answer: C

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157. In acidic medium potassium dichromate acts as an oxidant according to the equation,

$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$. What is the equivalent weight of $K_2Cr_2O_7$? (mol. Wt. = M)

- A. M
- B. $M/2$
- C. $M/3$
- D. $M/6$

Answer: D

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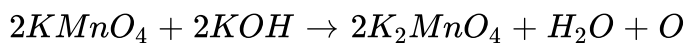
158. The protection of steel by chrome plating is due to

- A. Cathodic protection
- B. Anodic protection
- C. Covering of steel surface
- D. Formation of alloy with iron

Answer: A

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159. In alkaline medium, $KMnO_4$ reacts as follows



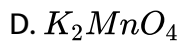
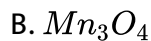
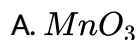
Therefore, the equivalent mass of $KMnO_4$ will be

- A. 31.5
- B. 52.7
- C. 72.0
- D. 158.0

Answer: D

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160. Manganese achieves its highest oxidation state in its compound



Answer: C

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161. Which of the following metal forms an amphoteric oxide



B. Fe

C. Cu

D. Zn

Answer: D



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162. Iron is rendered passive by treatment with concentrated

A. Conc. HCl

B. Conc. HNO_3

C. Conc. H_2SO_4

D. Conc. H_3PO_4

Answer: B



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163. The colour of zinc sulphide is

- A. White
- B. Black
- C. Brown
- D. Red

Answer: A



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164. Cuprite contains

- A. Cu_2S
- B. $CuFeS$
- C. $Cu(OH)_2 \cdot CuCO_3$
- D. Cu_2O

Answer: D



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165. Which of the following ions will give a colourless aqueous solution



Answer: C



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166. Zinc reacts with hot and concentrated H_2SO_4 to give



B. SO_2

C. SO_3

D. H_2S

Answer: B



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167. Which metal is electro-deposited on iron surface to prevent rusting

A. Cu

B. Zn

C. Mg

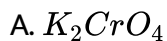
D. Pb

Answer: B



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168. In which of the following ionic radii of chromium would

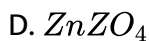
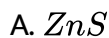


Answer: A



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169. A compound of Zinc which is white in cold state and yellow in hot state, is



Answer: B

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170. What is the product obtained when MnO_2 solution is boiled with PbO_2 and concentrated HNO_3

A. MnO_2

B. $HMnO_4$

C. Mn_3O_4

D. $PbMnO_4$

Answer: B

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171. Acidified potassium dichromate is treated with hydrogen sulphide. In the reaction, the oxidation number of chromium

A. Increases from +3 to +6

B. Decreases from +6 to +3

C. Remains unchanged

D. Decreases from +6 to +2

Answer: B

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172. The correct formula of permanganic acid is

A. $HMnO_4$

B. $HMnO_5$

C. H_2MnO_4

D. H_2MnO_3

Answer: A

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173. The equivalent weight of potassium permanganate in acid solution is

- A. 158
- B. 31.6
- C. 52.16
- D. 79

Answer: B



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174. Which statement is not correct

- A. Potassium permanganate is a powerful oxidising substance
- B. Potassium permanganate is a weaker oxidising substance than potassium dichromate

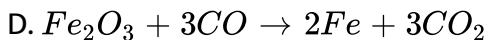
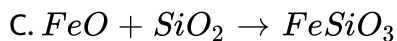
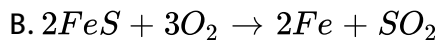
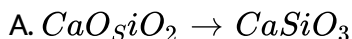
C. Potassium permanganate is a stronger oxidising substance than potassium dichromate

D. Potassium dichromate oxidises a secondary alcohol into a ketone

Answer: B

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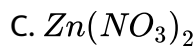
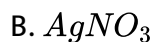
175. In smelting of iron, which of the following reactions takes place in Blast furnace at $400^{\circ}C - 600^{\circ}C$



Answer: D

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176. Colourless solutions of the following four salts are placed separately in four different test tubes and a strip of copper is dipped in each one of these. Which solution will turn blue?

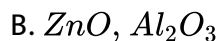
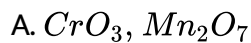


Answer: B



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177. A group of acidic oxide is



C. CaO , ZnO

D. Na_2O , Al_2O_3

Answer: A

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178. Silver nitrate on heating gives

A. AgO and NO_2

B. AgO , NO and O_2

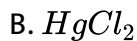
C. Ag and NO_2

D. Ag , NO_2 and O_2

Answer: D

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179. Out of following which compound is used for preservation of wood

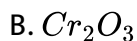


Answer: C



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180. When conc. HCl is added to the solution of $Cr(NO_3)_2$, then it slowly turns green due to formation of the following

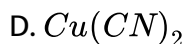
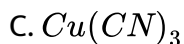
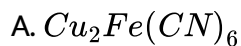


D. Chlorocomplex

Answer: B

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181. When $CuSO_4$ solution is added to $K_4[Fe(CN)_6]$, the formula of the product formed is



Answer: A

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182. Which element on reaction with HNO_3 gives five different products

A. Fe

B. Cu

C. Na

D. Zn

Answer: B

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183. Which of the following is also known as "Fools gold"

A. Wurtzite

B. Iron pyrites

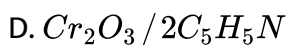
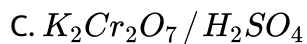
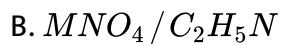
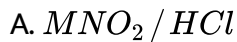
C. Chalcosite

D. Silver glance

Answer: B

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184. Collin's reagent is

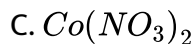
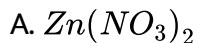


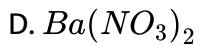
Answer: D



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185. Which compound has coloured aqueous solution

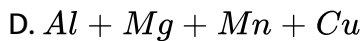
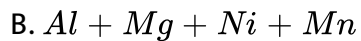
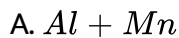




Answer: C

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186. Duralumin is an alloy of



Answer: D

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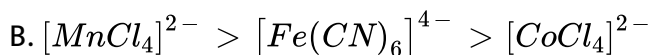
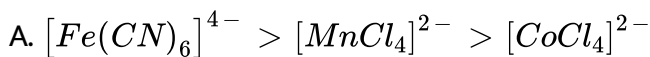
187. Which one of the following statements is correct

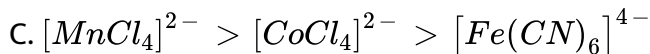
- A. Manganese salts give violet borax bead test in the reducing flame
- B. From a mixed precipitate of $AgCl$ and AgI ammonia solution dissolves only $AgCl$
- C. Ferric ion give a deep green precipitate on adding potassium ferrocyanide solution
- D. On boiling a solution having K^+ , Ca^{2+} and HCO_3^- ions we get a precipitate of $K_2Ca(CO_3)_2$

Answer: B

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





Answer: C

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189. Excess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the following statement is incorrect for this reaction ?

A. $Na_2S_2O_3$ is oxidised

B. CuI_2 is formed

C. Cu_2I_2 is formed

D. Evolved I_2 is reduced

Answer: B

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

- A. Ferrous oxide is more basic in nature than the ferric oxide
- B. Ferrous compounds are relatively more ionic than the corresponding ferric compounds
- C. Ferrous compounds are less volatile than the corresponding ferric compounds
- D. Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds

Answer: D



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191. The purple colour of $KMnO_4$ is due to

A. Charge transfer

B. d-d transition

C. f-f transition

D. d-f transition

Answer: A

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192. Dipping iron article into a strongly alkaline solution of sodium phosphate :

A. Does not affect the article

B. Forms $Fe_2O_3 \cdot xH_2O$ on the surface

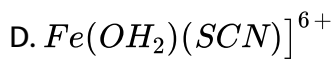
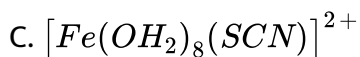
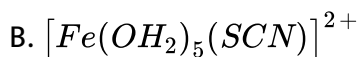
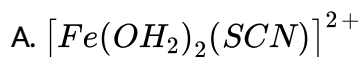
C. Forms iron phosphate film

D. Form ferric hydroxide

Answer: C

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193. When SCN^- is added to an aqueous solution containing $Fe(NO_3)_3$, the complex ion produced is



Answer: B

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194. Identify the statement which is not correct regarding $CuSO_4$?

A. It reacts with KI to give iodine

B. It reacts with KCl to give Cu_2Cl_2

C. It reacts with $NaOH$ and glucose to give Cu_2O

D. It give CuO on strong heating in air

Answer: B

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195. The metal oxide which decomposes on heating, is:

A. SnO

B. Al_2O_3

C. CuO

D. HgO

Answer: D

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196. In the reduction of dichromate by Fe(II), the number of electrons involved per chromium atom is :-

- A. 2
- B. 3
- C. 4
- D. 1

Answer: B



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197. CrO_3 dissolves in aqueous NaOH to give:

- A. CrO_4^{2-}
- B. $Cr(OH)_3^-$
- C. $Cr_2O_7^{2-}$
- D. $Cr(OH)_2$

Answer: A

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198. Which of the following is the green coloured powder produced when ammonium dichromate is used in fire works

A. Cr

B. CrO_3

C. Cr_2O_3

D. $CrO(O_2)$

Answer: C

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199. Which of the following is used as indelible ink

A. Aq. $CuSO_4$ solution

B. Aq. $AgNO_3$ solution

C. Aq. $NaCl$ solution

D. Aq. $NaOH$ solution

Answer: B

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200. The co-ordination compound of which one of the following compositions will produce two equivalents of $AgCl$ on reaction with aqueous silver nitrate solution

A. $CoCl_3 \cdot 3NH_3$

B. $CoCl_3 \cdot 6NH_3$

C. $CoCl_3 \cdot 4NH_3$

D. $CoCl_3 \cdot 5NH_3$

Answer: D



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201. Railway wagon axles are made by heating rods of iron embedded in charcoal powder. The process is known as

- A. Case hardening
- B. Sheradizing
- C. Annealing
- D. Tempering

Answer: A



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202. The least stable oxide at room temperature is

A. ZnO

B. CuO

C. Sb_2O_3

D. Ag_2O

Answer: D

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203. $4K_2Cr_2O_7 \xrightarrow{\text{heat}} 4K_2CrO_4 + 3O_2 + X$. In the above reaction X is

A. CrO_3

B. Cr_2O_7

C. Cr_2O_3

D. CrO_5

Answer: C

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204. The extraction of which of the following metals involves bessemerisation?

A. Fe

B. Ag

C. Al

D. Cu

Answer: D



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205. In which of the following processes, platinum is used as a catalyst

A. Oxidation of ammonia to form HNO_3

B. Hardening of oils

C. Production of synthetic rubber

D. Synthesis of methanol

Answer: A

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206. Iron is dropped in dil. HNO_3 , it gives

- A. Ferric nitrate
- B. Ferric nitrate and NO_2
- C. Ferrous nitrate and ammonium nitrate
- D. Ferrous nitrate and nitric oxide

Answer: C

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207. The metal present in insulin is

A. Iron

B. Cobalt

C. Zinc

D. Manganese

Answer: C



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208. Which one of the following is a wrong statement about cast iron

A. It is also called pig iron

B. It contains about 4.5 % carbon

C. It is corrosion resistant

D. It contracts on cooling

Answer: D



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209. Which of the following is wrongly matched

A. German silver $Cu + Zn + Ni$

B. Alnico $Fe + Al + Ni + Co$

C. Monel metal $Cu + Zn + zn$

D. Duralumin $Al + Cu + Mg + Mn$

Answer: C



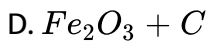
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210. Carbon monoxide reacts with iron to form

A. $Fe(CO)_5$

B. $FeCO_3$

C. $FeO + C$



Answer: A::D



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211. The reaction, which forms nitric oxide, is

A. C and N_2O

B. Cu and N_2O

C. Na and NH_3

D. Cu and HNO_3

Answer: D



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212. A cuprous ore among the following is :

- A. Cuprite
- B. Malachite
- C. Chalcopyrites
- D. Azurite

Answer: A

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213. Iron loses magnetic property at

- A. Melting point
- B. 1000 K
- C. Curie point
- D. Boiling point

Answer: C

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214. Heat treatment alters the properties of steel due to

- A. Chemical reaction on heating
- B. Partial rusting
- C. Change in the residual energy
- D. Change in the lattice structure due to differential rate of cooling

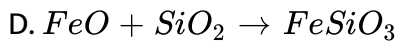
Answer: D



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215. Identify the reaction that does not take place during the smelting process of copper extraction

- A. $2FeS + 3O_2 \rightarrow 2FeO + 2SO_2 \uparrow$
- B. $Cu_2O + FeS \rightarrow Cu_2S + FeO$
- C. $2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2 \uparrow$



Answer: C

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216. Which metal is used to make alloy steel for armour plates, safes and helmets

A. Al

B. Mn

C. Cr

D. Pb

Answer: B

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217. Stainless steel does not rust because

- A. Chromium and nickel combine with iron
- B. Chromium forms an oxide layer and protects iron from rusting
- C. Nickel present in it, does not rust
- D. Iron forms a hard chemical compound with chromium present in it

Answer: B



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218. The main product obtained when a solution of sodium carbonate reacts with mercuric chloride is

- A. $Hg(OH)_2$
- B. $HgCO_3 \cdot HgO$
- C. $HgCO_3$
- D. $HgCO_3 \cdot Hg(OH)_2$

Answer: B

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219. Hydrogen gas is not liberated when the following metal is added to dil. HCl :

A. Mg

B. Sn

C. Ag

D. Zn

Answer: C

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220. Carbon cannot reduce Fe_2O_3 to Fe at a temperature below 983K because.

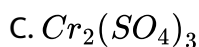
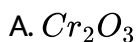
- A. Carbon monoxide formed is thermodynamically less stable than ferric oxide
- B. Carbon has a higher affinity towards oxidation than iron
- C. Free energy change for the formation of carbon dioxide is less negative than that for ferric oxide
- D. Iron has a higher affinity oxygen than carbon

Answer: B



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221. When H_2O_2 is shaken with an acidified solution of $K_2Cr_2O_7$ in the presence of ether, the ethereal layer turns blue due to the formation of



D. CrO_5

Answer: D

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222. The orange solid on heating gives a colourless gas and a green solid which can be reduced to metal by aluminium powder. The orange and the green solids are respectively

A. $(NH_4)_2Cr_2O_7$ and Cr_2O_3

B. $Na_2Cr_2O_7$ and Cr_2O_3

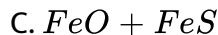
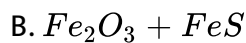
C. $K_2Cr_2O_7$ and CrO_3

D. $(NH_4)_2Cr_2O_4$ and CrO_3

Answer: A

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223. Red hot iron absorbs SO_2 giving the product

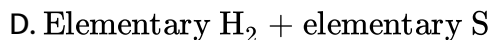
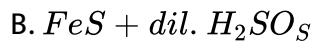
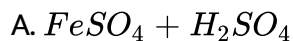


Answer: C



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224. How H_2S is liberated in laboratory

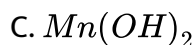
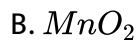
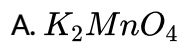


Answer: B



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225. $KMnO_4$ in basic medium is reduced to

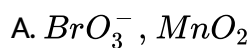


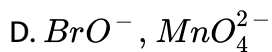
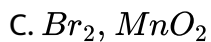
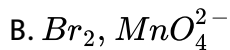
Answer: B



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226. MnO_4^- reacts with Br^- in alkaline pH to give

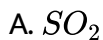




Answer: A

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227. On heating $K_4[Fe(CN)_6]$ with conc. H_2SO_4 gives the gas

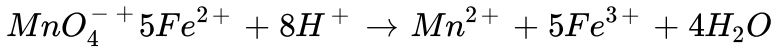


Answer: C

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228. The equivalent mass of $KMnO_4$ in the following reaction is _____.

(M = Molecular mass)



A. $\frac{M}{2}$

B. $\frac{M}{3}$

C. $\frac{M}{4}$

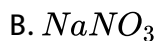
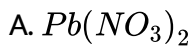
D. $\frac{M}{5}$

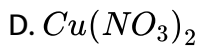
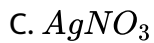
Answer: D



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229. The nitrate of which metal left globule on heating strongly





Answer: C

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230. In electroplating, the metal that is not used for plating is

A. Fe

B. Zn

C. Ni

D. Au

Answer: A

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231. One of the important use of ferrous sulphate is in the

- A. Manufacture of blue ink
- B. Manufacture of chalks
- C. Preparation of hydrogen sulphide
- D. Preparation of anhydrous ferric chloride

Answer: A



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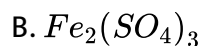
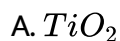
232. A solution of copper sulphate may be kept safely in the container made up of

- A. Fe
- B. Ag
- C. Zn
- D. Al

Answer: B

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233. Which of the following will show increase in weight when kept in magnetic field



Answer: B

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234. While writing the formula of ferrous oxide it is written as (FeO), because it is

A. Non-stoichiometric

B. Non-existent

C. Paramagnetic

D. Ferromagnetic

Answer: A



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235. Which of the following exhibits maximum oxidation state of vanadium?

A. $VOCl_3$

B. VCl_4

C. VCl_3

D. VCl_2

Answer: A

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236. On heating pyrolusite with KOH in presence of air we get

- A. $KMnO_4$
- B. K_2MnO_4
- C. $Mn(OH)_2$
- D. Mn_2O_4

Answer: B

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237. $Cu(CN)_4^{2-}$ is colourless as it absorbs light in

- A. Visible region
- B. Ultraviolet region
- C. Infrared region

D. All above are wrong

Answer: D

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238. Which of the following compound is expected to be colourless

A. ScO

B. V_2O_3

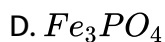
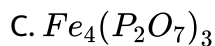
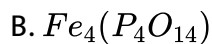
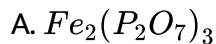
C. $CuCN$

D. $Cr_2(SO_4)_3$

Answer: C

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239. Chemical formula for calcium pyrophosphate is $Ca_2P_2O_7$. The formula for ferric pyrophosphate will be

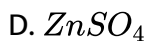
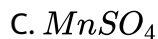
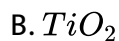


Answer: C



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240. Which of the following is coloured



Answer: C

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241. Chrome green is

- A. Chromium sulphate
- B. Chromium chloride
- C. Chromium nitrate
- D. Chromium oxide

Answer: D

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242. In the extraction of copper when molten copper is cooled slowly, blister copper is obtained due to evolution of the following gas

- A. Water vapour
- B. Sulphur dioxide
- C. Carbon dioxide
- D. Carbon monoxide

Answer: B

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243. The most impure form of iron is

- A. Cast iron
- B. Wrought iron
- C. Steel iron
- D. None

Answer: A

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244. Parke's process of desilverization of lead depends upon

- A. Partition coefficient of silver between molten zinc/molten lead having a high value
- B. Partition coefficient of silver between molten zinc/molten lead giving a low value
- C. Crystallizing out of pure lead while the silver-lead eutectic which has a lower melting point is left behind in liquid form
- D. Chemical combination of zinc and silver which precipitates out easily

Answer: A



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245. Match the item under List I with the compounds/elements from the

List II. Select the correct answer from the sets (a), (b), (c) and (d)

List I	List II
(i) Explosive	(A) NaN_3
(ii) Artificial gem	(B) Fe_3O_4
(iii) Self reduction	(C) Sn
(iv) Magnetic material	(D) Al_2O_3
	(E) $Pb(N_3)_2$
	(F) Fe_2O_3
	(G) Cu
	(H) SiC

A. (i) A, (ii) D, (iii) G, (iv) B

B. (i) A, (ii) D, (iii) G, (iv) F

C. (i) E, (ii) D, (iii) G, (iv) B

D. (i) E, (ii) H, (iii) C, (iv) F

Answer: C



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246. Spiegeleisen is an alloy of

- A. *Fe*, *Cu* and *Mn*
- B. *Fe*, *Mg* and *C*
- C. *Fe*, *Co* and *Cr*
- D. *Fe*, *Cu* and *Ni*

Answer: A



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247. The presence of Si in steel gives it

- A. Fibrous structure
- B. Silicate type structure
- C. Sheet type structure
- D. None of these

Answer: A



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248. The presence of Mn in steel produces

- A. Elasticity
- B. Increases tensile strength
- C. Both (a) and (b)
- D. None of these

Answer: C



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249. The addition of metal like Cr, Mn W and Ni to ordinary steel makes it

- A. More useful

B. Alters the properties of ordinary steel

C. Both (a) and (b)

D. None of these

Answer: C



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250. Stainless steel is non-corrosive. This character is more prominent in

A. Mn steel

B. Ordinary steel

C. Ti steel

D. All of these

Answer: C



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251. When little vanadium is mixed with steel, it becomes

- A. More hard
- B. More tensility
- C. Both (a) and (b)
- D. No effect

Answer: C



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252. To obtain steel entirely free from sulphur and phosphorus, the process used is

- A. Electrothermal process
- B. Bessemer process
- C. Open-hearth process
- D. Duplex process

Answer: A



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253. A clock spring is heated to redness and then plunged into cold water.

This treatment will cause it to become

- A. Soft and ductile
- B. More springy than before
- C. Strongly magnetic
- D. Hard and brittle

Answer: D



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254. Mark the steel in which carbon % is highest

- A. Mild steel
- B. Hard steel
- C. Alloy steel
- D. None of these

Answer: B

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255. Mark the variety of iron which has highest melting point

- A. Pig iron
- B. Cast iron
- C. Wrought iron
- D. Steel

Answer: C

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256. In the extraction of zinc which gas is burnt in the jackets surrounding the retorts

- A. Water gas
- B. Producer gas
- C. Oil gas
- D. Coal gas

Answer: B



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257. In the Bessemer and open-hearth process for the manufacture of steel, which one of the following is used for the removal of carbon in part or whole

- A.

Bessemer	Open-hearth
(a) Ferric oxide	Air

- B. Bessemer Open-hearth
(b) Air Ferric oxide
- C. Bessemer Open-hearth
(c) Oxygen Scrap iron
- D. Bessemer Open-hearth
(c) Air Scrap iron

Answer: D

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258. About the basic open hearth process, which statement is wrong

- A. Limestone is added to the charge
- B. Phosphorus impurity cannot be removed by this process
- C. Carbon content of the steel can be uniformly controlled over a series of batches
- D. Iron scrap can be batches

Answer: A

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259. Which of the following statements is wrong

- A. Heating to a high temperature and then cooling suddenly, e.g. by dipping in water, makes steel hard and brittle
- B. Steel can be softened by heating it to a high temperature for a prolonged time and then cooling slowly. This is called quenching
- C. Tempering of hardened steel done by heating it to just below red heat at controlled temperature and duration
- D. Phosphorus impurity makes steel 'cold short'

Answer: D



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260. Hot and conc. Nitric acid when reacts with copper, the gas obtained is

A. N_2

B. Nitrous oxide

C. NO

D. NO_2

Answer: D

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261. Paris green is

A. Double green is copper carbonate and copper nitrate

B. Double salt of copper acetate and copper arsenite

C. Double salt of copper acetate and copper sulphate

D. Double salt of copper and silver nitrate

Answer: B

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262. Which of the following metals displaces SO_2 gas from concentrated sulphuric acid

A. Mg

B. Zn

C. Cu

D. None of these

Answer: C



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263. Orford process is used in extraction of

A. Fe

B. Co

C. Pt

D. Ni

Answer: D



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264. Horn silver is

A. $AgCl$

B. Ag

C. $AgBr$

D. CH_3COOAg

Answer: A



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265. The extraction of nickel involves

- A. The formation of $Ni(CO)_4$
- B. The decomposition of $Ni(CO)_4$
- C. The formation and thermal decomposition of $Ni(CO)_4$
- D.

Answer: C

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266. When phosphine is passed through aqueous solution of copper sulphate, the product produced is

- A. $Cu(OH)_2$
- B. Cu_3P_2
- C. $[Cu(PH_3)_4]^{2+}$
- D. $[Cu(PH_3)_2]^{2+}$

Answer: B

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267. Assertion : The aqueous solution of $FeCl_3$ is basic in nature .

Reason : $FeCl_3$ hydrolyses in water.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false and reason both is true.

Answer: D

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268. Assertion : $AgCl$ dissolves in NH_4OH solution.

Reason: Due to formation of a complex.

- A. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

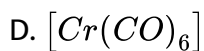
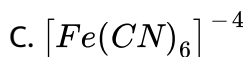
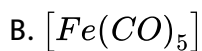
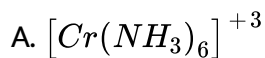
Answer: A



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Critical Thinking

1. Atomic numbers of Cr and Fe are respectively 24 and 26. Which of the following is paramagnetic with the spin of the electron?

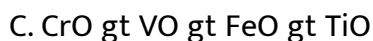
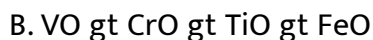
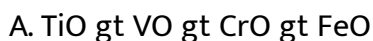


Answer: A



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2. The basic character for the transition metal monoxides follows the order (Atomic no's. Ti = 22, V = 23, Cr = 24, Fe = 26)



D. TiO gt FeO gt VO gt CrO

Answer: A

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3. Which of the following pairs of metals is purified by van arkel method?

A. Ni and Fe

B. Ga and In

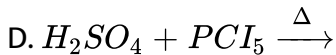
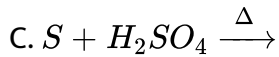
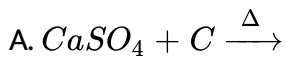
C. Zr and Ti

D. Ag and Au

Answer: C

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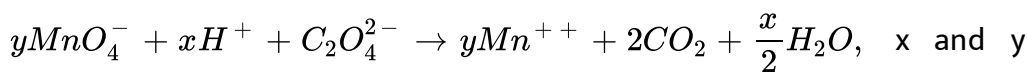
4. Sulphur trioxide can be obtained by which of the following reactions :



Answer: B

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5. In following reaction



are

A. 2 and 16

B. 16 and 2

C. 8 and 16

D. 5 and 2

Answer: B

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6. The acidic, basic or amphoteric nature of Mn_2O_7 , V_2O_5 and CrO are respectively

- A. Acidic, acidic and basic
- B. Basic, amphoteric and acidic
- C. Acidic, amphoteric and basic
- D. Acidic, basic and basic

Answer: C

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7. What happens when aluminium and zinc salts react with an excess of $NaOH$

A. White precipitate of formed

B. White precipitate of both Zn and Al first formed redissolve in excess of $NaOH$

C. White precipitate of Al redissolves but of Zn does not

D. White precipitate of Zn redissolves and that of Al does not

Answer: B

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8. Which of the following ions form most stable complex compound

A. Cu^{++}

B. Ni^{++}

C. Fe^{++}

D. Mn^{++}

Answer: A



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9. Which transition metal reduces steam to evolve hydrogen

A. Mg

B. Fe

C. Sc

D. Pt

Answer: B



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10. General configuration of outermost and penultimate shell is $(n - 1)s^2(n - 1)p^6(n - 1)d^xns^2$. If $n = 4$ and $x = 5$ then no. of protons in the nucleus will be

A. gt 25

B. It 24

C. 25

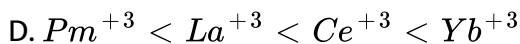
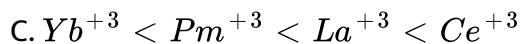
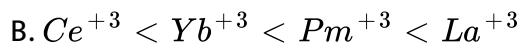
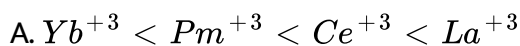
D. 30

Answer: C

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11. Arrange Ce^{3+} , La^{3+} , Pm^{3+} and Yb^{3+} in increasing order of their size

-



Answer: A

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12. The atomic numbers of vanadium (V), Chromium (Cr), manganese (Mn) and iron (Fe) respectively 23, 24, 25 and 26. Which one of these may be expected to have the higher second ionization enthalpy ?

A. V

B. Cr

C. Mn

D. Fe

Answer: B



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13. Irregular trend in the standard reduction potential value of first row transition elements is due to

A. Regular variation of first and second ionisation enthalpies

B. Irregular variation of sublimation enthalpies

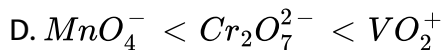
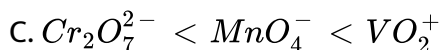
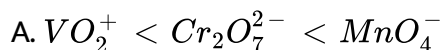
C. Regular variation of sublimation enthalpies

D. Increase in no. of unpaired electrons

Answer: B

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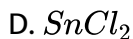
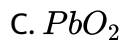
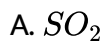
14. The correct order of increasing oxidising power in the series is



Answer: A

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15. Mn^{2+} can be converted into Mn^{7+} by reacting with



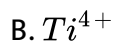
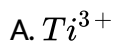
Answer: C



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16. An element is in M^{3+} form. Its electronic configuration is $[Ar]3d^1$

the ion is



Answer: A

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17. Transition metal with low oxidation state will act as:

- A. A base
- B. An acid
- C. An oxidizing agent
- D. None of these

Answer: D

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18. Which of the following is not an element.

- A. Graphite

B. Diamond

C. 22-carat gold

D. Rhombic sulphur

Answer: C

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19. Which of the following is more paramagnetic

A. Fe^{+2}

B. Fe^{+3}

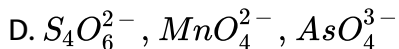
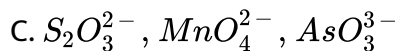
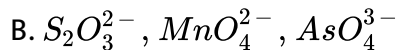
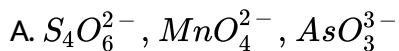
C. Cr^{+3}

D. Mn^{+3}

Answer: B

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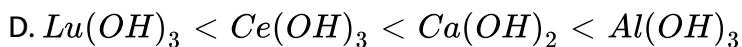
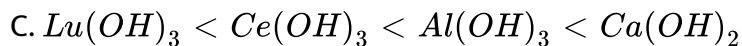
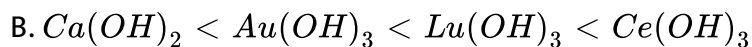
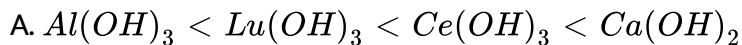
20. Formula of thiosulphate, manganate and arsenate respectively are



Answer: D

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21. Which of the following option is the correct order of the basic strength of metallic hydroxides



Answer: A

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JEE Section (Only one choice correct answer)

1. Which one of the following dissolves in hot concentrated $NaOH$?

A. Fe

B. Zn

C. Cu

D. Ag

Answer: B

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2. German silver is an alloy of

A. Copper, zinc and nickel

B. Copper and silver

C. Copper, zinc and tin

D. Copper, zinc and silver

Answer: A

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3. Which of the following is strongest Bronsted base

A. ClO^-

B. ClO_2^-

C. ClO_3^-

D. ClO_4^-

Answer: A

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4. Iron is rendered passive by the action of

A. Conc. H_2SO_4

B. Conc. H_3PO_4

C. Conc. HCl

D. Conc. HNO_3

Answer: D



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5. The oxide which gives hydrogen peroxide on treatment with dilute acid is

A. PbO_2

B. Na_2O_2

C. MnO_2

D. TiO_2

Answer: B

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6. The compound insoluble in acetic acid

- A. Calcium oxide
- B. Calcium carbonate
- C. Calcium oxalate
- D. Calcium hydroxide

Answer: C

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7. The compound which gives oxygen on moderate heating is

A. Cupric oxide

B. Mercuric oxide

C. Zinc oxide

D. Aluminium oxide

Answer: B

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8. Which of the following do not contain peroxide ions

A. PbO_2

B. H_2O_2

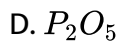
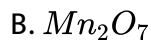
C. SrO_2

D. BaO_2

Answer: A

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9. Which one of the following oxides is ionic?



Answer: A



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10. Solder is an alloy of

A. 70 % lead, 30 % tin

B. 30 % lead, 70 % tin

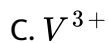
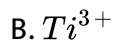
C. 80 % lead, 20 % tin

D. 90 % Cu, 10 % tin

Answer: B

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11. Which out of the following has maximum number of unpaired electrons ?



Answer: D

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12. Among the following statements, the incorrect one is

- A. Calamine and siderite are carbonates
- B. Argentite and cuprite are oxides
- C. Zinc blende and pyrites are sulphides
- D. Malachite and azurite are ores of copper

Answer: B



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13. The only cations present in the slightly acidic solution are Fe^{3+} , Zn^{2+} and Cu^{2+} . The reagent that when added in excess to this solution would identify and separate Fe^{3+} in one step is:

- A. 2 M HCl
- B. 6M NH_3
- C. 6M $NaOH$

D. H_2S gas

Answer: D

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

A. $3/5$

B. $2/5$

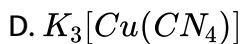
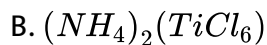
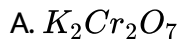
C. $4/5$

D. 1

Answer: A

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15. Among the following the compound that is both paramagnetic and coloured is



Answer: C



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16. In nitroprusside ion, the iron and NO exist as $Fe(II)$ and NO^+ rather than Fe^{III} and NO . These forms can be differentiated by

A. Estimating the concentration of iron

B. Measuring the concentration of CN^-

C. Measuring the solid state magnetic moment

D. Thermally decomposing the compound

Answer: C



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17. Bassemer converter is used in the manufacture of

A. Pig iron

B. Steel

C. Wrough iron

D. Cast iron

Answer: A



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18. The bonds present in the structure of dichromate ion are

- A. Four equivalent $Cr - O$ bonds only
- B. Six equivalent $Cr - O$ bonds and one $O - O$ bond
- C. Six equivalent $Cr - O$ bonds and one $Cr - Cr$ bond
- D. Six equivalent $Cr - O$ bonds are one $Cr - O - Cr$ bond

Answer: D

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19. The spin magnetic moment of cobalt in the compound $Hg[Co(SCN)_4]$ is

- A. $\sqrt{3}$
- B. $\sqrt{8}$
- C. $\sqrt{15}$
- D. $\sqrt{24}$

Answer: C

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20. Which pair of compounds is expected to show similar colour in aqueous medium?

- A. $FeCl_2$ and $CuCl_2$
- B. $VOCl_2$ and $CuCl_2$
- C. $VOCl_2$ and $FeCl_2$
- D. $FeCl_2$ and $MnCl_2$

Answer: B

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21. Which of the following will not be oxidized by O_3 ?

- A. KI
- B. $FeSO_4$

C. $KMnO_4$

D. K_2MnO_4

Answer: C

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22. Native silver metal forms a water soluble complex with a dilute aqueous solution of $NaCN$ in the presence of

A. Nitrogen

B. Oxygen

C. Carbon dioxide

D. Argon

Answer: B

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23. 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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24. Which of the following arrangements does not represent the correct order of the property stated against it?

A. $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$: paramagnetic behaviour

B. $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: ionic size

C. $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in aqueous solution

D. $Si < Ti < Cr < Mn$: number of oxidation states

Answer: A

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25. Four successive members of the first row transition elements are listed below with atomic numbers. Which one of them is expected to have the highest $E_{M^{3+}/M^{2+}}^0$ value

A. *Cr* ($Z = 24$)

B. *Mn* ($Z = 25$)

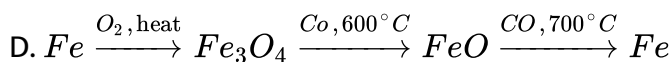
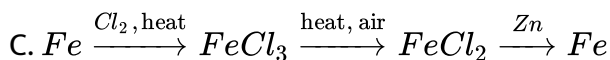
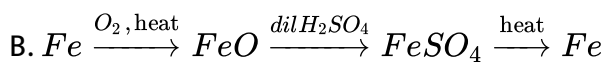
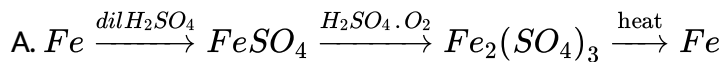
C. *Fe* ($Z = 26$)

D. *Co* ($Z = 27$)

Answer: D

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26. Which series of reactions correctly represents chemical reactions related to iron and its compounds ?

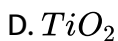
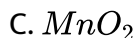


Answer: D



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27. Which of the following compounds is metallic and ferromagnetic ?

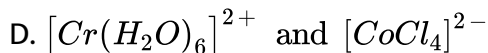
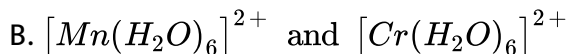
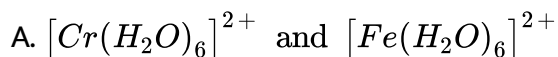


Answer: A

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28. The pair having the same magnetic moment is

[at. No. $Cr = 24$, $Mn = 25$, $Fe = 26$ and $Co = 27$]



Answer: A

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29. The reaction of zinc with dilute and concentrated nitric acid, respectively, produce

A. NO_2 and NO

B. NO and N_2O

C. NO_2 and N_2O

D. N_2O and NO_2

Answer: D

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30. Galvanization is applying a coating of :

A. Cr

B. Cu

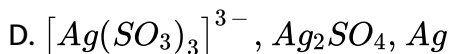
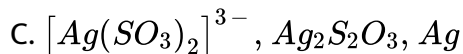
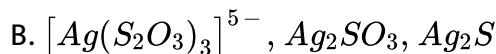
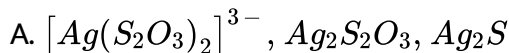
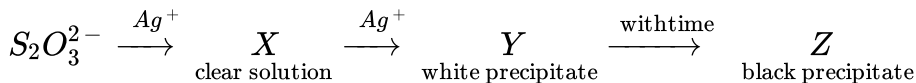
C. Zn

D. Pb

Answer: C

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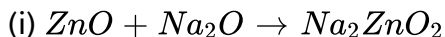
31. In the following reaction sequence in aqueous solution, the species X, Y and Z, respectively



Answer: A

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32. In the following reaction, ZnO is respectively acting as a/an



A. Base and base

B. Acid and acid

C. Acid and base

D. Base and acid

Answer: C

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33. Silver nitrate, on heating at moderate temperature gives

A. Ag_2O

B. $AgNO_2$

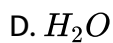
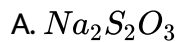
C. O_2

D. Both (b) and (c)

Answer: D

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34. $AgCl$ is not soluble in

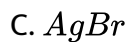
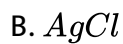
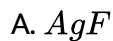


Answer: D



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35. Which of the following is ionic



D. AgI

Answer: A



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36. Siderite is

A. Fe_2O_3

B. $FeCO_3$

C. SnO_2

D. ZnC

Answer: B



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37. Equivalent weight of $K_2Cr_2O_4$ in acidic medium is

A. $\frac{\text{Mol. wt}}{3}$

B. $\frac{\text{Mol. wt.}}{6}$

C. $\frac{\text{Mol. wt.}}{2}$

D. Mol.wt.

Answer: B

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38. KO_2 is used in oxygen cylinders in space and submarines because it

A. Eliminates moisture

B. Absorbs CO_2

C. Produces ozone

D. Produces CO_2

Answer: B

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JEE Section (More than one choice correct answer)

1. Potassium manganate (K_2MnO_4) is formed when

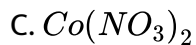
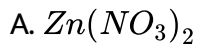
- A. Chlorine is passed into aqueous $KMnO_4$ solution
- B. Manganese dioxide is fused with potassium hydroxide in air
- C. Formaldehyde reacts with potassium permanganate in presence of a strong alkali
- D. Potassium permanganate reacts with conc. Sulphuric acid

Answer: B::C



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2. The aqueous solution of the following salts will be coloured in the case of



Answer: C::D

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3. Which of the following alloys contain (s) Cu and Zn?

A. Bronze

B. Brass

C. Gun metal

D. Type metal

Answer: A::B

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4. The addition of high proportions of manganese makes steel useful in making rails or railroads because manganese is useful in making rails or railroads because manganese

- A. Gives hardness to steel
- B. Helps the formation of oxides of iron
- C. Can remove oxygen and sulphur
- D. Can show highest oxidation state of +7

Answer: A::C



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5. Which of the following statement(s) is (are) correct with reference to the ferrous and ferric ions ?

- A. Fe^{3+} gives brown colour with potassium ferricyanide

B. Fe^{2+} gives blue precipitate with potassium ferricyanide

C. Fe^{3+} gives red colour with potassium thiocyanate

D. Fe^{2+} gives brown colour with ammonium thiocyanate

Answer: B::C

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6. Which of the following is/are soluble in ethanol

A. HgF_2

B. $HgCl_2$

C. $HgBr_2$

D. HgI_2

Answer: A::B::C

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7. Which of the following halides react(s) with $AgNO_{3(aq)}$ to give a precipitate that dissolves in $Na_2S_2O_{3(aq)}$

A. HCl

B. HF

C. HBr

D. HI

Answer: A::C::D



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8. The correct statement(s) about Cr^{2+} and Mn^{3+} is(are)

[Atomic number of $Cr = 24$ and $Mn = 25$]

A. Cr^{2+} is a reducing agent

B. Mn^{3+} is an oxidizing agent

C. Both Cr^{2+} and Mn^{3+} exhibit d^4 electronic configuration

D. When Cr^{2+} is used as a reducing agent, the chromium ion attains d^5 electronic configuration

Answer: A::B::C

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9. Fe^{3+} is reduced to Fe^{2+} of NaOH

- A. H_2O_2 in presence of $NaOH$
- B. Na_2O_2 in water
- C. H_2O_2 in presence of H_2SO_4
- D. Na_2O_2 in presence of H_2SO_4

Answer: C::D

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10. Extraction of copper from copper pyrite ($CuFeS_2$) involves

- A. Crushing followed by concentration of the ore by froth flotation
- B. Removal of iron as slag
- C. Self-reduction step to produce 'blister copper' following evolution of SO_2
- D. Refining of 'blister copper' by carbon reduction

Answer: A::B::C



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11. To an acidified dichromate solution, a pinch of Na_2O_2 is added and shaken. What is observed ?

- A. Blue colour
- B. Orange colour changing to green
- C. Copious evolution of oxygen

D. Bluish-green precipitate

Answer: A::C

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12. Pick out the correct statement(s):

A. MnO_2 dissolves in conc. HCl , but does not form Mn^{4+} ions

B. Decomposition of acidic $KMnO_4$ is not catalysed by sunlight

C. MnO_4^{2-} is strongly oxidising and stable only in very strong alkali.

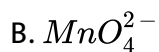
In dilute alkali, water or acidic solution it disproportionates

D. $KMnO_4$ does not act as oxidising agent in alkaline medium

Answer: A::C

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13. The species that undergoes disproportionation in an alkaline medium are

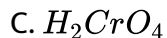
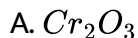


Answer: A::B::C



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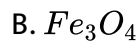
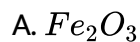
14. $(NH_4)_2Cr_2O_7$ on heating gives



Answer: A::B

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15. Iron reacts with steam to form

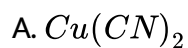


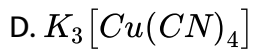
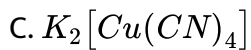
D. Both B & C

Answer: D

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16. $CuSO_4$ reacts with KCN to form



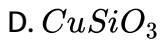
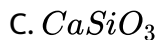
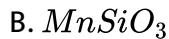
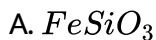


Answer: B::D



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17. The slag obtained in extraction of copper pyrites is mainly



Answer: A::C



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18. After partial roasting, the sulphide of copper can be reduced by

- A. Carbon
- B. Self-reduction
- C. Cyanide process
- D. Heating

Answer: A::B



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19. Identify the statement which is correct for copper sulphate

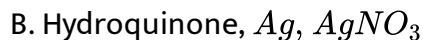
- A. It reacts with $NaOH$ and glucose to give Cu_2O (brick red ppt)
- B. It reacts with KCl to give Cu_2Cl_2
- C. It gives CuO on strong heating
- D. It reacts with KI to give I_2

Answer: A::C::D

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20. AgBr used in photography, is removed with the help of called

And forms



Answer: A::D

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21. In solid $CuSO_4 \cdot 5H_2O$

- A. Five molecules of H_2O are coordinate bonded to Cu^{2+}
- B. Cu^{2+} ion is coordinate bonded to four water molecules
- C. One H_2O molecule is H-bonded
- D. It has four type of bonds : Ionic, covalent, coordinate and H-bond

Answer: A::B::C

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22. Which of the following contain five unpaired electrons

- A. Mn^{2+}
- B. Fe^{3+}
- C. Fe^{2+}
- D. Ni^{2+}

Answer: A::B

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23. An explosion takes place when conc. H_2SO_4 is added to $KMnO_4$ due to formation of

- A. Mn_2O_7
- B. MnO_2
- C. $MnSO_4$
- D. $(MnO_3)_2SO_4$

Answer: A::D



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24. Which of the following statement(s) is/are correct with reference to Fe^{2+} and Cu^{2+}

- A. Both react with NaOH

B. Cu^{2+} gives blue ppt of $Cu(OH)_2$ where as Fe^{2+} gives $Fe(OH)_2$

[green ppt]

C. Cu^{2+} gives chocolate brown ppt whereas Fe^{2+} gives sky blue ppt

with $K_4[Fe(CN)_6]$

D. Both have four unpaired electrons

Answer: A::B::C

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JEE Section (Reasoning type questions)

1. Statement I : Zn^{2+} is diamagnetic

Statement II : The electrons are lost from 4s orbital to from Zn^{2+}

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 1

- B. Statement 1 is true, statement 2 is true , statement 2 si not a correct explanation for statement 1
- C. Statement 1 is true, statement 2 is false
- D. Statement 1 is false, statement 2 is ture

Answer: B

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2. Statement 1 : NO_3^- ion is reduced in preference to hydronium ion.

Statement 2 : Zn gives H_2 gas with dil. HCl and also with dil. H_2SO_4 .

- A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 2
- B. Statement 1 is true, statement 2 is true , statement 2 si not a correct explanation for statement 2
- C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: B

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3. Statement 1 : Energy gap between 4f, 5d and 6s subshells is small whereas that between 5f, 6d and 7s subshells is large.

Statement 2 : Lanthanoids show a limited number of oxidation states whereas actinoids show a large number of oxidation states.

A. Statement 1 is true, statement 2 is true, statement 2 is a correct explanation for statement 3

B. Statement 1 is true, statement 2 is true, statement 2 is not a correct explanation for statement 3

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: D

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4. Statement 1 : Ce^{3+} has the tendency to charge to Ce^{4+} .

Statement 2 : Ce^{3+} used as an oxidizing agent in volumetric analysis.

- A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 4
- B. Statement 1 is true, statement 2 is true , statement 2 is not a correct explanation for statement 4
- C. Statement 1 is true, statement 2 is false
- D. Statement 1 is false, statement 2 is true

Answer: D

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5. Assertion : Ammoniacal silver nitrate converts glucose to gluconic acid and metallic is precipitated.

Reason : Glucose acts as a weak reducing is precipitated.

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 5

B. Statement 1 is true, statement 2 is true , statement 2 is not a correct explanation for statement 5

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: A



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6. Statement 1 : To a solution of potassium chromate if a strong acid is added it changes its colour from yellow to orange.

Statement 2 : The colour change is due to the oxidation of potassium chromate.

- A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 6
- B. Statement 1 is true, statement 2 is true , statement 2 is not a correct explanation for statement 6
- C. Statement 1 is true, statement 2 is false
- D. Statement 1 is false, statement 2 is true

Answer: C



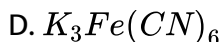
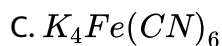
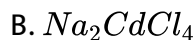
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JEE Section (Comprehension type questions)

1. Transition metal compounds are coloured due to $d-d$ and charge transfer transitions, Colour due to $d-d$ transition is shown by

transition metal compounds having d^1 and d^9 electrons whereas the compounds containing d^0 and d^{10} configurations are intensely coloured due to charge transfer transitions.

Which of the following compound is not coloured



Answer: B



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2. Transition metal compound are coloured due to $d - d$ and charge transfer transitions, Colour due to $d - d$ transition is shown by transition metal compounds having d^1 and d^9 electrons whereas the compounds containing d^0 and d^{10} configurations are intensely coloured

due to charge transfer transitions.

The purple colour of $[Ti(H_2O_6)]^{3+}$ ion is due to

- A. Unpaired d-electron
- B. Transfer of an electron
- C. Intermolecular vibrations
- D. Presence of water molecules

Answer: A



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3. Transition metal compound are coloured due to $d - d$ and charge transfer transitions, Colour due to $d - d$ transition is shown by transition metal compounds having d^1 and d^9 electrons whereas the compounds containing d^0 and d^{10} configurations are intensely coloured due to charge transfer transitions.

Which of the following compound is not coloured

A. Na_2CdCl_2

B. Pressure of the reaction

C. Nature of ligands or Lewis bases attached to the metal ion

D. Concentration of the ligands

Answer: A

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JEE Section (Integer type questions)

1. The number of water molecule(s) directly bonded to the metal centre is

$CuSO_4 \cdot 5H_2O$ is

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2. Consider the following list of reagent

Acidified $K_2Cr_2O_7$, alkaline $KMnO_4$, $CuSO_4$, H_2O_2 , Cl_2 , O_3 , $FeCl_3$, HNO_3

The total number of reagents that can oxidise aqueous iodide iodine is

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3. In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, the equivalent weight of $K_2Cr_2O_7$ is $\frac{\text{molecular weight}}{X}$. What is the value of X.

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4. The oxidation number of Cr in the product of alkaline oxidative fusion of $FeCr_2O_4$ is

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5. How many Cr-O bonds are equivalent in chromate dianion ?

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6. $MCl_4 \xrightarrow[(A) \text{ (ii) } H_2O]{(i) Zn} (B)$ purple colour compounds



Find out the number of unpaired electrons in the compound (B)

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JEE Section (Matrix Match type questions)

1. Match the entries listed in Column I with appropriate entries listed in

Column II.

Column I

(A) Wilkinson's catalyst

(B) V_2O_5 catalyst

(C) Ziegler-Natta catalyst

(D) Platinum catalyst

Column II

(p) Polymerisation of alkenes

(q) $(Ph_3P)_3RhCl$

(r) Hydrogenation of alkenes

(s) Manufacture of H_2SO_4
(contact process)

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1. The correct statement (s) regarding the binary transition metal carbonyl compounds is (are)

(Atomic numbers: Fe = 26, Ni = 28)

A. Total number of valence shell electrons at metal centre in $Fe(CO)_5$

or $Ni(CO)_4$ is 16

B. These are predominantly low spin in nature

C. Metal - carbon bond strengthens when the oxidation state of the metal is lowered

D. The carbonyl $C -$ bond weakens when the oxidation state of the metal is increased

Answer: B::C



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2. The correct option(s) to distinguish nitrate salts of Mn^{2+} and Cu^{2+} taken separately is(are)

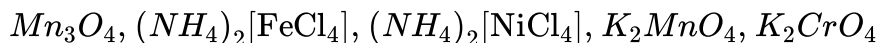
- A. Mn^{2+} shows the characteristic green colour in the flame test
- B. Only Cu^{2+} shows the formation of precipitate by passing H_2S in acidic medium
- C. Only Mn^{2+} shows the formation of precipitate by passing H_2S in faintly basic medium
- D. Cu^{2+} / Cu has higher reduction potential than Mn^{2+} / Mn (measured under similar conditions)

Answer: B::D



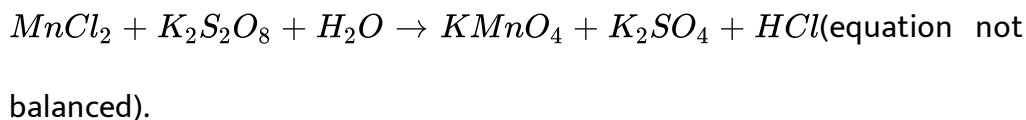
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1. Among the species given below, the total number of diamagnetic species is _____. H atom, NO_2 monomer, O_2^- (superoxide), dimeric sulphur in vapour phase,



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2. To measure the quantity of $MnCl_2$ dissolved in an aqueous solution, it was completely converted to $KMnO_4$ using the reaction



Few drops of concentrated HCl were added to this solution and gently warmed. Further, oxalic acid (225 mg) was added in portions till the colour of the permanganate ion disappeared. Calculate the quantity of $MnCl_2$ (in mg) present in the initial solution.

(Atomic weights in $g\ mol^{-1}$: Mn=55, Cl=35.5)

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