CHEMISTRY

PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

D & F BLOCK ELEMENTS

Inorganic Chemistry D F Block Elments

1. Which one of the following alloys contains some of the lanthanoid metals ?

A. Mischmetal

B. Brass

C. Bronze

D. Ziggler-Natta

Answer: 1

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2. Identify the incorrect statement among the following .

A. Among V, Cr, Mn and Fe, Mn is expected to have the highest third ionization enthalpy.

B. $Eu(II)$ acts as a strong reducing agent.

C. The ionic sizes of lanthanoids decrease in general with increasing atomic number.

D. $VOCl_2$ and $FeCl_2$ are expected to have the same magnetic moment ('spin only')

Answer: 4

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3. Which of the following is a lanthanide ?

A. Curium

B. Californium

C. Uranium

D. Europium

Answer: 4

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4. Which of the following statements is true for transition elements ?

A. They are diamagnetic

B. They shows variable oxidation states

C. They do not form alloy

D. They shows inert pair effect

Answer: 2

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5. Among the following series of transition metal ions the one where all meal ions have $3d^2$ electronic configuration is

A. $Ti^{+3}, V^{+2}, Cr^{+3}, Mn^{+4}$

B. $Ti^{+2}, V^{+3}, Cr^{+4}, Mn^{+5}$

C. $Ti^{+}, V^{+4}, Cr^{+6}, Mn^{+7}$

D. $Ti^{+2}, V^{+3}, Cr^{+2}, Mn^{+3}$

Answer: 2

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6. The ions from among the following which are colourless are :

$(i)Ti^{+4}$ $(ii)Cu^{+1}$ $(iii)Co^{+3}$ $(iv)Fe^{+2}$

A. (i) and (ii) only

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

C. (iii) and (iv) only

D. (ii) and (iii) only

Answer: 1

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7. Which of the following ions has the maximum magnetic moment in aqueous solution ?

A. Mn^{2+}

B. Fe^{2+}

C. Co^{2+}

D. Cr^{2+}

Answer: 1

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8. Among the following outermost configurations of transitionn metals, which shows the highest oxidation state

A. $3d^3 4s^2$

B. $3d^5 4s^1$

C. $3d^5 4s^2$

D. $3d^6 4s^2$

Answer: 3

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9. The maximum oxidation state shown by $V(Z = 23), Cr(Z = 24), Co(Z = 27), Sc(Z = 21)$, are respectively

A. $+5,\ +5,\ +3,\ +2$

B. $+5,\ +6,\ +3,\ +3$

C. $+5,\ +4,\ +5,\ +2$

D. $+5,\ +3,\ +2,\ +1$

Answer: 2

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10. Transition elements are used as catalyst because :

A. of high ionic charge

B. of variable oxidation state

C. large surface area of reactants

D. of their specific nature

Answer: 2

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

A. Cr^{3+}

B. Cr_2O_3

C. $Cr_2O_7^{2-}$

D. CrO_4^-

Answer: 3

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

A. $3/5$

B. $2/5$

C. $4/5$

D. 1

Answer: 1

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13. Which one of the following compounds does not decolourise an acidified aqueous solution of $KMnO_4$

A. Suluphur dioxide

B. Ferric chloride

C. H_2O_2

D. $FeSO_4$

Answer: 2

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14. When MnO_2 is fused woth KOH, a coloured compound is formed, the product and its colour are

A. k_2MnO_4, green

B. Mn_2O_3brown

C. Mn_2O_4,black

D. $KMnO_4$,purple

Answer: 1

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15. The basic character of the transition metal monoxide follows the order

A. $VO > CrO > TiO > FeO$

B. $CrO > VO > FeO > TiO$

C. $TiO > FeO > VO > CrO$

D. $TiO > VO > CrO > FeO$

Answer: 4

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16. Which of the following reactions represents " developing"in photography ?

A. $AgNO_3 + NaBr \rightarrow AgBr + NaNO_3$

B. $AgNO_3 + 2Na_2S_2O +_3 \rightarrow Na_3\left[Ag(S_2O_3)_2 + NaBr\right.$

C. $C_6H_4(OH)_2 + 2AgBr^* \rightarrow C_6H_4O_2 + 2HBr + 2Ag$

D. $AgBr + 2NH_3 \rightarrow \left[Ag(NH_3)_2\right]Br$

Answer: 3

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17. Which of the following ions are colourless in the aqueous solutions ?

A. La^{3+} and Lu^{3+}

B. Nd^{3+} and Pm^{3+}

C. Ce^{3+} and Pt^{3+}

D. Sm^{3+} and Eu^{3+}

Answer: 1

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18. Which of the following factor may be regarded as the main cause of lanthanide contraction?

A. Poor shielding of one of the $4f-$ electrons by anoher in the sub-shell.

B. Effective shielding of one of the $4f-$ electrons by another in the sub-shell

C. Poorer shielding of 5d electron by 4f electrons.

D. Greater shielding of 5d electron by 4f electron.

Answer: 1

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19. Why does ZnO show increased electrical conductivity and turns yellow on heating?

A. $d - d$ transition

B. $C - T$ spectra

C. Higher polarisation caused by Zn^{2+} ion

D. $F -$ centres

Answer: 4

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20. Which of the following is arranged in order of incresing melting point ?

A. $Zn < Cu < Ni < Fe$

B. $Fe < Ni < Cu < Zn$

C. $Ni < Fe < Zn < Cu$

D. $Cu < Zn < Fe < Ni$

Answer: 1

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21. In which of the following reaction "Philosopher's wool" is formed

A. ZnO

B. BaO

C. $HgCl$

D. Hg_2Cl_2

Answer: 1

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22. CrO_3 dissolves in aqueous NaOH to give

A. $Cr_2O_7^{2-}$

B. CrO_4^{2-}

C. $Cr(OH)_3^{2-}$

D. $Cr(OH)_2$

Answer: 2

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23. Mercury on heating with aqua regia gives

A. $Hg(NO_3)_2$

B. $HgCl$

C. $Hg(NO_2)_2$

D. Hg_2Cl_2

Answer: 2

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24. The formula of azurite is :

A. $CuCO_3.Cu(OH)_2$

B. $2CuCO_3.Cu(OH)_2$

C. $CuCO_3.2Cu(OH)_2$

D. $CuSO_4.Cu(OH)_2$

Answer: 2

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25. Oxide of metal cation which is not amphoteric ?

A. Al^{3+}

B. Cr^{3+}

C. Fe^{3+}

D. Zn^{2+}

Answer: 3

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26. The ratio of mass of a diamagnetic substance in a magnetic field to its actual mass

A. is greater than one

B. is less than one

C. is equal to one

D. cannot be predicted

Answer: 2

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27. CrO_4^{2-} (yellow) changes to $Cr_2O_7^{2-}$ (orange) in $pH = y$. Hence x and y are :

A. $6, 8$

B. $6, 5$

C. $8, 6$

D. $7, 7$

Answer: 1

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28. An excess of $Na_2S_2OO_3$ react with aqueous $CuSO_4$ to give

A. CuS_2O_3

B. $Cu_2S_2O_3$

C. $Na_2\left[Cu(S_2O_3)_2\right]$

D. $Na_4\left[Cu_6(S_2O_3)_5\right]$

Answer: 4

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29. $\left[Cr(H_2O)_6\right]Cl_3$ (at no. of Cr = 24) has a magnetic moment of $3.83B.M.$ The correct distribution of $3d$ electrons the chromium of the complex.

A. $3d_{xy}^1, 3d_{yz}^1, 3d_{xx}^1$

B. $3d_{xy}^1, 3d_{yx}^1, 3d_{z^2}^1$

C. $3d_{(x^2-y^2)}^1, 3d_{z^2}^1, 3d_{zx}^1$

D. $3d_{xy}^1, 3d_{(x^2-y^2)}^1, 3d_{yz}^1$

Answer: 1

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30. Potassium manganate (K_2MnO_4) is formed when

A. Cl_2 is passed into an aqueous solution of $KMnO_4$

B. MnO_2 is fuesed with KOH

C. Formaldehyde reacts with $KMnO_4$ in the presence of strong alkali

D. $KMnO_4$ reacts with conc. H_2SO_4

Answer: 3

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31. Uub is the symbol for the element with atomic number-

A. 102

B. 108

C. 110

D. 112

Answer: D

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32. Which of the following species has $O - O$ bond?

A. $Cr_2O_7^{-2}$

B. MnO_4^-

C. CrO_5

D. CrO_4^{-2}

Answer: 3

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33. $FeCr_2O_4$(chromite) is converted to Cr by following steps :

Chromite $\xrightarrow{I} Na_2CrO_4 \xrightarrow{II} Cr_2O_3 \xrightarrow{III} Cr$

Reagents in I, II, and III step might be :

	$I-\text{step}$	$II-\text{step}$	$III-\text{step}$
A.	$Na_2CO_3/\text{air},\Delta$	C	C
B.	$NaOH/\text{air},\Delta$	C,Δ	At,Δ
C.	$NaOH/\text{air},\Delta$	C,Δ	C,Δ
D.	$\text{conc.}H_2SO_4,\Delta$	NH_4Cl,Δ	C,Δ

Answer: 2

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34. When the same amount of zinc is treated separately with excess of sulphric acid and excess of sodium hydroxide, the ratio of volume of hydrogen evolved is

A. $1:1$

B. $1:2$

C. $2:1$

D. $9:4$

Answer: 1

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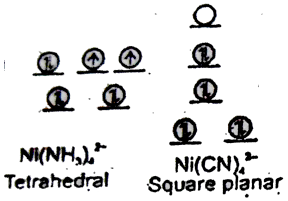
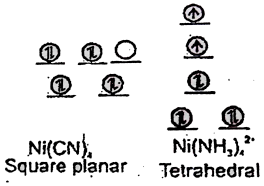
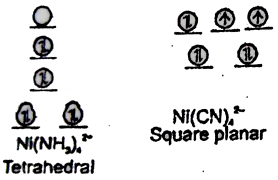
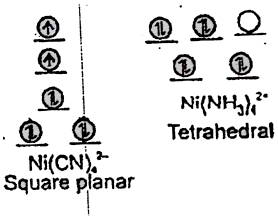
35. Both $\left[Ni(CO)_4\right]$ and $\left[Ni(CN)_4\right]^{2-}$ are diamagnetic The hybridisations of nickel in these complexes , respectively are :

A. 

B. 



C.



D.

Answer: 1

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36. Spin - only magnetic moment of $\left[Co(NH_3)_3(H_2O)_3\right]Cl_3($ in Bohr Magnetons) is :

A. Zero

B. $\sqrt{3}$

C. $\sqrt{24}$

D. $\sqrt{35}$

Answer: 1

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37. CO forms a volatile carbonyl complex with which of the following metals ?

A. Na

B. Sn

C. Ni

D. Hg

Answer: 3

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38. Match List I with List II and select the correct answer using the code given below below the lists :

List $-I$	List $-II$
$(a) CuCl_2, 2H_2O$	(I) Colourless and diamagnetic
$(b) Cu_2Cl_2$	(II) Green and paramagnetic
$(c) CuO$	(III) Calamine
$(d) ZnCO_3$	(IV) $Black$ and $basic$

Code:

A.

a	b	c	d
II	I	IV	III

B.

a	b	c	d
III	I	II	IV

C.

a	b	c	d
IV	II	III	I

D.

a	b	c	d
I	II	III	IV

Answer: 1

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39. Match List I with List II and select the correct answer using the code given below the lists :

List $-I$ (Reaction)	List $-II$ (Proces)
$a.\ NH_4Br + AgNO_3 \rightarrow AgBr + NH_4NO_3$	$p.$ Preparation of
$b.\ C_6H_4(OH)_2 + 2AgBr \rightarrow 2Ag + C_6H_4O_2 + 2HBr$	$q.$ Developing of t
$c.\ 2Na_2S_2O_3 + AgBr \rightarrow Na_3\left[Ag(S_2O_3)_2\right] + 2NaBr$	$r.$ Fixing of he fil
$d.\ AuCl_3 + 3Ag \rightarrow 3AgCl + Au$	$s.$ Toning process

Code:

A. $\begin{matrix} a & b & c & d \\ p & q & r & s \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ p & r & q & s \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ p & s & q & r \end{matrix}$

D. $\begin{matrix} a & b & c & d \\ q & s & p & r \end{matrix}$

Answer: A

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40. The $E_{M^{3+}/M^{2+}\hat{}\circ}$ values for Cr, Mn, Fe and Co are $0.41,\ +1.57,\ +0.77$ and $+1,97V$ respectively. For which one of these metals the change ub oxidation state from $= 2$ to 3 is easiest :

A. $Cr^{+2}(aq)$ is more stable than $Cr^{+3}(aq)$

B. $Mn^{+3}(aq)$ is more stalbe than $Mn^{+2}(aq)$

C. Cr^{+2} acts as a reducing agent and Mn^{+2} acts as an oxidising agent in their aqueous solutions

D. None of these

Answer: 3

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