CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

D & F BLOCK ELEMENTS

Level I Homework

1. Which of the following is incorrect w.r.t. transition elements ? :They easily form complexes, They forms coloured ions, Show variable oxidation states always differing by two units, Cr has highest MP in 1^{st} transition series

A. They easily form complexes

B. They forms coloured ions

C. Show variable oxidation states always differing by two units

D. Cr has highest MP in 1^{st} transition series

Answer:

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2. Which among the following belongs to d-block but it is not a transition element?

A. Mn

B. Fe

C. Zn

D. Cr

Answer:

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3. Which set of elements is transitional in character ?

(i) Fe, Co, Ni (ii) Ru, Rh, Pd (iii) Os, lr, Pt i , ii iii, i iii, ii i , ii, iii

A. i, ii

B. iii, i

C. iii, ii

D. i, ii, iii

Answer:

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4. Which of the following ion has same number of unpaired electrons as that of V^{3+} ion ? C r + 3 M n + 2 N i + 2 F e + 3

A. Cr^{+3}

B. Mn^{+2}

C. Ni^{+2}

D. Fe^{+3}

Answer:

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5. In which of the following elements, the configuration is against Auf-bau rule ?

A. Ni, Pd, Pt

B. Sc, Ti, Zr

C. Pd, Pt, Cu

D. Fe, Cr, Mn

Answer:

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6. In the following pair of d-block elements, the first member is a liquid at room temperature and the second member is mostly available in the earth's crust. The pair is

A. Hg, Fe

B. Hg, Tc

C. Hg, Zn

D. Hg, Au

Answer:

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7. Which element exhibits highest debsity in 3d series Sc Cr Zn Cu

A. Sc

B. Cr

C. Zn

D. Cu

Answer:

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8. The IP_1 of Zr is 674 kJ/mole. The IP_1 of H_f is

A. 656 kJ

B. 760 kJ

C. 616 kJ

D. 631 kJ

Answer:

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9. Which among the following does not show variable valency ? Mn Fe Zn Cr

A. Mn

B. Fe

C. Zn

D. Cr

Answer:

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10. An element M has the electron configuration [Ar] $3d^5 4s^2$. Which one of its oxide is unlikely to exist ?

A. MO_2

B. M_2O_3

C. MO_4

D. M_2O_7

Answer:

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

A. $Fe(CO)_5$

B. Fe_2O

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

D. $FeSO_4(NH_4)_2SO_4.6H_2O$

Answer:

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12. The correct order of atomic size is

A. $Sc < Y < La$

B. $Ti < Zr < Hf$

C. $Sc > Y > La$

D. $Sc > Y > La$

Answer:

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13. In which pair, both ions are coloured in aqueous medium ?

S c + 3 , Z n + 2 C u + 2 , T i + 4 T i + 3 , C o + 3 C d + 2 , M n + 2

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

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

C. Ti^{+3}, Co^{+3}

D. Cd^{+2}, Mn^{+2}

Answer:

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14. The ion having maximum magnetic moment is C o + 3 C r + 3 N i + 2 C u + 1

A. Co^{+3}

B. Cr^{+3}

C. Ni^{+2}

D. Cu^{+1}

Answer:

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15. Which of the following can not form amalgam ? Z n , N a C u , M g F e , P t T i , C r

A. Zn, Na

B. Cu, Ma

C. Fe, Pt

D. Ti, Cr

Answer:

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16. Which element in 3d-series is a strong reducing agent in its $+2$ oxidation state ? Ti V Cr Mn

A. Ti

B. V

C. Cr

D. Mn

Answer:

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17. A pair of elements having lowest MP in 3d -series is

A. Ni, V

B. Sc, Ti

C. Sc, Co

D. Mn,Zn

Answer:

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18. Chromyl chloride when dissolves in NaOH solution gives yellow solution . The yellow solution contains C r 2 O 7 − 2 C r O 4 − 2 C r O 5 C r 2 O 3

A. $Cr_2O_7^{2-}$

B. CrO_4^{2-}

C. CrO_5

D. Cr_2O_3

Answer:

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

A. $1/3$

B. 3

C. $1/6$

D. 6

Answer:

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20. Calomel is

A. Hg_2Cl_2 and Hg

B. Hg_2Cl_2

C. $Hg + Hg_2Cl_2$

D. $HgCl_2$

Answer:

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21. Which of the following metal oxides is white in colour but becomes yellow on heating A g 2 O Z n O F e O M g O

A. Ag_2O

B. ZnO

C. FeO

D. MgO

Answer:

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22. Maximum IP value in 3d series is

A. Zn

B. Cr

C. Cu

D. V

Answer:

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23. The maximum oxidation state of ruthenium is + 6 + 7 + 8 + 5

A. $+6$

B. $+7$

C. $+8$

D. $+5$

Answer:

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24. The mineral from which potassium permanganate is manufactured is

A. Pyrolusite, MnO_2

B. Branuite , Mn_2O_3

C. Hausmannite , Mn_3O_4

D. Manganite , MnO_3, H_2O

Answer:

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25. Which of the following is not the electronic configuration of lanthanoid elements ?

A. $[Xe]4f^{10}.6s^2$

B. $[Xe]4f^{1}5d^{1}.6s^{2}$

C. $[Xe]4f^{14}5d^{10}6s^{1}$

D. $[Xe]4f^{7}5d^{1}6s^{2}$

Answer:

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26. The stable $+2$ ions of lanthanides in aqueous solution are

A. Eu^{2+}

B. Ce^{2+}

C. Lu^{3+}

D. Fe^{2+}

Answer:

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27. SRP values of lanthanides lies between

A. -2.2 to $-2.4V$

B. 4 to $2V$

C. 1 to $5V$

D. 0.1 to $-0.2V$

Answer:

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28. The correct order of ionic radii of Y^{3+},La^{3+}, Eu^{3+} and Lu^{3+} is

A. $Y^{3+} < La^{3+} < Eu^{2+} < Lu^{3+}$

B. $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$

C. $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$

D. $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$

Answer:

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29. A compound in which a metal ion $M^{x+}(Z = 25)$ has a spin only magnetic moment of $\sqrt{24}BM$. The no. of unpaired

electrons in the compound and the oxidation state of the metal ion are respectively 4,2 5,3 3,2 4,3

A. 4,2

B. 5,3

C. 3,2

D. 4,3

Answer:

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30. The d-electron configuration of Cr^{2+}, Mn^{2+}, Fe^{2+} and Co^{2+} are d^4, d^5, d^6 and d^7 respectively. Which one of the following will exhibit minimum paramagnetic behaviour ? [C r

(H2O)6]2+[Mn(H2O)6]2+[Fe(H2O)6]2+[Co(H2O)6]2+

A. $\left[Cr(H_2O)_6\right]^{2+}$

B. $\left[Mn(H_2O)_6\right]^{2+}$

C. $\left[Fe(H_2O)_6\right]^{2+}$

D. $\left[Co(H_2O)_6\right]^{2+}$

Answer:

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31. Which of the following statements are correct about the reason for complex formation of d-block metals ?

A. Small size

B. High ionic charge

C. Availability of d-orbitals

D. All these

Answer:

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32. Oxidising reactions of $KMnO_4$ are given below. Which is/are correct ?

A. $10I^- + 2MnO_4^- + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 5I_2$

B. $5S^- + 2MnO_4^- + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 5S$

C.

$$5NO_2^- + 2MnO_4^- + 6H^+ \rightarrow 2Mn^{2+} + 5NO_3^- + 3H_2O$$

D. All the above

Answer:

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33. Which of the following is not related to lanthanoid contraction and its consequences ?

A. The ionic radii of Ln (III) decrease with increase in atomic number due to imperfect shielding of one electron by another in the same subshell

B. Formation of chemical twins or similar pairs

C. Decreases in basicity of the hydroxides

D. Silvery white appearance and dense metals

Answer:

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34. m.p. range of Ln ranges from $1000K$ to $1200K$ except the steel hard

A. $._{62}Sm$

B. $._{71}Lu$

C. $._{61}Pm$

D. $._{70}Yb$

Answer:

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35. The actinoid with $5f^0$ configuration in the ground state

A. $._{90}Th$

B. $._{95}Am$

C. $._{96}Cm$

D. $._{102}No$

Answer:

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36. Actinoids which exhibit $+7$ oxidation states are

A. Th- and Bk`

B. Pa-and Am`

C. U- and Am`

D. Np-and Pu'

Answer:

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37. Which statement is false ?

A. More number of oxidation states are exhibited by actinoids than Ln

B. Chemistry of actinoids is not so smooth as that of Ln

C. Actinoid contraction is greater from element to element resulting from poor shielding of 5f electrons

D. $._{92}U$ is the heaviest primordial element

Answer:

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38. Which of the following has $6d^1$ configuration

A. Pa

B. U

C. Np

D. All

Answer:

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Level Ii

1. Which of the following is not the characteristion of transition metal ?

A. A. In these elements the outer most penultimate shells are incomplete

B. B. Pd has a configuration $5s^0 4d^{10}$

C. C. Show variable oxidation states always differing by one unit

D. D. Silver is not transition metal because $Ag^+ = 5s^0 4d^{10}$

Answer:

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2. Which among the following is incorrect ?

A. A. Transition elements : $(n-1)d^{1-10}ns^{1-2}$

B. B. Inner transitio elements : $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$

C. C. Cr^{+2} is weak reducing agent than Fe^{+2}

D. D. In 3d-series highest magnetic moment and M.P. present in Cr

Answer:

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3. Which among the following is incorrect ?

A. $Mn^{+2} > Fe^{+2} > Co^{+2} > Ni^{+2}$: ionic size

B. $K > Ca > Sc > Ti$: Density

C. $V < Cr > Mn$: M.P

D. $Fe = Co = Ni$: Atomic size

Answer:

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4. Following statements are related to the trends in stability of higher oxidation states. The incorrect statement is

A. Stability order of Cu^+ & Ag^+ halide complexes is

$1 > Br > Cl > F$

B. Copper (I) compounds are unknwon is solution

C. Highest oxidation state of $+8$ given by Os & Ru in their oxides

D. Oxidising power : $VO_2^+ > Cr_2O_7^{2-} > MnO_4^-$

Answer:

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5. For Ni and Pt different I.P values are given below :

	$(IP_1) + (IP)_2$	$(IP)_3 + (IP)_4$
Ni	2.49	8.80
Pt	2.60	6.70

hence :

A. Nickel (II) compounds tend to be thermodynamically more stable than platinum (II)

B. Plantinum (IV) compounds tend to be more stable than nickel (IV)

C. Both correct

D. None is correct

Answer:

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6. The following statements are related to standard reduction potentials of the first row T.S. which is incorrect ?

A. $E^{\ominus}_{M^{2+}/M}$ for copper is positive $(0.34V)$ accounts for its inability to liberate H_2 from acids

B. The values of $E^{\ominus}$ for Mn, Ni and Zn are more negative than expected from the trend

C. $E^{\ominus}_{M^{3+}/M^{2+}}$ for Mn ,Fe and Co are negative

D. $Co^{3+}/Co^{2+} > Mn^{3+}/Mn^{2+} > Fe^{3+}/Fe^{2+}$ - decreasing order as oxidant

Answer:

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7. Which of the following is correct ? (1) ΔH1 of group 12 is Zn>Cd>Hg (2) V205 is amphoteric,exist as VO4^3- in acidic medium (3)K2[PtCl6] is thermodynamically unstable (4)In the d-block , I.E, is lowest for La and highest for Hg

A. $\Delta_i H_1$ for group 12 is $Zn > Cd > Hg$

B. V_2O_5 is amphoteric , exist as VO_4^{3-} in acid medium

C. $K_2[PtCl_6]$ is thermodynamically unstable

D. In the d-block , I.E, is lowest for La and highest for Hg

Answer:

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8. Match List I with List II and select the correct answer using codes given below th lists :

List I (Alloys)	List II (Constituents)
(A) Gun metal	1. Lead + Tin
(B) German silver	2. Copper + Tin + Zinc
(C) Brass	3. Copper + Zinc
(D) Solder	4. Copper + Zinc + Nickel

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

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

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

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

Answer:

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9.

Given $E^0_{Cl_2}/Cl^- = 1.36V$ $E^0_{Cr^{+3}}/Cr = -0.74V$

$E^0_{Cr_2O_7^{-2}}/Cr^{+3} = 1.33V$ $E_{MnO_4^-}/Mn^{+2} = 1.51V$

Among the following, strongest reducing agent is

A. Mn^{+2}

B. Cr^{+3}

C. Cl^-

D. Cr

Answer:

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10. Paramagnetic and coloured in the following is

A. $K_2Cr_2O_7$

B. $(NH_4)_2TiCl_6$

C. $VOSO_4$

D. $K_3\left[Cu(CN)_4\right]$

Answer:

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11. Which of the following statement is wrong ?

A. Hg shows $+I$ & $+II$ oxidation states but Zn and Cd shows only $+II$

B. Increasing order of observed spin only magnetic moment in BM is $Cr^{+2} < Fe^{+2} < Mn^{+2}$

C. In aq.solution , Cu_2l_2 & $Cu_2(CN)_2$ are stable

D. Mercurous ion is paramagnetic

Answer:

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12. Which of the following is incorrect

A. Tic, Mn_4N, Fe_3H are non stochiometric compounds

B. Active species in $TiCl_4 + AIR_3$ (Zeigler-Natta catalyst) is Ti^{+3}

C. Mn can form MnF_7 & MnO_3F as stable compounds

D. In 3d-series V has highest ΔH atomisation

Answer:

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13.

Element:	Fe	Co	Ni	Cu
Metallic radii:	126	125	125	128

Which of these elements will have highest density?

A. Fe

B. Ni

C. Co

D. Cu

Answer:

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14. A pair of amphoteric oxides are

A. V_2O_5, Cr_2O_3

B. CrO, CrO_3

C. CrO_2, MnO_2

D. Sc_2O_3, TiO_2

Answer:

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15. Which one these may be expected to have correct w.r.t. IE

A. $I_1 : Cr < Mn < Fe$

B. $I_2 : Cr > Mn < Fe$

C. Both 1 & 2

D. $I_1 : Cr = Mn > Fe$

Answer:

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

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

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

C. A white ppt of CuI, HgI, and PbI_2 in each case

D. None is correct

Answer:

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17. Which of the following statement is incorrect ?

A. Iron (III) catalyses the reaction between iodide and persulphate ions

B. Interstitial compounds are non-stoichiometric and are neither covalent nor ionic

C. Alloy formation is due to similar radii and other characteristics

D. Basic nature : $TiO < VO < CrO < MnO < FeO$

Answer:

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18. $MnO_2 \xrightarrow{I} MnO_4^{2-} \xrightarrow{II} MnO_4^-$ I and II are

A. Fusion with KOH/air , electrolytic oxidation

B. Fusion with KOH/KNO_3 , disproportion in a neutral solution

C. Fusion with HNO_3/air , electrolytic reduction

D. Both 1 & 2

Answer:

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19. Which of the following is incorrect ?

A. $FeSO_4$ on heating forms Fe_2O_3, SO_2 and SO_3

B. $CuSO_4$ on reaction with excess KCN forms a colourless soluble complex $K_3\left[Cu(CN)_4\right]$.

C. Fe reacts with Cl_2 to form $FeCl_2$

D. MnO_4^{-2} undergoes disporportion in aqueous neutral medium into MnO_4^- and MnO_2

Answer:

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20. Which is wrong w.r.t. $K_2Cr_2O_7$?

A. K_2Cr_2O may be used as oxidizing agent in HCl but not $KMnO_4$

B. Tetrahedral chromate and dichromate ion are interconvertible in aq.solution

C. Act as oxidant in acidic medium where Eqt.mass $= \frac{M}{6}$

D. Solubility of $Na_2Cr_2O_7 < K_2Cr_2O_7$

Answer:

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21. Which is not related to the reactions of $K_2Cr_2O_7$?

A. Chromyl chloride test

B. CrO_3

C. CrO_5

D. Cr_2O_3, N_2, H_2O

Answer:

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22. In the dichromate ion, correct statement is

A. There are eight $Cr-O$ bonds and 2 tetrahedra units.

B. Cr-O-Cr bridged bond angle $=126^{\circ}$

C. Six $Cr-O-$ bonds are equivalent$(163\mathrm{pm})$

D. All are true

Answer:

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23. Which is false regarding $KMnO_4$?

A. Permanganate is diamagnetic , but coloured

B. Mn(II) salts is oxidised by peroxodisulphate to $KMnO_4$

C. Permanganate at $\left[H^{+}\right]=1$ should oxidise water vigorously

D. $KMnO_4$ is isomorphous to $KCIO_4$

Answer:

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24. $y \xleftarrow[OH^-]{MnO_4^-} I^- \xrightarrow[H^+]{Cr_2O_7^{-2}} x$. Sum of oxidation state of central atom in x & y is _____

A. 7

B. 0

C. 5

D. 3

Answer:

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25. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid

A. Cr^{+3} and $Cr_2O_7^{-2}$ are formed

B. $Cr_2O_7^{-2}$ and H_2O are formed

C. CrO_4^{-2} is reduced to $+3$ state if Cr

D. CrO_4^{-2} is oxidised to $+7$ state of Cr

Answer:

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26. Lanthanide for which $+2$ and $+3$ oxidation states are common in La Nd Ce Eu

A. La

B. Nd

C. Ce

D. Eu

Answer:

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27. Which of the following statement is not correct ?

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

B. $\ln_3 C$, $\ln_2 C_3$ & $\ln C_2$ are carbides of Ln

C. La is actually an element of transition series rather than lanthanoid series

D. Atomic radii of Zr and Hf are same because of lanthanide contraction

Answer:

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28. The order of sum of the first three ionization energies of the lanthanoids Ce, Eu, Gd, Yb and Lu is : $Ce > Eu > Gd > Yb > Lu$, $Yb > Lu > Eu > Gd > Ce$, $Yb > Eu > Lu > Gd > Ce, Yb > Eu > Gd > Lu > Ce$

A. $Ce > Eu > Gd > Yb > Lu$

B. $Yb > Lu > Eu > Gd > Ce$

C. $Yb > Eu > Lu > Gd > Ce$

D. $Yb > Eu > Gd > Lu > Ce$

Answer:

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29. For f-block element, incorrect statement is

A. Ln with xf electrons has pink colour, then the Ln with $(14 - x)f$ electrons also pink colour

B. EuH_2 & YbH_2 are ionic hydrides

C. In 'An' complex formation order is $M^{+4} > MO_2^{+2} > M^{+3} > MO_2^{+}$

D. Pr, Nd, Tb and Dy can exhibit $+4$ oxistate both in oxides and halides

Answer:

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30. Which is incorrectly paired ?

A. $Ce(SO_4)_2$-oxidant in volumetric analysis

B. Mixed oxides of Ln-catalyst in petroleum cracking

C. Misch metal -Ln$+4-5\%$ Fe

D. Phosphor screens -gas mantles

Answer:

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31. Which of the following is incorrect

A. 5f electrons are less effectively shielded from nuclear charge than 4f electrons

B. Sm has exceptionally high MP than other lanthanides

C. Th has ground level configuration of $5F^0$

D. Np and Pu can have $+7$ oxidation state

Answer:

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32. Which statements are incorrect?

A. IE_1 of Ln are around $600kJ$, the second about $1200kJ$ comparable to that of calcium

B. $E^{\ominus}$ for $\ln^{3+} + 3e^- \rightarrow \ln_{(s)}$ varies from $-2.2V$ to $-2.4V$ except $Eu(-2.0V)$

C. Sm^{2+} and Yb^{2+} are good reductants

D. Chemical twins are also formed due to actinoid contraction

Answer:

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33. Which is correct statement ?

A. $._{92}U$ is heaviest primordial element

B. Ce, Pr, Tb, Dy and Nd can exhibit $+2$ oxidation state

C. Pa, U, NP, Lr can have $6d'$ configuration

D. Ln do not react with acids to liberate H_2 gas

Answer:

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34. Assertion : $HgCl_2$ & $AgCl$ are colourless, but Hgl_2 & Agl are coloured

Reason : Large anions are more polarisable : If both Assertion and Reason are true and reason is the correct explanation of Assertion, If both Assertion and Reason are true but reason is not the correct explanation of Assertion, If Assertion is true but Reason is false, If both Assertion and Reason are false

A. If both Assertion and Reason are true and reason is the correct explanation of Assertion

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

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer:

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35. Assertion : Lanthanoids show a limited number of oxidation states, whereas actinoids show a large number of oxidation states

Reason : Actinoid contraction is grater from element to element due to poor shielding of $5f-$ orbitals

A. If both Assertion and Reason are true and reason is the correct explanation of Assertion

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

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer:

36. Assertion : In aqueous solution Cr^{+3} is more stable than Fe^{+3}

Reason : $E^0_{Cr^{+3}}/Cr^{+2} = -0.41V$, but $E^0_{Fe^{3+}/Fe^{2+}} = 0.77V$

A. If both Assertion and Reason are true and reason is the correct explanation of Assertion

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

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer:

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37. Assertion : In 4d series many elements have abnormal configurations

Reason : MP order : $Cu > Ag > Au$: If both Assertion and Reason are true and reason is the correct explanation of Assertion, If both Assertion and Reason are true but reason is not the correct explanation of Assertion, If Assertion is true but Reason is false, If both Assertion and Reason are false

A. If both Assertion and Reason are true and reason is the correct explanation of Assertion

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

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer:

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38. Assertion : The radius of $La^{+3}(Z = 57)$ is 1.06Å whereas radius of $Lu^{+3}(Z = 71)$ is 1.09Å

Reason : Due to Lanthanoid contraction , paramanetism is least with $._{60}Nd$: If both Assertion and Reason are true and reason is the correct explanation of Assertion, If both Assertion and Reason are true but reason is not the correct explanation of Assertion, If Assertion is true but Reason is false, If both Assertion and Reason are false

A. If both Assertion and Reason are true and reason is the correct explanation of Assertion

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

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer: