

INORGANIC CHEMISTRY

ENTHUSIAST | LEADER | ACHIEVER



EXERCISE

d and f-Block Elements

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions)
Build Up Your Understanding
d-BLOCK ELEMENTS

- For a catalyst which condition is not essential :
 (1) Variable oxidation states
 (2) High ionisation energy
 (3) Vacant orbitals
 (4) Free valency on the surface
DB0001
- To which of the following series the transition element from $Z = 39$ to $Z = 48$ belong :
 (1) 3d series (2) 4d series
 (3) 5d series (4) 6d series
DB0002
- KMnO_4 on treatment with conc. H_2SO_4 forms a compound (X) which decomposes explosively on heating forming (Y). The (X) and (Y) are respectively
 (1) Mn_2O_7 , MnO_2 (2) Mn_2O , Mn_2O_3
 (3) MnSO_4 , Mn_2O_3 (4) Mn_2O_3 , MnO_2
DB0003
- Which pair of ions is colourless :
 (1) Mn^{3+} , Co^{3+} (2) Fe^{3+} , Cr^{3+}
 (3) Zn^{2+} , Sc^{3+} (4) Ti^{2+} , Cu^{2+}
DB0004
- $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ (Ammonium dichromate) is used in fire works. The green coloured powder blown in air is :
 (1) Cr_2O_3 (2) CrO_2 (3) Cr_2O_4 (4) CrO_3
DB0005
- $\text{Cr}_2\text{O}_7^{2-} \xrightleftharpoons[X]{Y} 2\text{CrO}_4^{2-}$, X and Y are respectively
 (1) $\text{X} = \text{OH}^-$, $\text{Y} = \text{H}^+$ (2) $\text{X} = \text{H}^+$, $\text{Y} = \text{OH}^-$
 (3) $\text{X} = \text{OH}^-$, $\text{Y} = \text{H}_2\text{O}_2$ (4) $\text{X} = \text{H}_2\text{O}_2$, $\text{Y} = \text{OH}^-$
DB0006
- The higher oxidation states of transition elements are found to be the combination with A and B, which are:
 (1) F, O (2) O, N (3) O, Cl (4) F, Cl
DB0008
- Magnetic moment of x^{n+} is $\sqrt{24}$ B.M. Hence No. of unpaired electron and value of 'n' respectively. (Atomic number = 26)
 (1) 4, 3 (2) 3, 5 (3) 4, 2 (4) 4, 1
DB0009

- The product of oxidation of I^- with MnO_4^- in weak alkaline medium is :
 (1) IO_3^- (2) I_2 (3) IO^- (4) IO_4^-
DB0010
- Which of the following oxide of chromium is amphoteric in nature
 (1) CrO (2) Cr_2O_3 (3) CrO_3 (4) CrO_5
DB0012
- Compared to Cu^{2+} having $3d^9$ configuration, Cu^+ having $3d^{10}$ configuration (aq. solution) :-
 (1) Is more stable
 (2) Is equally stable
 (3) Is less stable
 (4) Stability depends upon nature of copper salt
DB0013
- CrO_3 is red orange in colour. The nature of oxide is:-
 (1) Acidic (2) Basic
 (3) Amphoteric (4) Neutral
DB0015
- Maximum spin magnetic moment is shown by :
 (1) d^5 (2) d^6 (3) d^7 (4) d^8
DB0017
- Disproportion can be shown by
 (1) MnO_4^{2-} in acidic medium
 (2) Cu^+ in aqueous medium
 (3) Cl_2 in alkaline medium
 (4) All of these
DB0018
- Which of the following configurations of 3d series exhibits the largest number of oxidation states -
 (1) $[\text{Ar}] 3d^8 4s^2$ (2) $[\text{Ar}] 3d^{10} 4s^1$
 (3) $[\text{Ar}] 3d^5 4s^2$ (4) $[\text{Ar}] 3d^7 4s^2$
DB0024
- Which of the following pair of ions has same value of "spin-only" magnetic moment
 (1) Cu^+ , Cu^{2+} (2) Co^{3+} , Fe^{2+}
 (3) Ti^{2+} , V^{2+} (4) Sc^{2+} , Zn^{+2}
DB0026

17. Which of the following transition metal do not form amalgam with Hg :-

- (1) Fe (2) Co
(3) Ni (4) All of the above

DB0145

18. Highest fluoride and oxide of Mn are respectively:-

- (1) MnF_7 , Mn_2O_7 (2) MnF_5 , Mn_2O_7
(3) MnF_4 , Mn_2O_7 (4) MnF_6 , Mn_2O_7

DB0146

19. Which is not a property of interstitial compound ?

- (1) Non stoichiometric
(2) Harder than pure metal
(3) Chemically inert
(4) Having low melting point

DB0147

20. Which halide of copper does not exist ?

- (1) CuF_2 (2) CuCl_2 (3) Cu_2I_2 (4) CuI_2

DB0148

21. Which order is correct for oxidising power ?

- (1) $\text{Cr}_2\text{O}_7^{2-} < \text{VO}_2^+$ (2) $\text{VO}_2^+ > \text{MnO}_4^-$
(3) $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-}$ (4) $\text{Cr}_2\text{O}_7^{2-} > \text{MnO}_4^-$

DB0149

22. Permanganate titrations in presence of Hydrochloric acid are not satisfactory because :-

- (1) HCl is a weak acid
(2) HCl is a volatile acid
(3) KMnO_4 will oxidise HCl into Cl_2
(4) KMnO_4 will show disproportionation in presence of HCl

DB0150

23. Which compound is used in manufacturing of $\text{K}_2\text{Cr}_2\text{O}_7$?

- (1) Na_2CrO_4 (2) CrO_5
(3) FeCr_2O_4 (4) CrO_3

DB0151

24. Which of the following does not give chromyl chloride test ?

- (1) NaCl (2) KCl (3) NH_4Cl (4) HgCl_2

DB0152

25. Which is correct match

- (1) Brass ; Cu + Zn
(2) Bronze ; Cu + Sn
(3) Stainless steel ; Cr + Ni
(4) All of the above

DB0153

26. Which of the following 3d series metal has positive value of $E^\circ(\text{M}^{+2}/\text{M})$?

- (1) Zn (2) Cu (3) Mn (4) Cr

DB0154

f-BLOCK ELEMENTS

27. Which of the following actinide element does not found in nature ?

- (1) Th_{90} (2) Pa_{91}
(3) U_{92} (4) Lr_{103}

FB0155

28. Which element does not show +4 oxidation state:-

- (1) Ce (2) Ti (3) Pt (4) Eu

FB0156

29. Which of the following ion is diamagnetic and colourless ?

- (1) La^{+3} (2) Lu^{+3}
(3) Zn^{+2} (4) All of the above

FB0157

30. The general electronic configuration of lanthanoid elements is :

- (1) $[\text{Xe}] 4f^{0-14} 5d^{0-1} 6s^2$
(2) $[\text{Xe}] 4f^{0-14} 5d^{1-2} 6s^1$
(3) $[\text{Xe}] 4f^{0-14} 5d^{0-1} 6s^{1-2}$
(4) None of these

FB0030

31. Cerium can show the oxidation state of +4 because

- (1) it resemble alkali metals
(2) it has very low value of I.E.
(3) of its tendency to attain noble gas configuration of xenon
(4) of its tendency to attain $4f^7$ configuration

FB0031

32. The highest oxidation state shown by actinides is:

- (1) +6 (2) +7 (3) +5 (4) +4

FB0033

33. The electronic configuration of gadolinium (At. No. 64) is :

- (1) $[\text{Xe}] 4f^7 5d^1 6s^2$ (2) $[\text{Xe}] 4f^8 5d^0 6s^2$
(3) $[\text{Xe}] 4f^8 5d^1 6s^1$ (4) $[\text{Xe}] 4f^7 5d^0 6s^2$

FB0034

34. Which oxidation state is not shown by lanthanoids?

- (1) +2 (2) +3 (3) +4 (4) +6

FB0158

35. Which of the following species acts as a reducing agent ?

- (1) Ce^{+4} (2) Lu^{+3} (3) Eu^{+2} (4) Ce^{+3}

FB0159

36. Which of the following pair have almost similar size?

- (1) Ti_{22} and Zr_{40} (2) Nb_{41} and Ta_{73}
(3) Y_{39} and La_{57} (4) Ca_{20} and Ir_{31}

FB0160

37. An increase in both atomic and ionic radii with atomic number occurs in any group of the periodic table. In accordance of this the ionic radii of Ti (IV) and Zr (IV) ions are 0.68 Å and 0.74 Å respectively but for Hf (IV) ion the ionic radius is 0.75 Å, which is almost the same as that for Zr (IV) ion. This is due to :-

- (1) greater degree of covalency in compounds of Hf^{4+}
(2) Lanthanide contraction
(3) Difference in the co-ordination number of Zr^{+4} and Hf^{+4} in their compounds
(4) Actinide contraction

FB0039

38. When lanthanoid element is heated with sulphur then compound obtained is :-

- (1) LnS_2 (2) Ln_2S_3 (3) Ln_2S (4) Ln_3S_4

FB0161

39. Formula of halide of lanthanoid may be

- (1) LnX_3 (2) LnX_5
(3) LnX_2 (4) LnX_6

FB0162

40. What is the composition of misch metal alloy?

- (1) Lanthanoid metal (95%) + Iron (5%)
(2) Cu (69%) + Zn (31%)
(3) Al (20%) + Cu (80%)
(4) Cr (50%) + Zn (30%) + Cu (20%)

FB0163

EXERCISE-I (Conceptual Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	2	1	3	1	1	1	3	1	2	3	1	1	4	3
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	2	4	3	4	4	3	3	3	4	4	2	4	4	4	4
Que.	31	32	33	34	35	36	37	38	39	40					
Ans.	3	2	1	4	3	2	2	2	1	1					

EXERCISE-II (Previous Year Questions)

AIPMT/NEET

AIPMT 2006

1. In which of the following pairs are both the ions coloured in aqueous solution?
(At. no. : Sc = 21, Ti = 22, Ni = 28, Cu = 29, Co = 27)
(1) Ni^{2+} , Cu^+ (2) Ni^{2+} , Ti^{3+}
(3) Sc^{3+} , Ti^{3+} (4) Sc^{3+} , Co^{2+}
2. More number of oxidation states are exhibited by the actinoids than by the lanthanoids. The main reason for this is
(1) more active nature of the actinoids
(2) more energy difference between 5f and 6d orbitals than that between 4f and 5d orbitals
(3) lesser energy difference between 5f and 6d orbitals than that between 4f and 5d orbitals
(4) greater metallic character of the lanthanoids than that of the corresponding actinoids

DB0040

FB0041

AIPMT 2007

3. Which one of the following ions is the most stable in aqueous solution
(1) V^{3+} (2) Ti^{3+} (3) Mn^{3+} (4) Cr^{3+}
4. Identify the incorrect statement among the following
(1) Lanthanoid contraction is the accumulation of successive shrinkages.
(2) As a result of lanthanoid contraction, the properties of 4d series of the transition elements have no similarities with the 5d series of elements.
(3) Shielding power of 4f electrons is quite weak.
(4) there is a decrease in the radii of the atoms or ions as one proceeds from La to Lu.

DB0042

FB0043

AIPMT 2008

5. The correct order of decreasing second ionisation enthalpy of Ti (22), V (23), Cr (24) and Mn (25) is:-
(1) $\text{Mn} > \text{Cr} > \text{Ti} > \text{V}$ (2) $\text{Ti} > \text{V} > \text{Cr} > \text{Mn}$
(3) $\text{Cr} > \text{Mn} > \text{V} > \text{Ti}$ (4) $\text{V} > \text{Mn} > \text{Cr} > \text{Ti}$

DB0044

AIPMT 2009

6. Which one of the elements with the following outer orbital configurations may exhibit the largest number of oxidation states?
(1) $3d^2 4s^2$ (2) $3d^3 4s^2$ (3) $3d^5 4s^1$ (4) $3d^5 4s^2$

DB0045

AIPMT 2010

7. Which of the following oxidation states is the most common among the lanthanoids :-
(1) 2 (2) 5 (3) 3 (4) 4
8. Which of the following pairs has the same size?
(1) Zn^{2+} , Hf^{4+} (2) Fe^{2+} , Ni^{2+}
(3) Zr^{4+} , Ti^{4+} (4) Zr^{4+} , Hf^{4+}
9. Which one of the following ions has electronic configuration $[\text{Ar}]3d^6$? (At. nos. Mn = 25, Fe = 26, Co = 27, Ni = 28)
(1) Co^{3+} (2) Ni^{3+} (3) Mn^{3+} (4) Fe^{3+}

FB0046

DB0047

DB0048

10. Which of the following ions will exhibit colour in aqueous solutions?
(1) Sc^{3+} (z = 21) (2) La^{3+} (z = 57)
(3) Ti^{3+} (z = 22) (4) Lu^{3+} (z = 71)

DB0049

AIPMT Pre. 2011

11. For the four successive transition elements (Cr, Mn, Fe and Co), the stability of +2 oxidation state in gaseous state will be there in which of the following order?
(1) $\text{Mn} > \text{Fe} > \text{Cr} > \text{Co}$
(2) $\text{Fe} > \text{Mn} > \text{Co} > \text{Cr}$
(3) $\text{Co} > \text{Mn} > \text{Fe} > \text{Cr}$
(4) $\text{Cr} > \text{Mn} > \text{Co} > \text{Fe}$
(At. nos. Cr = 24, Mn = 25, Fe = 26, Co = 27)

DB0051

AIPMT Pre. 2012

12. Which of the statements is not true?
(1) $\text{K}_2\text{Cr}_2\text{O}_7$ solution in acidic medium is orange
(2) $\text{K}_2\text{Cr}_2\text{O}_7$ solution becomes yellow on increasing the pH beyond 7
(3) On passing H_2S through acidified $\text{K}_2\text{Cr}_2\text{O}_7$ solution, a milky colour is observed
(4) $\text{Na}_2\text{Cr}_2\text{O}_7$ is preferred over $\text{K}_2\text{Cr}_2\text{O}_7$ in volumetric analysis

DB0053

AIPMT Mains 2012

- 13.** Which one of the following does not correctly represent the correct order of the property indicated against it ?
- (1) $Ti < V < Cr < Mn$: increasing melting points
 - (2) $Ti < V < Mn < Cr$: increasing 2nd ionization enthalpy
 - (3) $Ti < V < Cr < Mn$: increasing number of oxidation states
 - (4) $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$: increasing magnetic moment

DB0054

- 14.** The catalytic activity of transition metals and their compounds is described mainly to :-
- (1) their ability to adopt variable oxidation states
 - (2) their chemical reactivity
 - (3) their magnetic behaviour
 - (4) their unfilled d-orbitals

DB0055

AIPMT 2015

- 15.** Magnetic moment 2.84 B.M. is given by :- (At. no.), Ni = 28, Ti = 22, Cr = 24, Co = 27)
- (1) Ti^{3+}
 - (2) Cr^{2+}
 - (3) Co^{2+}
 - (4) Ni^{2+}

DB0062

- 16.** Which of the following processes does not involve oxidation of iron ?
- (1) Decolourization of blue $CuSO_4$ solution by iron
 - (2) Formation of $Fe(CO)_5$ from Fe
 - (3) Liberation of H_2 from steam by iron at high temperature
 - (4) Rusting of iron sheets

DB0063

- 17.** Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii ? (Number in the parenthesis are atomic numbers).
- (1) Zr (40) and Nb (41)
 - (2) Zr (40) and Hf (72)
 - (3) Zr (40) and Ta (73)
 - (4) Ti (22) and Zr (40)

FB0064

NEET-I 2016

- 18.** Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$ solution ?
- (1) The solution turns blue
 - (2) The solution is decolourized
 - (3) SO_2 is reduced
 - (4) Green $Cr_2(SO_4)_3$ is formed

DB0067

- 19.** The electronic configurations of Eu (Atomic No 63), Gd (Atomic No 64) and Tb (Atomic No. 65) are
- (1) $[Xe]4f^7 6s^2$, $[Xe]4f^8 6s^2$ and $[Xe]4f^8 5d^1 6s^2$
 - (2) $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$
 - (3) $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^8 5d^1 6s^2$
 - (4) $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

FB0068

NEET-II 2016

- 20.** Which one of the following statements related to lanthanons is **incorrect** ?
- (1) All the lanthanons are much more reactive than aluminium
 - (2) Ce(+4) solutions are widely used as oxidizing agent in volumetric analysis
 - (3) Europium shows +2 oxidation state.
 - (4) The basicity decreases as the ionic radius decreases from Pr to Lu.

FB0069

NEET(UG) 2017

- 21.** Name the gas that can readily decolourise acidified $KMnO_4$ solution :
- (1) SO_2
 - (2) NO_2
 - (3) P_2O_5
 - (4) CO_2

DB0074

- 22.** $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed is :
- (1) HgI_2, I^-
 - (2) HgI_4^{2-}, I_3^-
 - (3) Hg_2I_2, I^-
 - (4) HgI_2, I_3^-

DB0075

- 23.** The reason for greater range of oxidation states in actinoids is attributed to :-
- (1) actinoid contraction
 - (2) 5f, 6d and 7s levels having comparable energies
 - (3) 4f and 5d levels being close in energies
 - (4) the radioactive nature of actinoids

FB0076

NEET(UG) 2018

- 24.** Which one of the following ions exhibits d-d transition and paramagnetism as well ?
- (1) CrO_4^{2-}
 - (2) $Cr_2O_7^{2-}$
 - (3) MnO_4^-
 - (4) MnO_4^{2-}

DB0084

25. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the **correct** code :

Column I	Column II
a. Co^{3+}	i. $\sqrt{8}$ B.M.
b. Cr^{3+}	ii. $\sqrt{35}$ B.M.
c. Fe^{3+}	iii. $\sqrt{3}$ B.M.
d. Ni^{2+}	iv. $\sqrt{24}$ B.M.
	v. $\sqrt{15}$ B.M.

	a	b	c	d
(1)	iv	v	ii	i
(2)	i	ii	iii	iv
(3)	iv	i	ii	iii
(4)	iii	v	i	ii

DB0085

NEET(UG) 2019

26. Which of the following reactions are disproportionation reaction ?

- (a) $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}^0$
 (b) $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$
 (c) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
 (d) $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$

Select the **correct** option from the following :-

- (1) (a) and (b) only
 (2) (a), (b) and (c)
 (3) (a), (c) and (d)
 (4) (a) and (d) only

FB0164

27. The manganate and permanganate ions are tetrahedral, due to

- (1) The π -bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese
 (2) There is no π -bonding
 (3) The π -bonding involves overlap of p-orbitals of oxygen with p-orbitals of manganese
 (4) The π -bonding involves overlap of d-orbitals of oxygen with d-orbitals of manganese

DB0165

NEET(UG) 2019 (ODISHA)

28. Match the catalyst with the process :-

Catalyst	Process
(i) V_2O_5	(a) The oxidation of ethyne to ethanal
(ii) $\text{TiCl}_4 + \text{Al}(\text{CH}_3)_3$	(b) Polymerisation of alkynes
(iii) PdCl_2	(c) Oxidation of SO_2 in the manufacture of H_2SO_4
(iv) Nickel complexes	(d) Polymerisation of ethylene

Which of the following is the correct option ?

- (1) i-c, ii-d, iii-a, iv-b
 (2) i-a, ii-b, iii-c, iv-d
 (3) i-a, ii-c, iii-b, iv-d
 (4) i-c, ii-a, iii-d, iv-b

DB0166

29. When neutral or faintly alkaline KMnO_4 is treated with potassium iodide, iodide ion is converted into 'X'. 'X' is-

- (1) I_2 (2) IO_4^- (3) IO_3^- (4) IO^-

DB0167

30. The oxidation state of Cr in CrO_5 is :

- (1) -6 (2) +12 (3) +6 (4) +4

DB0168

NEET(UG) 2020

31. The calculated spin only magnetic moment of Cr^{2+} ion is :

- (1) 2.84 BM (2) 3.87 BM
 (3) 4.90 BM (4) 5.92 BM

DB0176

32. Identify the incorrect statement.

- (1) The oxidation states of chromium in CrO_4^{2-} and $\text{Cr}_2\text{O}_7^{2-}$ are not the same
 (2) Cr^{2+} (d^4) is a stronger reducing agent than Fe^{2+} (d^6) in water.
 (3) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.
 (4) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

DB0177

NEET(UG) 2020(COVID-19)

33. The oxidation number of the underlined atom in the following species

- (1) $\text{Cu}_2\underline{\text{O}}$ is -1 (2) $\underline{\text{Cl}}\text{O}_3^-$ is +5
(3) $\text{K}_2\underline{\text{Cr}}_2\text{O}_7$ is + 6 (4) $\text{H}\underline{\text{Au}}\text{Cl}_4$ is +3

Identify the incorrect option.

DB0178

34. Match the following aspects with the respective metal.

Aspects	Metal
(a) The metal which reveals a maximum number of oxidation states	(i) Scandium
(b) The metal although placed in 3d block is considered not as a transition element	(ii) Copper
(c) The metal which does not exhibit variable oxidation states	(iii) Manganese
(d) The metal which in +1 oxidation state in aqueous solution undergoes disproportionation	(iv) Zinc

Select the correct option :

- (1) (a)-(i) (b)-(iv) (c)-(ii) (d)-(iii)
(2) (a)-(iii) (b)-(iv) (c)-(i) (d)-(ii)
(3) (a)-(iii) (b)-(i) (c)-(iv) (d)-(ii)
(4) (a)-(ii) (b)-(iv) (c)-(i) (d)-(iii)

DB0179

NEET(UG) 2021

35. The **incorrect** statement among the following is :

- (1) Actinoid contraction is greater for element to element than Lanthanoid contraction.
(2) Most of the trivalent Lanthanoid ions are colorless in the solid state.
(3) Lanthanoids are good conductors of heat and electricity.
(4) Actinoids are highly reactive metals, especially when finely divided.

DB0180

36. Zr (Z =40) and Hf (Z =72) have similar atomic and ionic radii because of :

- (1) belonging to same group
(2) diagonal relationship
(3) lanthanoid contraction
(4) having similar chemical properties

DB0181

NEET (UG) 2022 (Overseas)

37. Match **List-I** with **List-II** :

List-I	List-II
(a) Element which exhibits +3 oxidation state only	(i) Mn
(b) Element which exhibits more number of oxidation states	(ii) Zn
(c) Element which is a reducing agent in its +2 oxidation state	(iii) Sc
(d) Element which is not considered as a transition element	(iv) Cr

Choose the **correct answer** from the options given below :

- (1) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
(2) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(4) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

DB0182

38. Identify the pair of Lanthanoids with one strong oxidant and one strong reductant.

- (1) Yb(II), Eu(II)
(2) Eu(IV), Lu(III)
(3) Ce(IV), Eu(II)
(4) Ce(IV), Tb(IV)

FB0183

Re-NEET (UG) 2022**39.** Given below are two statements :**Statement I :** Cr^{2+} is oxidising and Mn^{3+} is reducing in nature.**Statement II :** Sc^{3+} compounds are repelled by the applied magnetic field.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (1) Both **Statement I** and **Statement II** are correct
- (2) Both **Statement I** and **Statement II** are incorrect
- (3) **Statement I** is correct but **Statement II** is incorrect
- (4) **Statement I** is incorrect but **Statement II** is correct

DB0184**EXERCISE-II (Previous Year Questions)****ANSWER KEY**

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	2	3	4	2	3	4	3	4	1	3	1	4	1	1	4
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	2	2	4	4	1	1	2	2	4	1	1	1	1	3	3
Que.	31	32	33	34	35	36	37	38	39						
Ans.	3	1	1	2	2	3	3	3	4						

EXERCISE-III (Analytical Questions)

1. The correct order of ionic radii of Y^{3+} , La^{3+} , Eu^{3+} and Lu^{3+} is
- (1) $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$
 - (2) $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$
 - (3) $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$
 - (4) $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$

FB0096

2. The aqueous solution containing which one of the following ions will be colourless :-
[Atomic no. : Sc = 21, Fe = 26, Ti = 22, Mn = 25]
- (1) Fe^{2+}
 - (2) Mn^{2+}
 - (3) Ti^{3+}
 - (4) Sc^{3+}

DB0098

3. The lanthanide contraction is responsible for the fact that
- (1) Zr and Y have about the same radius
 - (2) Zr and Nb have similar oxidation state
 - (3) Zr and Hf have about the same radius
 - (4) Zr and Zn have the same oxidation state

FB0100

4. Which one of the following nitrates will leave behind a metal on strong heating ?
- (1) Copper nitrate
 - (2) Manganese nitrate
 - (3) Silver nitrate
 - (4) Ferric nitrate

DB0101

5. In which of the following, oxidation state of Mn is six
- (1) K_2MnO_4
 - (2) MnO_2
 - (3) $KMnO_4$
 - (4) MnO_4^{-1}

DB0103

6. Which has maximum magnetic moment :-
- (1) Co^{+2}
 - (2) Mn^{+3}
 - (3) Mn^{+2}
 - (4) Cr^{+3}

DB0104

7. Which of the following element has maximum composition in misch metal ?
- (1) La
 - (2) Fe
 - (3) Ce
 - (4) Lu

FB0169

8. Which of the following lanthanoid ion has maximum spin magnetic moment ?
- (1) Ce^{+3}
 - (2) Pr^{+3}
 - (3) Nd^{+3}
 - (4) Pm^{+3}

FB0170
Master Your Understanding

9. Which is related with lanthanoid contraction ?
- (1) Radius of 4d & 5d series elements of a group is almost same
 - (2) IE of 5d series elements is very high as compared to 4d series elements of a group
 - (3) Density of 5d series elements is abnormally high in its own group.
 - (4) All

FB0171

10. When hydrogen peroxide is added to acidified potassium dichromate, a blue colour is produced due to formation of
- (1) CrO_3
 - (2) Cr_2O_3
 - (3) CrO_5
 - (4) CrO_4^{2-}

DB0109

11. The actinoids exhibit more number of oxidation states in general than the lanthanoids. This is because
- (1) due to less energy difference between 6d & 5f
 - (2) the 5f orbitals are more buried than the 4f orbitals
 - (3) there is a similarity between 4f and 5f orbitals in their angular part of the wave function
 - (4) the actinoids are more reactive than the lanthanoids.

FB0111

12. In which of the following oxy anion all X-O bonds are not equivalent. (X – Central atom)
- (1) MnO_4^-
 - (2) CrO_4^{2-}
 - (3) MnO_4^{2-}
 - (4) $Cr_2O_7^{2-}$

DB0172

13. When Cu^{+2} solution reacts with excess of KI, then which option is incorrect ?
- (1) Insoluble Cu_2I_2 is obtained
 - (2) I_2 is liberated
 - (3) CuI_2 is formed
 - (4) It is a redox reaction between Cu^{+2} & I^-

DB0173

14. When MnO_2 is heated with fused KOH then the product obtained is
- (1) $KMnO_4$, purple
 - (2) K_2MnO_4 , green
 - (3) MnO_2 , black
 - (4) Mn_2O_3 , brown

DB0174

15. Iron exhibits +2 and +3 oxidation states. Which of the following statements about iron is **incorrect**?
- (1) Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds.
 - (2) Ferrous oxide is more basic in nature than the ferric oxide.
 - (3) Ferrous compounds are relatively more ionic than the corresponding ferric compounds.
 - (4) Ferrous compounds are less volatile than the corresponding ferric compounds.

DB0115

16. Which of the following metal cation is reduced from its higher oxidation state (+2) to (+1) by both KI solution and excess of KCN solution ?
- (1) Zn^{2+}
 - (2) Hg^{2+}
 - (3) Cu^{2+}
 - (4) None

DB0117

17. Cr^{2+} is reducing in nature because—
- (1) In Cr^{2+} , configuration changes from d^4 to d^3 to achieve half filled t_{2g} .
 - (2) Cr^{2+} gain an electron to achieve d^5 configuration
 - (3) Cr^{2+} give an electron to achieve d^5 configuration
 - (4) In Cr^{2+} configuration changes from d^4 to d^3 to achieve half filled d-subshell.

DB0119

18. Which among the following order of oxidising power is correct—

- (1) $\text{CrO}_4^- < \text{MoO}_4^- < \text{WO}_4^-$
- (2) $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$
- (3) $\text{CrO}_3 < \text{MnO}_2 < \text{Fe}_2\text{O}_3$
- (4) $\text{Pb}^{4+} < \text{Sn}^{4+} < \text{C}^{4+}$

DB0121

19. Which of the following reaction is not correct ?

- (1) $\text{Zn} + \text{dil H}_2\text{SO}_4 \longrightarrow \text{ZnSO}_4 + \text{H}_2$
- (2) $\text{Cu} + \text{dil H}_2\text{SO}_4 \longrightarrow \text{CuSO}_4 + \text{H}_2$
- (3) $\text{CuSO}_4 + \text{KI} \longrightarrow \text{K}_2\text{SO}_4 + \text{CuI}_2 + \text{I}_2$
- (4) $\text{Na}_2\text{CrO}_4 + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + \text{Na}_2\text{Cr}_2\text{O}_7$

DB0175

EXERCISE-III (Analytical Questions)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	4	4	3	3	1	3	3	4	4	3	1	4	3	2	1
Que.	16	17	18	19											
Ans.	3	1	2	2											