

EXERCISE - I (Conceptual Questions)

Build Up Your Understanding

d-BLOCK ELEMENTS

1. 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

CDF001

2. 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

CDF002

3. 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

CDF003

4. 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+}

CDF004

5. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ (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

CDF005

6. $\text{Cr}_2\text{O}_7^{2-} \xrightleftharpoons[X]{Y} 2\text{CrO}_4^{2-}$, 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) $\text{X} = \text{H}_2\text{O}_2$, $\text{Y} = \text{OH}^-$

CDF006

7. 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

CDF007

8. 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

CDF008

9. 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^-

CDF009

10. Which of the following oxide of chromium is amphoteric in nature
 (1) CrO (2) Cr_2O_3
 (3) CrO_3 (4) CrO_5

CDF010

11. 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

CDF011

12. CrO_3 is red orange in colour. The nature of oxide is:-
 (1) Acidic (2) Basic
 (3) Amphoteric (4) Neutral

CDF012

13. Maximum spin magnetic moment is shown by:
 (1) d^5 (2) d^6 (3) d^7 (4) d^8

CDF013

14. 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

CDF014

15. 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) $[\text{Ar}] 3d^7 4s^2$

CDF015

d and f Block Elements

16. 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}

CDF016

17. Which of the following transition metal do not form amalgam with Hg :-
 (1) Fe (2) Co
 (3) Ni (4) All of the above

CDF017

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

CDF018

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

CDF019

20. Which halide of copper does not exist ?
 (1) CuF_2 (2) CuCl_2
 (3) CuI_2 (4) CuI

CDF020

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) $\text{Cr}_2\text{O}_7^{-2} > \text{MnO}_4^-$

CDF021

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

CDF022

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

CDF023

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

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

CDF024

25. Which is correct match
 (1) Brass ; Cu + Zn
 (2) Bronze ; Cu + Sn
 (3) Stainless steel ; Cr + Ni
 (4) All of the above

CDF025

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

CDF026

f-BLOCK ELEMENTS

27. Which of the following actinide element does not found in nature ?
 (1) ${}_{90}\text{Th}$ (2) ${}_{91}\text{Pa}$
 (3) ${}_{92}\text{U}$ (4) ${}_{103}\text{Lr}$

CDF027

28. Which element does not show +4 oxidation state:-
 (1) Ce (2) Ti
 (3) Pt (4) Eu

CDF028

29. Which of the following ion is diamagnetic and colourless ?
 (1) La^{+3}
 (2) Lu^{+3}
 (3) Zn^{+2}
 (4) All of the above

CDF029

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

CDF030

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
CDF031
32. The highest oxidation state shown by actinides is:
 (1) +6 (2) +7
 (3) +5 (4) +4
CDF032
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) $[\text{Xe}] 4f^7 5d^0 6s^2$
CDF033
34. Which oxidation state is not shown by lanthanoids?
 (1) +2 (2) +3
 (3) +4 (4) +6
CDF034
35. Which of the following species acts as a reducing agent ?
 (1) Ce^{+4} (2) Lu^{+3}
 (3) Eu^{+2} (4) Ce^{+3}
CDF035
36. Which of the following pair have almost similar size?
 (1) $_{22}\text{Ti}$ and $_{40}\text{Zr}$ (2) $_{41}\text{Nb}$ and $_{73}\text{Ta}$
 (3) $_{39}\text{Y}$ and $_{57}\text{La}$ (4) $_{20}\text{Ca}$ and $_{77}\text{Ir}$
CDF036
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 $0.68 \text{ \AA}$ and $0.74 \text{ \AA}$ respectively but for Hf (IV) ion the ionic radius is $0.75 \text{ \AA}$, 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
CDF037
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
CDF038
39. Formula of halide of lanthanoid may be
 (1) LnX_3 (2) LnX_5
 (3) LnX_2 (4) LnX_6
CDF039
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%)
CDF040

EXERCISE-I (Conceptual Questions)

ANSWER KEY

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

EXERCISE - II (Previous Year Questions)

AIPMT/NEET

AIPMT 2015

1. 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+}
CDF055
2. 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
CDF056
3. 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) & Nb (41) (2) Zr (40) & Hf (72)
(3) Zr (40) & Ta (73) (4) Ti (22) & Zr (40)
CDF057

NEET-I 2016

4. 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
CDF058
5. 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 $[Xe]4f^9 5d^1 6s^2$
(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 $[Xe]4f^9 6s^2$
CDF059

NEET-II 2016

6. 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.
CDF060

NEET(UG) 2017

7. Name the gas that can readily decolourise acidified $KMnO_4$ solution :
(1) SO_2 (2) NO_2
(3) P_2O_5 (4) CO_2
CDF061
8. $HgCl_2$ 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^-
CDF062

9. 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
CDF063

NEET(UG) 2018

10. 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-}
CDF064

11. 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

CDF065

NEET(UG) 2019

12. 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

CDF066

13. 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

CDF067

NEET(UG) 2019 (ODISHA)

14. 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

CDF068

15. 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^-

CDF069

16. The oxidation state of Cr in CrO_5 is :

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

CDF070

NEET(UG) 2020

17. 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

CDF071

18. 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.

CDF072

NEET(UG) 2020(COVID-19)

19. 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.

CDF073

20. 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-series 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)

CDF074

NEET(UG) 2021

21. 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.

CDF075

22. 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

CDF076

NEET(UG) 2022

23. 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

CDF097

NEET(UG) 2023

24. Which of the following statements are **incorrect** ?

- A. All the transition metals except scandium form MO oxides which are ionic.
 B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7 .
 C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5 .
 D. V_2O_4 dissolves in acids to give VO_4^{3-} salts.
 E. CrO is basic but Cr_2O_3 is amphoteric.

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

- (1) B and D only (2) C and D only
 (3) B and C only (4) A and E only

CDF098

25. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Ionisation enthalpy increases along each series of the transition elements from left to right. However, small variations occur.

Reason (R) : There is corresponding increase in nuclear charge which accompanies the filling of electrons in the inner d-orbitals.

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

- (1) **(A)** is correct but **(R)** is not correct.
- (2) **(A)** is not correct but **(R)** is correct.
- (3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**.
- (4) Both **(A)** and **(R)** are correct but **(R)** is **not** the correct explanation of **(A)**.

CDF099

NEET(UG) 2024

26. 'Spin only' magnetic moment is same for which of the following ions ?

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

Choose the most appropriate answer from the options given below :

- | | |
|------------------|------------------|
| (1) B and D only | (2) A and E only |
| (3) B and C only | (4) A and D only |

CDF100

27. The E° value for the Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} due to change of

- (1) d^5 to d^4 configuration
- (2) d^5 to d^2 configuration
- (3) d^4 to d^5 configuration
- (4) d^3 to d^5 configuration

CDF101

28. The pair of lanthanoid ions which are diamagnetic is

- | | |
|-----------------------------|-----------------------------|
| (1) Ce^{4+} and Yb^{2+} | (2) Ce^{3+} and Eu^{2+} |
| (3) Gd^{3+} and Eu^{3+} | (4) Pm^{3+} and Sm^{3+} |

CDF102

NEET(UG) 2024 (Re-examination)

29. Which of the following pairs of ions will have same spin only magnetic moment values within the pair ?

- | | |
|---------------------------|---------------------------|
| (A) Zn^{2+} , Ti^{2+} | (B) Cr^{2+} , Fe^{2+} |
| (C) Ti^{3+} , Cu^{2+} | (D) V^{2+} , Cu^+ |

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

- | | |
|------------------|------------------|
| (1) C and D only | (2) A and D only |
| (3) A and B only | (4) B and C only |

CDF103

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	2	2	4	4	1	1	2	2	4	1	1	1	1	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Answer	3	3	1	1	2	2	3	4	2	3	1	3	1	4	

EXERCISE – III (Analytical Questions)

Master Your Understanding

1. Given below are two statements :

Statement-I : Ag is a transition element.

Statement-II : Ag atom has completely filled d-orbital ($4d^{10}$) in its ground state.

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

- (1) Both Statement-I and II are incorrect.
- (2) Statement-I is correct while II is incorrect.
- (3) Statement-I and II both are correct.
- (4) Statement-I is incorrect and II is correct.

CDF077

2. Given below are two statements :

Statement-I : All the transition elements show typical metallic properties such as high tensile strength, ductility but low thermal and electrical conductivity.

Statement-II : Zn, Cd & Hg are very hard and have low volatility.

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

- (1) Statement-I is correct while II is incorrect.
- (2) Both Statement-I and II are incorrect.
- (3) Statement-I and II both are correct.
- (4) Statement-I is incorrect and II is correct.

CDF078

3. Given below are two statements :

Statement-I : Transition elements exhibit higher enthalpies of atomisation.

Statement-II : Transition elements have stronger inter atomic interaction.

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

- (1) Statement-I is correct while II is incorrect.
- (2) Statement-I and II both are correct.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CDF079

4. Given below are two statements :

Statement-I : Cr^{+2} act as reducing agent and Mn^{+3} act as oxidising agent.

Statement-II : $E^0(\text{M}^{+2}/\text{M})$ value for all 3d-series element's are negative.

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

- (1) Statement-I is incorrect and II is correct.
- (2) Statement-I and II both are correct.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is correct while II is incorrect.

CDF080

5. Given below are two statements :

Statement-I : All Cu(II) halides are known except the iodide.

Statement-II : Increasing order of oxidising power is $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$

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

- (1) Both Statement-I and II are incorrect.
- (2) Statement-I is incorrect and II is correct.
- (3) Statement-I and II both are correct.
- (4) Statement-I is correct while II is incorrect.

CDF081

6. Given below are two statements :

Statement-I : Ce^{+4} is a strong oxidant but Eu^{+2} is a strong reducing agent.

Statement-II : All lanthanoid ion in +3 oxidation state are paramagnetic.

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

- (1) Statement-I and II both are correct.
- (2) Both Statement-I and II are incorrect.
- (3) Statement-I is correct while II is incorrect.
- (4) Statement-I is incorrect and II is correct.

CDF082

7. Match the column :

Column-I (Catalysis)		Column-II (Process)	
(i)	Ni in the presence of Hydrogen	(a)	Ziegler-Natta catalyst
(ii)	CuCl_2	(b)	Contact process
(iii)	V_2O_5	(c)	Vegetable oil to vegetable ghee
(iv)	$\text{TiCl}_4 + \text{Al}(\text{C}_2\text{H}_5)_2$	(d)	Decon process

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

CDF083

8. Match the column :

Column-I (Property)		Column-II (Element)	
(i)	Lanthanoid which show +4 oxidation state	(a)	Pm
(ii)	Lanthanoid which can show +2 oxidation state	(b)	Gd
(iii)	Radioactive lanthanoid	(c)	Ce
(iv)	Lanthanoid which has $4f^7$ configuration in +3 oxidation state	(d)	Eu

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

CDF084

9. Match the column :

Column-I		Column-II	
(a)	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	(p)	Green vitriol
(b)	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	(q)	Blue vitriol
(c)	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	(r)	Epsom salt
(d)	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	(s)	White vitriol

- (1) a-p, b-r, c-s, d-q (2) a-q, b-r, s-s, d-p
(3) a-r, b-s, c-p, d-q (4) a-q, b-p, c-s, d-r

CDF085

10. Match the column :

Column-I (Composition)		Column-II (Alloy)	
(a)	$\text{Cu} + \text{Ni}$	(p)	Silver UK coins
(b)	$\text{Ni} + \text{Cu} + \text{Zn}$	(q)	German silver
(c)	$\text{Cu} + \text{Zn} + \text{Sn}$	(r)	Gun metal
(d)	$\text{Ln}(95\%) + \text{Fe}$	(s)	Misch metal

- (1) a-p, b-q, c-r, d-s
(2) a-q, b-r, c-s, d-p
(3) a-s, b-q, c-r, d-p
(4) a-q, b-p, c-s, d-r

CDF086

11. Match the column :

Column-I (Compound)		Column-II (Properties)	
(i)	K_2MnO_4	(a)	Amphoteric
(ii)	KMnO_4	(b)	Paramagnetic & green coloured
(iii)	$\text{K}_2\text{Cr}_2\text{O}_7$	(c)	Diamagnetic & purple coloured
(iv)	V_2O_5	(d)	Diamagnetic & orange coloured

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

CDF087

12. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : $\text{K}_2\text{Cr}_2\text{O}_7$ is used as a primary standard solution in Titration.

Reason (R) : It is not a hygroscopic in nature. In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
(2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
(3) (A) is not correct but (R) is incorrect.
(4) (A) & (R) both are correct.

CDF088

13. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : The 3rd ionisation energy of Gd is abnormally low.

Reason (R) : Exchange energy of 4f subshell is high.

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

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is not correct but (R) is incorrect.
- (4) (A) & (R) both are correct.

CDF089

14. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Ce⁺⁴ can oxidise water and it is a good analytical reagent.

Reason (R) : The E⁰ value for Ce⁺⁴/Ce⁺³ is +1.74V.

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

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is not correct but (R) is incorrect.
- (4) (A) & (R) both are correct.

CDF090

15. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Eu⁺² & Yb⁺² are reducing agent.

Reason (R) : Both ions have strong tendency to convert into stable +3 in its aq. solution.

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

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is not correct but (R) is incorrect.
- (4) (A) & (R) both are correct.

CDF091

16. Which of the following oxides are Amphoteric in nature.

- (A) V₂O₅ (B) Cr₂O₃
(C) CrO₅ (D) Mn₂O₇

- (1) If A, B and C options are correct.
- (2) If A & B both options are correct.
- (3) If B & D both are options correct.
- (4) If A & C both are options correct.

CDF092

17. Which of the following statement is correct.

- (A) In Lanthanide series metallic radius regularly decreases from La to Lu.
(B) La is actually an elements of transition series rather than lanthanide.
(C) La(OH)₃ is less basic than Lu(OH)₃
(D) The atomic radius of Zr & Hf are nearly similar because of lanthanoid contraction.

- (1) If A, B and C options are correct.
- (2) If A & B both options are correct.
- (3) If B & D both are options correct.
- (4) If A & C both are options correct.

CDF093

18. Which of the following element does not [Ar]3d⁵ in its electronic configuration.

- (A) Cr (B) Fe (C) Mn (D) Ni

- (1) If A, B and C options are correct.
- (2) If A & B both options are correct.
- (3) If B & D both are options correct.
- (4) If A & C both are options correct.

CDF094

19. Which of the following order of given properties are correct.

- (A) $\text{CrO} > \text{Cr}_2\text{O}_3 > \text{CrO}_3$: Melting point
 (B) $\text{Mn}_2\text{O}_7 > \text{Mn}_2\text{O}_3 > \text{MnO}$: Acidic nature
 (C) $\text{CrO}_3 > \text{MoO}_3 > \text{WO}_3$: Oxidising nature character
 (D) $\text{V}_2\text{O}_5 > \text{V}_2\text{O}_4 > \text{V}_2\text{O}_3$: Basic nature
 (1) If A, B and C options are correct.
 (2) If A & B both options are correct.
 (3) If B & D both are options correct.
 (4) If A & C both are options correct.

CDF095

20. MnO_4^{2-} can be converted to MnO_4^-

- (A) By oxidation of O_3
 (B) By electrolytic oxidation
 (C) By the addition of dil. H_2SO_4
 (D) By the addition of HCl
 (1) If A, B and C options are correct.
 (2) If A & B both options are correct.
 (3) If B & D both are options correct.
 (4) If A & C both are options correct.

CDF096

EXERCISE-III (Analytical Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	2	2	4	3	3	2	3	1	1	3	1	1	1	1
Question	16	17	18	19	20										
Answer	2	3	3	1	1										