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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

I-CHEMISTRY

DPP

DAILY PRACTICE PROBLEMS

DPP NO. 1

Inorganic Chemistry : d & f Block Elements

DPP No. : 1

- Which one of the following does not correctly represent the correct order of the property indicated against it?
 - (1) $Ti < V < Cr < Mn$: increasing number of oxidation states
 - (2) $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$: increasing magnetic moment
 - (3) $Ti < V < Cr < Mn$: increasing melting points
 - (4) $Ti < V < Mn < Cr$: increasing 2nd ionization enthalpy
- Which of the following lanthanoid ions is diamagnetic ?
(At nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)
 - (1) Sm^{2+}
 - (2) Eu^{2+}
 - (3) Yb^{2+}
 - (4) Ce^{2+}
- Magnetic moment 2.83 BM is given by which of the following ions?
(At.nos.Ti = 22, Cr = 24, Mn = 25, Ni = 28)
 - (1) Ti^{3+}
 - (2) Ni^{2+}
 - (3) Cr^{3+}
 - (4) Mn^{2+}
- Which one of the following statements related to lanthanons is incorrect ?
 - (1) Ce (+4) solutions are widely used as oxidizing agent in volumetric analysis.
 - (2) Europium shows +2 oxidation state.
 - (3) The acidic nature decreases as the ionic radius decreases from Pr to Lu
 - (4) All the lanthanous are much more reactive than aluminium
- Name the gas that can readily decolourise acidified $KMnO_4$ solution:
 - (1) CO_2
 - (2) SO_2
 - (3) NO_2
 - (4) P_2O_5
- Match the right 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) | iii | v | i | ii |
| (3) | iv | i | ii | iii |
| (4) | i | ii | iii | iv |



7. The number of hydrogen bonded water molecule(s) associated with $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is –
 (1) 3 (2) 1 (3) 2 (4) 5
8. Identify the incorrect statement.
 (1) 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.
 (2) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.
 (3) The oxidation states of chromium in CrO_4^{2-} and $\text{Cr}_2\text{O}_7^{2-}$ are not the same
 (4) $\text{Cr}^{2+}(\text{d}^4)$ is a stronger reducing agent than $\text{Fe}^{2+}(\text{d}^6)$ in water

9. 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)
10. The **incorrect** statement among the following is :
 (1) Most of the trivalent Lanthanoid ions are colourless in the solid state.
 (2) Lanthanoids are good conductors of heat and electricity.
 (3) Actinoids are highly reactive metals, especially when finely divided.
 (4) Actinoid contraction is greater for element to element than Lanthanoid contraction.
11. In the neutral or faintly alkaline medium, KMnO_4 oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from
 (1) +7 to +3 (2) +6 to +5 (3) +7 to +4 (4) +6 to +4
12. Identify the pair of Lanthanoides 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)

13. Decrease in size from left to right in actinoid series is greater and gradual than that in lanthanoid series due to :
- (1) 4 f orbitals are penultimate
 - (2) 4 f orbitals have greater shielding effect
 - (3) 5 f orbitals have poor shielding effect
 - (4) 5 f orbitals have greater shielding effect
14. 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
15. Read the following statements and choose the set of correct statements:
- (A) Chrome steel is used for cutting tools and crushing machines.
 - (B) The fine dust of aluminium is used in paints and lacquers.
 - (C) Copper is used for reduction of alcohol.
 - (D) Zinc dust is used as a reducing agent in the manufacture of paints.
 - (E) Iron is used for galvanising zinc.
- Choose the **most appropriate** answer from the options given below:
- (1) (D) and (E) only (2) (A) and (D) only
 (3*) (A), (B) and (D) only (4) (B), (C) and (D) only

Answer Key

- | | | | | | | | | | | | | | |
|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. | (3) | 2. | (3) | 3. | (2) | 4. | (3) | 5. | (2) | 6. | (1) | 7. | (2) |
| 8. | (3) | 9. | (2) | 10. | (1) | 11. | (3) | 12. | (3) | 13. | (3) | 14. | (3) |
| 15. | (3) | | | | | | | | | | | | |