UNIT-8: d-and f-Block elements

One mark questions:	
1. What are transition elements?	K
2. Write the general electronic configuration of d-block elements.	K
3. Elements of which groups in the periodic table form the d-block?	K
4. Zinc, Cadmium and Mercury are d-block elements but not regarded as transition elements. Why?	K
5. Why are Cu, Ag and Au included under transition elements even though they contain completely filled d orbitals in their ground state?	K
6. On what ground can you say that Sc (Z=21) is a transition elements but Zn (Z=30) is not?	K
7. Generally, how does the melting points of the transition metals vary in a series?	K
8. Transition metals exhibit variable oxidation states in their compounds. Why?	U
9. Name one 3d-series element that does not show variable oxidation state.	U
10. Name the 3d series metal which shows highest oxidation state.	U
11. Name a metal in 3d-series which exhibits +1 oxidation state most frequently.	U
12. 3d-series transition metals exhibit +2 as the most common oxidation state (except Sc) why?	U
13. Complete the disproportionation reaction: $2Cu^{+}_{(aq)} \longrightarrow$	U
14. Copper (II) compounds are more stable in aqueous solution than copper (I) compounds. Give reasons.	U
15. The E^0 (M^{2+}/M) value for copper is positive (+0.34V) What is the possible reason for this?	U
16. Which of the following ion is coloured? Sc^{3+}, Zn^{2+} and Cr^{3+}	U
17. Arrange the following in their increasing value for E^0 (M^{3+}/ M^{2+}) values: Sc, Zn, Mn, Fe	A
18. Transition metals and their compounds show paramagnetic behavior. Why?	U
19. Vanadium has relatively low E^0(M^{3+}/M^{2+}) value. Give reason.	U
20. Write the formula of the oxidised product obtained when I^- ions are treated with MnO_4^- in fairly alkaline medium.	U
21. Between MnO and Mn_2O_7 which one of these has more covalent character?	U
22. Mention an important oxoacid of manganese.	K
23. Arrange Cr_2O_3, CrO_3 CrO in increasing order of their acid character.	U

24. Between $KMnO_4$ and $K_2Cr_2O_7$ which one of these is used as primary standard in volumetric analysis?	U
25. What are f-block elements?	K
26. Name the two series of f-block elements?	K
27. What are lanthanoids?	K
28. What are actinoids?	K
29. What is actinoid contraction?	K
30. What is the composition of Mischmetall?	K
31. What is the most common oxidation state of lanthanoids and actinoids?	K
32. Give reason: Cerium shows +4 oxidation state.	U
33. Actinoids contraction is more than lanthanoid contraction. Give reason?	U
34. Actinoids shows larger number of oxidation state than lanthanoids, Why?	U
35. Name an element that shows highest oxidation number among actinoids.	K
Two mark questions	
1. Name two characteristic properties exhibited by d-block elements due to their partially filled d-orbitals?	K
2. Transition elements exhibits higher enthalpies of atomization. Give reasons.	U
3. Compare the variability and stability in the oxidation state of transition metals and non transition (p- block) elements.	U
4. Second ionisation enthalpy is unusually high for chromium (atomic number 24) but for zinc (atomic number 30) it is unusually low. Give reasons.	U
5. Give reason: Transition metals and their many compounds act as good catalysts.	U
6. Write equations to show the catalytic activity of Fe (III) in the reaction: $2I^- + S_2O_8^{2-} \longrightarrow I_2 + 2SO_4^{2-}$	K
7. The transition metals generally form coloured compounds. Why?	U
8. Transition metals form large number of complex compounds. Give reason.	U
9. The second ionization enthalpy is unusually higher for Cr and Cu. Give reasons.	U
10. Which is a stronger reducing agent between Cr^{2+} and Fe^{2+} and why ?	U
11. E^0 (Mn^{3+} / Mn^{2+}) for manganese is comparatively high, but the same for Fe is low. Give reasons.	U
12. Among Mn^{3+}, Cr^{3+}, V^{3+}, Ti^{3+} which one of these is most stable in aqueous solution? Give reason.	U
13. Mn^{3+} is a good oxidizing agent but Cr^{2+} is a good reducing agent even though both have d^4 configuration. Give reason.	U

14. As the oxidation number of a metal in an oxide increases what happens to the i) ionic character of the oxide ii) chemical nature of the oxide?	K
15. What are diamagnetic substances? Between Ti^{3+} and Ti^{4+}, which is diamagnetic?	K
16. Sc^{3+} is diamagnetic and colourless in aqueous medium. Give reasons.	U
17. Cu^{+} is diamagnetic and Cu^{2+} is paramagnetic. Why?	U
18. Calculate the magnetic moment of Fe^{2+}. (At no:26)	S
19. What are interstitial compounds? Give an example.	K
20. Give any two characteristics of interstitial compounds.	K
21. Give two characteristics of transition metal alloys.	K
22. Transition metals readily form alloys. Give reason. Name an alloy with a transition and a non-transition element.	U
23. Give the laboratory preparation of potassium permanganate, with an equation.	K
24. What is the action of heat on potassium permanganate at 513K? Give the equation.	K
25. What is the gas liberated When i) Crystals of potassium permanganate is heated to 513K. ii) Acidified potassium permanganate is treated with oxalate ion at 333K?	K
26. i) Complete the following equation: $2MnO_4^- + 3Mn^{2+} + 2H_2O \longrightarrow$ ii) Write the structure of MnO_4^{2-} ion.	K
27. How do MnO_4^- and MnO_4^{2-} ions differ with respect to : i) oxidation state of Mn ii) Magnetic property ?	U
28. What is disproportionation of an oxidation state. Give an equation to show the disproportionation of MnO_4^{2-} in acidic solution.	U
29. Show the inter conversion of chromate and dichromate ions?	K
30. An aqueous solution contains CrO_4^{2-} and $Cr_2O_7^{2-}$ ions. When the pH of this solution is increased, concentration of which of these ion increases? Give an equation to justify your answer.	U
31. Write the full ionic equation for the oxidation of i) H_2S ii) Sn^{2+} by acidified potassium dichromate solution	K
32. Give the structure of chromate ions and dichromate ions.	S
33. What is lanthanoid contraction? Why is it caused?	K
34. Write the two consequences of lanthanoid contraction.	U
35. La^{3+} is colourless and diamagnetic. Give reasons.	U

36. What are the product/s formed when a lanthanoid reacts with i) Nitrogen gas ii) water?	K
37. What is the common oxidation state of f-block elements. What is the maximum oxidation state shown by uranium?	K
38. Study of actinoids is difficult. Give reasons.	U
39. Eu and Yb show +2 oxidation state. Give reasons.	U
Three mark questions:	
1. Name the metal of the 1st row transition series that has (i) highest value for magnetic moment (ii) zero spin only magnetic moment in its +2 oxidation state (iii) zero spin only magnetic moment in its +1 oxidation state	U
2. Give reasons: i) Transition metals have high melting points ii) Metal ions of same charge in a row of 'd' block elements show decrease in radius iii) Density of metals in a row of d-block increases.	U
3. Between scandium (atomic number 21) and zinc (atomic number 30) which has higher and lower value for E^0 (M^{3+} / M^{2+}) values. Justify your answer.	U
4. i) Oxygen is better than fluorine in stabilizing higher oxidation states of transition metals. Give reason. ii) Write the formula of the fluoride and oxide of manganese in which it exhibits highest oxidation state.	U
5. Name the cupric halide that does not exist. Give reason with an equation.	U
6. a) Write the steps involves in the commercial preparation of potassium permanganate. b) Permanganate titrations in presence of hydrochloric acid are unsatisfactory. Why?	K
7. How is potassium dichromate prepared from chromite ore? Give equations.	K
8. Write ionic equations for the oxidation of : i) thiosulphate ions in fairly alkaline $KMnO_4$ solution ii) iodide ions in acidified $K_2Cr_2O_7$ solution iii) Fe^{+2} ions by acidified $K_2Cr_2O_7$ solution.	K
9. Give three characteristics of lanthanoids.	K
10. Give three chemical properties of lanthanoids.	K

11. Give three characteristics of actinoids.	K
12. Compare the chemistry of actinoids with that of lanthanoids with respect to i) Electronic configuration ii) Oxidation state iii) Chemical reactivity	U
13. Match the following: i) Ferrous alloy bullets ii) Mischmetall + Mg polymerisation iii) Nickel complex steel	U