d-BLOCK ELEMENTS

1. For a catalyst which condition is not essential :
(1) Variable valency (2) High ionisation energy
(3) Empty orbitals (4) Free valency on the surface

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

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

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+}

5. $(NH_4)_2Cr_2O_7$ (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

6. $CrO_7^{-2} \overset{X}{\underset{Y}{\rightleftharpoons}} 2CrO_4^{-2}$, X and Y are respectively
(1) X = OH^-, Y = H^+ (2) X = H^+, Y = OH^-
(3) X = OH^-, Y = H_2O_2 (4) X = H_2O_2 Y = OH^-

7. During estimation of oxalic acid Vs $KMnO_4$, self indicator is :
(1) $KMnO_4$ (2) Oxalic acid (3) K_2SO_4 (4) $MnSO_4$

8. 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

9. Magnetic moment of x^{n+} is $\sqrt{24}$ B.M. Hence Number of unpaired electron and value of 'n' respectively. (Atomic number = 26).
(1) 4, 3 (2) 3, 5 (3) 4, 2 (4) 4, 1

10. The product of oxidation of I^- with MnO_4^- in alkaline medium is:
(1) IO_3^- (2) I_2 (3) IO^- (4) IO_4^-

11. Copper becomes green when exposed to moist air for longer period.
(1) Because of the formation of a layer of cupric oxide on the surface of copper
(2) Because of the formation of a layer of basic carbonate of copper on the surface of copper
(3) Because of the formation of a layer of cupric hydroxide on the surface of copper.
(4) (1) and (3) both

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

13. 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

14. Pick out the wrong statement:-
(1) $K_2Cr_2O_7$ reduces ferric sulphate to ferrous sulphate
(2) Iron do not form amalgam.
(3) Permanent magnet is made by an alloy called Alnico
(4) In the Lathanides ionic radius decreases from La^{+3} to Lu^{+3}

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

16. Cl_2 gas is obtained by various reactions but not by:
(1) $KMnO_4 + \text{conc. } HCl \xrightarrow{\Delta}$
(2) $KCl + K_2Cr_2O_7 + \text{conc. } H_2SO_4 \xrightarrow{\Delta}$
(3) $MnO_2 + \text{conc. } HCl \xrightarrow{\Delta}$
(4) $KCl + F_2 \xrightarrow{\Delta}$

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

18. 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

19. The basic character of the transition metal monoxides follows the order :
(Atomic number Ti = 22, V = 23, Cr = 24, Fe = 26)
(1) TiO > FeO > VO > CrO (2) TiO > VO > CrO > FeO
(3) VO > CrO > TiO > FeO (4) CrO > VO > FeO > TiO

20. Which of the following reactions is used to estimate copper volumetrically.?
(1) $2Cu^{2+} + 4F^{-} \longrightarrow Cu_2F_2 + F_2$
(2) $Cu^{2+} + 4NH_3 \longrightarrow [Cu(NH_3)]^{2+}$
(3) $2Cu^{2+} + 2CNS^{-} + SO_2 + 2H_2O \longrightarrow Cu_2(CNS)_2 + H_2SO_4 + 2H^{+}$
(4) $2Cu^{2+} + 4I^{-} \longrightarrow Cu_2I_2 + I_2$

21. Atomic size of gold is almost the same as that of silver. It is due to :
(1) the same crystal structure of silver and gold
(2) almost the same electropositive character of the two metals
(3) transition metals contraction in a series.
(4) the effect of lanthanide contraction

22. Which among the following statements is incorrect
(1) In d-block elements oxidation state differ by unity.
(2) In p-block metals oxidation state differ by two units.
(3) In a group of p-block lower oxidation states are favoured by the heavier members.

(4) In a group of d-block higher oxidation states are favoured by the lighter member.

23. Which among the following order of oxidizing character is correct-
(1) $CrO_3 > MoO_3$ (2) $K_2Cr_2O_7 > KMnO_4$
(3) $Fe(CO)_5 > Mn(CO)_5$ (4) $V_2O_3 > V_2O_5$

24. Which of the following configurations of 3d series metals exhibits the largest number of oxidation states-
(1) [Ar] $3d^8\ 4s^2$ (2) [Ar] $3d^{10}\ 4s^1$
(3) [Ar] $3d^5\ 4s^2$ (4) [Ar] $3d^7\ 4s^2$

25. Which of the following statement regarding interstetial compounds is incorrect-
(1) They are chemically inert (2) They are soft and nonconductive
(3) They retain metallic conductivity (4) They have high melting point.

26. 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}

f-BLOCK ELEMENTS

27. The elements from thorium (At. No. 90) to lawrencium (At. No. 103) in which 5f energy levels are filled up are called :
(1) lanthanides (2) rare earths (3) actinides (4) transuranics

28. Select the element in the following which does not show +4 oxidation state :
(1) Ti (2) Zr (3) La (4) Pt

29. With increase in atomic number the ionic radii of actinides :
(1) contract slightly (2) increase gradually
(3) show no change (4) change irregularly

30. The general electronic configuration of lanthanide is :
(1) [Xe] $4f^{14}\ 5d^{0-1}\ 6s^2$ (2) [Xe] $4f^{0-14}\ 5d^{1-2}\ 6s^1$
(3) [Xe] $4f^{0-14}\ 5d^{0-1}\ 6s^{1-2}$ (4) None of these

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

32. In aqueus solution Eu^{+2} acts as :
(1) an oxidising agent (2) reducing agent
(3) can ad as redox agent (4) None of these

33. The maximum oxidation state shown by actinides is :
(1) +6 (2) +7 (3) +5 (4) +4

34. The outer electronic configuration of gadolinium (At. No. 64) is :
(1) $4f^7 5d^1 6s^2$ (2) $4f^8 5d^0 6s^2$

(3) $4f^8 5d^1 6s^1$ (4) $4f^7 5d^0 6s^2$

35. The most characteristic oxidation state of lanthanides is :
(1) +2 (2) +3 (3) +4 (4) none of these

36. The common oxidation state of actinides is :
(1) +4 (2) +3 (3) +5 (4) +6

37. Which of the following f - block elements, will change its group on emmitting a-particle (alpha particle):
(1) $_{58}Ce$ (2) $_{70}Lu$ (3) $_{90}Th$ (4) $_{92}U$
Correct answer is :-
(1) Only land 3 (2) Only 2 and 4 (3) All (4)None

38. 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}

39. 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

ANSWER KEY

EXERCISE-I (Conceptual Questions)

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