

Contents: 7.1 Position in the periodic table

7.2 Electronic configurations of the *d*-block elements

1. *d*-block elements are arranged in ... of periodic table.
(1) three series (2) six series
(3) two series ☒ (4) four series
2. Second series of transition elements starts with :
☒ (1) yttrium (2) chromium
(3) zinc (4) scandium
3. Which one of the following is an example of non-typical transition elements?
(1) Li, K, Na ☒ (2) Zn, Cd, Hg
(3) Be, Al, Pb (4) Ba, Ca, Sr
4. The most abundant transition elements is.
(a) Cr ☒ (b) Fe
(c) W (d) Mn
5. The ground state electronic configuration of Cr^{2+} is
(1) $[\text{Ar}]4s^13d^5$ (2) $[\text{Ar}]4s^23d^4$
☒ (3) $[\text{Ar}]3d^4$ (4) $[\text{Ar}]4s^13d^3$
6. The ground state electronic configuration of Zn^{2+} is:
(1) $[\text{Ar}]4s^23d^8$ (2) $[\text{Ar}]4s^23d^{10}$
(3) $[\text{Ar}]4s^13d^9$ (4) $[\text{Ar}]3d^{10}$
7. In Cu ($Z = 29$) :
(1) 13 electrons have spin in one direction and 16 electrons in other direction
(2) 14 electrons have spin in one direction and 15 electrons in other direction
(3) all the electrons have spin in one direction
(4) none of these
8. The general valence shell electronic configuration of *d*-block elements is
☒ (1) $(n-1)d^{1-10}ns^{1-2}$ (2) $nd^{1-10}ns^{1-2}$
(3) $nd^{1-10}(n-1)s^{1-2}$ (4) $(n-1)d^{1-10}(n-1)s^{1-2}$
9. A transition element X has a configuration $[\text{Ar}]3d^4$ in its +3 oxidation state. Its atomic number is
☒ (1) 25 (2) 26
(3) 22 (4) 19

10. Among the following series of transition metal ions, the one where all metal ions have $3d^2$ electronic configuration is
- (1) $Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+}$ (2) $Ti^{+}, V^{4+}, Cr^{6+}, Mn^{7+}$
 (3) $Ti^{4+}, V^{3+}, Cr^{2+}, Mn^{3+}$ (4) $Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+}$

11. Which of the following has more unpaired electrons.
- (a) Zn^{+} (b) Fe^{2+}
 (c) N^{3+} (d) Cu^{+}

12. The highest oxidation state is achieved by which of the following?
- (a) $(n-1)d^5, ns^2$ (b) $(n-1)d^5, ns^1$
 (c) $(n-1)d^3, ns^2$ (d) $(n-1)d^4, ns^2$

Content: 8.3 General properties of the transitional elements(d-block)

13. The most common oxidation state for ions of the transition elements is
- (1) +2 (2) +3
 (3) +4 (4) +5

14. Which of the following atoms has the biggest radius?
- (1) ~~Ti~~ (2) Cr
 (3) Fe (4) Ni

15. Which of the following ions is most likely to form colored compounds?
- (1) Sc^{3+} (2) Cu^{+}
 (3) Zn^{2+} (4) ~~Cr^{3+}~~

16. Which of the following will be diamagnetic?
- (1) Ni^{2+} (2) Cr^{2+}
 (3) Co^{3+} (4) Ti^{4+}

17. Which of the following will be paramagnetic?
- (1) V^{5+} (2) Ni^{2+}
 (3) Mn^{7+} (4) Ti^{4+}

18. Which of the following should be the strongest reducing agent? The standard reduction potentials of Cu, Fe, Co and Sc are +0.34V, -0.44V, -0.277V and -2.1V respectively.

- (1) Fe (2) Co
 (3) Sc (4) Cu

19. Which of the following will be the strongest oxidizing agent?
- (1) Cr(II) (2) Cr(III)
 (3) Cr(IV) (4) ~~Cr(VI)~~

20. Which ion has maximum magnetic moment.
- (1) V^{3+} (2) Fe^{3+}
 (3) Mn^{3+} (4) Cu^{2+}

21. Transitional elements exhibit variable valencies because they release electrons from the following

orbits.

- (1) ns orbit (2) $(n-1)d$ and ns orbits
(3) ns and np orbits (4) $(n-1)d$ orbit

22. Magnetic moment of $[\text{Ag}(\text{CN})_2]^-$ is zero. How many unpaired electrons are there?
(1) Zero (2) 4 (3) 3 (4) 1

23. Formation of interstitial compounds makes the transition metal
(1) more soft (2) more ductile
(3) more metallic (4) more hard

24. The element showing oxidation states of +2, +3, +4, +6 and +7 is:
(1) Cr (2) Mn (3) Co (4) V

25. Which of the following species will impart colour to an aqueous solution
(a) Cu^+ (b) Zn^{2+} (c) Cr^{3+} (d) Ti^{4+}

Content 8.4: Some important compounds of transitional elements

26. Acidified potassium dichromate is treated with hydrogen sulphide. In the reaction, the oxidation number of chromium

- (1) Increases from +3 to +6
(2) Remains unchanged
(3) Decreases from +6 to +3
(4) Decreases from +6 to +2

27. The transitional metal which form green compound in +3 oxidation state and yellow orange compound in +6 oxidation state is

- (1) Fe (2) Cr (3) Ni (4) Co

28. In acidic medium one mole of MnO_4^- accepts how many moles of electrons in a redox process?
(1) 1 (2) 5 (3) 3 (4) 6

29. If acidified solution of $\text{K}_2\text{Cr}_2\text{O}_7$ is treated with Na_2SO_3 , then product formed is

- (1) Na_2SO_4 (2) $\text{Cr}_2(\text{SO}_4)_3$
(3) Both (1) and (2) (4) sulphur

30. An acidified solution of KMnO_4 oxidizes

- (1) sulphates (2) sulphites
(3) nitrates (4) ferric salts

31. KMnO_4 on heating above 200°C gives

- (1) $\text{K}_2\text{MnO}_3 + \text{O}_2 + \text{MnO}_2$
(2) $\text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
(3) $\text{MnO}_2 + \text{O}_2$
(4) none of these

32. Which oxide of Mn is acidic in nature?

- (1) MnO (2) Mn_2O_7
(3) Mn_2O_3 (4) MnO_2

33. Which ion in aqueous medium has orange colour?

- (1) $\text{Cr}_2\text{O}_7^{2-}$ (2) Cr^{3+} (3) MnO_4^- (4) MnO_4^{2-}

Inner transitional elements(f-Block elements)

Contents: 8.5: The lanthanides

8.6: The actinides

34. All those elements belong to *f*-block whose atomic numbers are
 (1) 58 to 71 (2) 90 to 103 (3) Both (1) and (2) (4) None
35. The inner transition elements are the elements in which the added electrons go to:
 (1) $(n-1)$ *d*-orbitals
 (2) $(n-2)$ *f*-orbitals
 (3) $(n-1)$ *d*-orbitals and $(n-1)$ *f*-orbitals
 (4) $(n-1)$ *d*-orbitals and *ns*-orbitals
36. 5*f*-level is successively filled up in:
 (1) lanthanoids (2) actinoids
 (3) rare gases (4) transition elements
37. Lanthanoids are.
 (1) 14 elements in the sixth period (atomic no. = 58 to 71) that are filling 4*f* sublevel
 (2) 14 elements in the sixth period (atomic no. = 90 to 103) that are filling 4*f* sublevel
 (3) 14 elements in the seventh period (atomic no. = 58 to 71) that are filling 4*f* sublevel
 (4) 14 elements in the seventh period (atomic no. = 90 to 103) that are filling 4*f* sublevel
38. The actinoids exhibit more number of oxidation states in general. This is because
 (1) the 5*f* orbitals extend further from the nucleus than the 4*f* orbitals
 (2) the 5*f*, 6*d* and 7*s* orbitals are of comparable energy
 (3) there is a similarity between 4*f* and 5*f* orbitals in their angular part of the wave function
 (4) the actinoids are more reactive than the lanthanoids
39. The lanthanoid contraction relates to
 (1) atomic radii
 (2) atomic as well as ionic radii
 (3) valence electrons
 (4) oxidation states
40. The correct statement(s) among the following is/are:
 (i) All the *d* and *f*-block elements are metals
 (ii) All *d* and *f*-block elements form coloured ions
 (iii) All *d* and *f*-block elements are paramagnetic
 (1) (i) only (2) (i) and (ii)
 (3) (ii) and (iii) (4) all of these
41. The common oxidation state of the elements of lanthanoid series is
 (1) +2 (2) +3 (3) +4 (4) +1