UNIT-16 d & f BLOCK ELEMENTS

Important Points

Position in periodic table	Block
Groups 1 to 2	s-Block
Groups 13 to 18	p-Block
Groups 3 to 12	d-Block
Two horizontal rows at the bottom of the periodic table	f-Block

- d-block elements are in periods 4 to 7.
- f-block elements are in periods 6 and 7.

Elements of d-block (Transition metal elements)

- The elements which in their ground state or any one of their oxidation states, d-orbital is incompletely filled are called transition elements.
- Amongst the d-block elements Zn, Cd and Hg do not act as transition elements.
- All the transition elements are metallic elements.
- In the first transition series, atomic radii decrease from Sc to V, while atomic radius remains same in elements Cr to Cu and the atomic radius of Zn is found increasing instead of decreasing.
- Not much difference is observed in first and second ionization enthalpies of two neighbouring transition elements but the value of second ionization enthalpy of Cr and Cu are more than those of their neighbouring elements.
- Most of the ionic and covalent compounds of transition elements are coloured.
- Compounds of transition elements act as catalysts in certain chemical reactions.
- The magnetic moment of transition element compounds,

  $\mu = \sqrt{n(n+2)}$ where μ = magnetic moment. n = number of unpaired element

  The unit of magnetic moment is BM (Bohr Magneton)
- The capacity to form complex compounds is much more than other elements because of definite characteristics of transition elements.
- In the formation of crystals of transition metals, the voids are there in which non-metal elements (H, C, N, B) arrange and form interstitial compounds.
- Scientists Hume and Rothery suggested the rules for the alloys and accordingly alloys having useful properties are obtained from transition metal elements.

- The compounds of transition element- $KMnO_4$ and $K_2Cr_2O_7$ are very useful in laboratory and in synthesis of organic compounds.

f-Block elements (Innertransition elements)

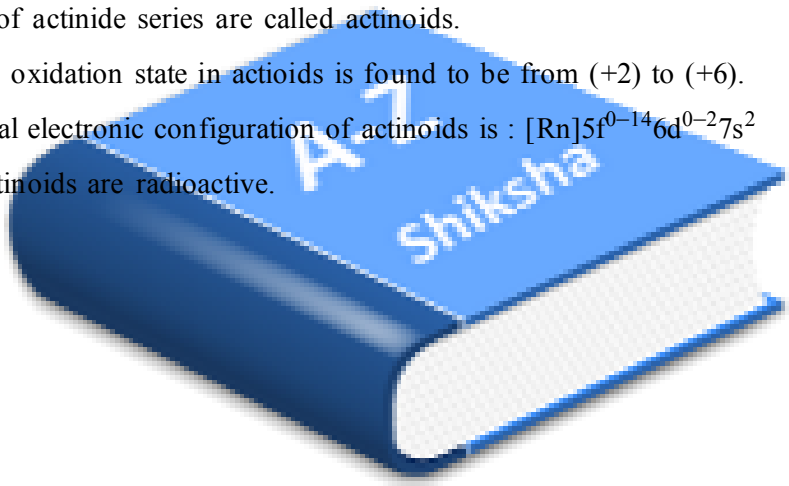
- f-Block elements are divided in to (1) Lanthanide series and (2) Actinide series.

Lanthanide series

- Lanthanide series : In period-6 Ce (Z = 58) to Lu (Z = 71)
- Elements of lanthanide series are called lanthanoids which are shown by symbol Ln.
- All the lanthanoids possess stable oxidation state (+3).
- The general electronic configuration of lanthanoids : $[Xe]4f^{1-14}5d^{0-1}6s^2$
- Amongst lanthanoids, promethium (Pm) is radioactive.

Actinide series

- Actinide series : In perod-7 Th (Z = 90) to Lr (Z = 103).
- Elements of actinide series are called actinoids.
- The stable oxidation state in actioids is found to be from (+2) to (+6).
- The general electronic configuration of actinoids is : $[Rn]5f^{0-14}6d^{0-2}7s^2$
- All the actinoids are radioactive.



MCQ

1. Whieh groups of elements are called d-block elements in modern periodic table ?
   (A) 1 to 2 (B) 3 to 10 (C) 3 to 12 (D) 13 to 18
2. Which block elements are more electropositive in modern periodic table ?
   (A) s (B) p (C) d (D) f
3. Which block elements are less electropositive in modern periodic table ?
   (A) s (B) p (C) d (D) f
4. Which elements transist between more electropositive and less electropositive elements ?
   (A) s (B) p (C) d (D) f
5. In modern periodic table, by which name d-block elements are known ?
   (A) More electropositive elements (C) Transition elements
   (B) Less electropositive elements (D) Inner transition elements
6. Which of the following is an electronic configuration at Th ?
   (A) $[Rn]\ 5f^{o}\ 6d^{2}\ 7s^{2}$ (C) $[Rn]\ 5f^{2}\ 6d^{2}\ 7s^{o}$
   (B) $[Rn]\ 5f^{2}\ 6d^{2}\ 7s^{2}$ (D) $[Rn]\ 5f'6d^{2}\ 7s^{o}$
7. By which reason, element -Th is introduce in f-block ?
   (A) According to electronic configuration (B) According to physical properties
   (C) According to chemical properties (D) According to practical properties
8. When d-block elements are consider as d-block elements ?
   (A) d-orbital is fully filled in ground state.
   (B) d-orbital is half filled in ground state.
   (C) d-orbital is fully filled in all oxidation states.
   (D) d-orbital is fully filled in only anyone oxidation state.
9. Which of the following elements are first transition element ?
   (A) Ac, Rt (B) Ac, Re (C) Rf, La (D) Y, Rf
10. Which of the following is general electron configuration of transition elements ?
    (A) $(n-1)\,d^{1-9}\ ns^{1-2}$ (B) $(n-1)d\ 1\text{-}10\ ns^{1\text{-}2}$
    (C) $(n-1)d^{1\text{-}10}\ ns^{1}$ (D) $(n\text{-}1)d^{1\text{-}9}\ ns^{2}$
11. Which of the following is an electron configuration of Cr ?
    (A) $[Ar]\ 3d^{4}\ 4s^{2}$ (B) $[Ar]\ 3d^{5}\ 4s^{2}$
    (C) $[Ar]\ 3d^{5}\ 4s^{1}$ (D) $[Ar]\ 3d^{5}\ 3s^{1}$
12. Which of the following is an electron configuration of Cu ?
    (A) $[Ar]\ 3d^{9}\ 4s^{2}$ (C) $[Ar]\ 3d^{10}\ 3s^{1}$
    (B) $[Ar]\ 3d^{9}\ 3s^{2}$ (D) $[Ar]\ 3d^{10}\ 4s^{1}$

13. Which of the following does not considered as transition element ?
(A) Cd (B) Pd (C) Ag (D) Ru

14. Which of the following does not considered as transition element ?
(A) Au (B) Hg (C) La (D) Pt

15. Which of the following does not relevant with transition elements ?
(A) Melting points of transition elements are high.
(B) Some ions of transition elements possesses paramagetic properties.
(C) All transition elements dissolves in acid.
(D) Transition elements processes various oxidation state.

16. Mention correct order of atomic radii.
(A) $T_i > M_n > C_0 > C_u > Z_n$ (C) $Ti > Mn > Co = Cu < Zn$
(B) $Ti < Mn < Co < Ca < Zn$ (D) $Ti > Mn = Ca > Co < Zn$

17. Which of the following elements have some atomic radii ?
(A) Mn, Fe, Co, Cu (B) Cr, Mn, Fe, Cu
(C) Cr, Mn, Fe, Co (D) Mn, Fe, Cu, Ni

18. Atomic radii of Zn increases in 3d transition series because
(A) Positive charge of nucleus increases (B) 3d orbital is fully filled
(C) Shielding effect
(D) Due to repulsion between $\bar{e}$-$\bar{e}$ of 3φ-otbital and attraeti on between $\bar{e}$-$\bar{e}$ deueases

19. In 3d series of transition element atomic radii remains same from Cr to Cu because
(A) Positive charge of nucleus increases.
(B) Sheilding effect increase for electron of 4s orbital.
(C) 3d orbital is fully filled
(D) Expansion of orbit does not occur.

20. Which elements have low ionisation enthalpy as compare to their neighbour element in first transition element ?
(A) Cr, Cu (B) Cr, Zn (C) Cr, Mn (D) Cu, Zu

21. Thermal stability of transition metal elements depends upon which of the following ?
(A) Atomic radii (B) Magnitude of ionisation enthalpy
(C) On electrode potential (D) Shielding effect

22. What is colour of aqueous solution of $\left[Ni\left(H_2o\right)_6\right]^{2t}$
(A) yellow (B) violet (C) pink (D) green

23. What is colour of aqueous solution of– $[Co(NH_3)_6]^{3+}$
(A) violet (B) yellowish orange (C) red (D) green

24. Which of the following metal ions have pink colour ?

(A) Cr^{3+}, Mn^{2+} (B) Co^{2+}, Mn^{3+}

(C) Co^{2+}, Mn^{2+} (D) Co^{3+}, Mn^{2+}

25. Which of the following metal ion is purple ?

(A) V^{4+} (B) Ti^{3+} (C) Fe^{3+} (D) Cu^{+}

26. Which of the following metal ions is colourless ?

(A) Ti^{4+} Cu^{2-+} (B) Ti^{4+} Cu^{+1}

(C) Cr^{2+}, Cu^{+} (D) T_i^{+4}, M_n^{+3}

27. Match column-A and B

	Column-A		Column-B
1.	V^{4+}	a.	colourless
2.	Ti^{3+}	b.	pink
3.	Ti^{4+}	c.	purple
4.	Mn^{2+}	d.	blue
		e.	vilot

(A) $1 \rightarrow d$ $2 \rightarrow c$ $3 \rightarrow a$ $4 \rightarrow e$

(B) $1 \rightarrow d$ $2 \rightarrow c$ $3 \rightarrow a$ $4 \rightarrow b$

(C) $1 \rightarrow d$ $2 \rightarrow e$ $3 \rightarrow a$ $4 \rightarrow b$

(D) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow b$ $4 \rightarrow a$

28. Match column-A and B.

	Column-A		Column-B
1.	$NiCl_2 . 6H_2O$	a.	pink
2.	$Co(NO_3)_2 . 6H_2O$	b.	colourless
3.	$FeCl_3$	c.	blue
4.	$CuSO_4 . 5H_2O$	d.	green
		e.	yellow

(A) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow b$ $4 \rightarrow a$

(B) $1 \rightarrow d$ $2 \rightarrow c$ $3 \rightarrow b$ $4 \rightarrow e$

(C) $1 \rightarrow d$ $2 \rightarrow a$ $3 \rightarrow c$ $4 \rightarrow b$

(D) $1 \rightarrow d$ $2 \rightarrow a$ $3 \rightarrow e$ $4 \rightarrow c$

29. Which catalyst is used to prepare SO_3 from SO_2 in contact process of production of H_2SO_4 ?

(A) NO (B) V_2O_5 (C) Fe (D) Ni

30. Which of the following trantion metal ion has magnetic moment 3.87 BM ?

(A) Co^{2+} (B) Co^{3+} (C) Fe^{2+} (D) Fe^{3+}

31. In which of the following compound of trantion metal ion has 4.90 BM magnetic momentum?
(A) KM_nO_4 (B) $NiCl_2$ (C) $CoCl_2$ (D) $FeSO_4$

32. Which of the following sentence is not suitable for the capacity of transition metal to form complex compounds ?
(A) Transition metal ions are small in size.
(B) Nuclear charge of trantion metal ion in comparatively more.
(C) Co-ordination covalent bond is not directional.
(D) Transition metal ions possesses different oxidation states.

33. Which of the following rules to prepare alloys should be obey ?
(A) Difference in atomic radii should be less than 15%.
(B) Valence electron configuration should not be equal.
(C) Atomic volume should not same.
(D) Crystal lattice structure are different.

34. What is the difference in atomic radii of two metallic elements to prepare alloys ?
(A) 15% (B) more than 15%
(C) less than 15% (D) 24.5 %

35. What is the difference of atomic radii of Au and Cu in 22 carate gold ?
(A) 15% (B) more than 15%
(C) less than 15% (D) 24.5%

36. Mn, Co, Cu metals are generally useful to prepare alloys because
(A) the difference in their atomic volume is more than 15%.
(B) the difference in their atomic volume is less than 2%.
(C) the difference in their atomic volume is 15%.
(D) the difference in their atomic volume is 2%.

37. Which alloy is used in preparation of coins ?
(A) Brass (B) Bronze
(C) German-Silver (D) Nichrome

38. Which alloy is used in preparation of antic - piece ?
(A) Nitinol (B) Bronze
(C) Cupronickle (D) German-Silver

39. Which alloy possesses facinating property of memory ?
(A) Brass (B) Nitinol
(C) Nichrom (D) Cupronicle

40. Match column-A and column-B properly.

	Column-A		Column-B
1.	Brass	a.	Ni (60%) Cr (40%)
2.	Bronze	b.	Cu (80%) Sn (20%)
3.	Cupronicle	c.	Cu (90%) Sn (10%)
4.	Nicnrom	d.	Cu (70%) Zn (30%)
		e.	Cu (75-85%) NI (25-15%)

(A) $1 \rightarrow d$ $2 \rightarrow c$ $3 \rightarrow e$ $4 \rightarrow a$

(B) $1 \rightarrow d$ $2 \rightarrow c$ $3 \rightarrow e$ $4 \rightarrow b$

(C) $1 \rightarrow d$ $2 \rightarrow e$ $3 \rightarrow a$ $4 \rightarrow b$

(D) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow a$ $4 \rightarrow d$

41. Where amalgum alloy is used ?

(A) In electric heater (B) In space reaserch

(C) To make surgical appliaces (D) In filling tooth cavity

42. Match Column-A and Column-B properly.

	Column-A		Column-B
1.	Stainless steel	a.	In reveting
2.	Bronze	b.	In antic piece
3.	Nitinol	c.	To make coins
4.	German silver	d.	To make surgical appliances
		e.	Cu (75-85%) NI (25-15%)

(A) $1 \rightarrow e$ $2 \rightarrow d$ $3 \rightarrow b$ $4 \rightarrow c$

(B) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow b$ $4 \rightarrow d$

(C) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow a$ $4 \rightarrow b$

(D) $1 \rightarrow e$ $2 \rightarrow c$ $3 \rightarrow a$ $4 \rightarrow d$

43. Which of the following proportion of constituent is present in amalgam alloys ?

(A) Hg (50%) Ag (35%) Sn (12%) Cu (3%)

(B) Hg (50%) Ag (35%) Sn (12%) Cu (3%) Zn (0.2%)

(C) Hg (50%) Ag (12%) Sn (35%) Cu (3%) Zn (0.2%)

(D) Hg (50%) Ag (35%) Sn (3%) Cu (12%)

44. $FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow$ mention which product is obtained ts ?

(A) $Na_2CrO_4 + Fe_3O_4 + CO_2$ (B) $Na_2CrO_4 + Fe_2O_3 + CO_2$

(C) $Na_2Cr_2O_7 + Fe_2O_3 + CO_2$ (D) $Na_2Cr_2O_7 + Fe_2O_3 + CO$

45. What will be the mole ratio of reactants in the given reation ?

$FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow Na_2CrO_4 + Fe_2O_3 + CO_2$

(A) 2:4:7 (B) 4:6:6 (C) 4:8:7 (D) 4:8:4

46. What will be mole ratio of product in the following equation ?

$FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow Na_2CrO_4 + Fe_2O_3 + CO_2$

(A) 8:2:8 (B) 8:4:8 (C) 4:4:8 (D) 8:2:6

47. $X + H^+ \rightarrow Y + Na^+ + H_2O$

$Y + KCl \rightarrow K_2\ Cr_2\ O_7 + NaCl$

Mention X and Y

(A) $X = Na_2\ Cr_2\ O_7$ $Y = Na_2\ Cr\ O_4$

(B) $X = Na_2\ Cr_2\ O_7$ $Y = Na_2\ Cr_2\ O_7$

(C) $X = Na_2\ Cr_2\ O_4$ $Y = Na_2\ Cr_2\ O_7$

(D) $X = Na_2\ Cr_2\ O_4$ $Y = Na_2\ Cr\ O_4$

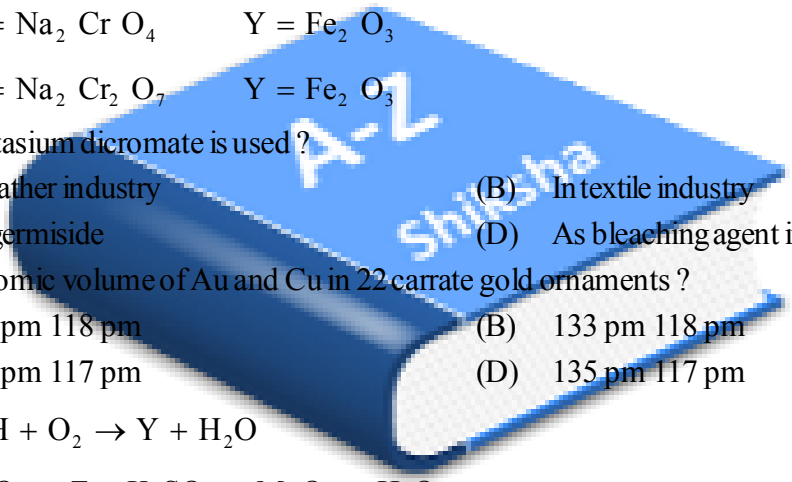
48. $Fe\ Cr_2\ O_4 + Na_2\ CO_3 + O_2 \rightarrow X + Y + CO_2$ Mention X and Y

(A) $X = Na_2\ Cr_2\ O_7$ $Y = Fe_3\ O_4$

(B) $X = Na_2\ Cr\ O_4$ $Y = Fe_3\ O_4$

(C) $X = Na_2\ Cr\ O_4$ $Y = Fe_2\ O_3$

(D) $X = Na_2\ Cr_2\ O_7$ $Y = Fe_2\ O_3$



49. Where potasium dicromate is used ?

(A) In leather industry (B) In textile industry

(C) As germiside (D) As bleaching agent in cotton cloths.

50. What is atomic volume of Au and Cu in 22 carrate gold ornaments ?

(A) 134 pm 118 pm (B) 133 pm 118 pm

(C) 134 pm 117 pm (D) 135 pm 117 pm

51. $X + KOH + O_2 \rightarrow Y + H_2O$

$Y + H_2SO_4 + Z + K_2SO_4 + MnO_2 + H_2O$

What are X, Y and Z in above reactions ?

(A) $X = K_2MnO_4$, $Y = MnO_2$, $Z = KMnO_4$

(B) $X = K_2MnO_4$, $Y = MnO_4$, $Z = KMnO_4$

(C) $X = MnO_2$, $Y = K_2\ MnO_4$, $Z = KMnO_4$

(D) $X = MnO_2$, $Y = KMnO_4\ \ MnO_4$, $Z = K_2\ \ MnO_4$

52. $K_2\ MnO_4 + H_2\ SO_4 \rightarrow KMnO_4 + K_2\ SO_4 + MnO_2 + H_2O$

What will be mole ratio of products in above reaction ?

(A) 1:1 (B) 2:1 (C) 1:2 (D) 2:2

53. $K_2\ MnO_4 + H_2SO_4 \rightarrow KMnO_4 + K_2SO_4 + MnO_2 + H_2O$

What will be mole ratio of products in above reaction ?

(A) 1:1:1:1 (B) 1:2:2:1 (C) 1:1:2:2 (D) 2:2:1:1

54. Potassium permangnate is used as .....

(A) As reducing agent (B) As corrosion inhibitors

(C) As decolouring agent in textile industry (D) In preparation of azo compound

55. Which of following is used in dry cell ?

(A) $KMnO_4$ (B) MnO_2 (C) $K_2Cr_2O_7$ (D) K_2MnO_2

56. Which of alloy is used to fill dental cavities ?

(A) Sodium amalgam (B) Zinc chloride

(C) Mercury (D) Mercury Amalgam

57. Which of following is used as gernlicide

(A) $K_2Cr_2O_7$ (B) $KMnO_4$ (C) $FeSO_4$ (D) K_2MnO_4

58. Which of following elements are include in Lanthanoide series ?

(A) La to Lu (B) Ce to Lu (C) La to yb (D) Ce to yb

59. Which of general symbol is used to represent Lanthanoides ?

(A) Ln (B) La (C) Le (D) Li

60. Which of following elements are include in actinide ?

(A) Th to Lr (B) Ac to Lr

(C) Ac to No (D) Th to No

61. What is general electronic configuration of outer shell of f-block elements ?

(A) $(n-2)f^{0-14}(n-1)d^{0-1}ns^2$ (B) $(n-2)f^{0-14}(n-1)d^{1-2}ns^2$

(C) $(n-1)f^{0-14}(n-1)d^{1-2}ns^2$ (D) $(n-1)f^{1-14}(n-1)d^{0-1}ns^1$

62. Which of following element has very close similarity with Lanthanoides ?

(A) Lr (B) Ce (C) Lu (D) La

63. What is electronic configuration of Ce $(Z=58)$

(A) $[Xe]\ 4f^2\ 5d^o\ 6s^2$ (B) $[Xe]\ 4f^1\ 5d^1\ 6s^2$

(C) $[Xe]\ 5d^2\ 6s^2$ (D) $[Xe]\ 4f^2\ 5d^1\ 6s^1$

64. Which of following is general electronic configuration of Lanthanoides ?

(A) $[Xe]\ 4f^{0-14}\ 5d^{0-1}\ 6s^2$ (B) $[Xe]\ 4f^{1-14}\ 5d^{1-2}\ 6s^2$

(C) $[Xe]\ 4f^{1-14}\ 5d^{0-1}\ 6s^2$ (D) $[Xe]\ 4f^{1-14}\ 5d^{0-1}\ 6s^{1-2}$

65. Which of following is general electronic configuration of actinides ?

(A) $[Ra]\ 5f^{0-14}\ 6d^{0-1}\ 7s^2$ (B) $[Rn]\ 5f^{1-14}\ 6d^{0-2}\ 7s^2$

(C) $[Rn]\ 5f^{0-14}\ 6d^{1-2}\ 7s^2$ (D) $[Rn]\ 5f^{0-14}\ 6d^{0-2}\ 7s^2$

66. Basic properties of hydroxides of lanthanoides is
(A) greater than $Al(OH)_3$ but less than $Ca(OH)_2$.
(B) greater than $Ca(OH)_2$ but less than $Al(OH)_3$.
(C) greater than $Ca(OH)_2$ and $Al(OH)_3$
(D) less than $Ca(OH)_2$ and $Al(OH)_3$

67. Lanthanoides elements are separated on the basis of their
(A) chemical properties (B) difference in basicity
(C) physical properties (D) difference in acidity

68. $Ln \xrightarrow{\text{Combusting in O}} X$ What is x

(A) LnO_3 (B) Ln_2O (C) Ln_2O_3 (D) Ln_2O_3

69. Which of following radioactive elements in Lanthanodies.
(A) Promethium (Pm) (B) Lutetium (Lu)
(C) Yetterbium (Yb (D) Samarium (Sm)

70. Which of following is used in gas lighters ?
(A) CeO_2 (B) Pyrophoric Misch metal
(C) Gadolinium sulphate (D) Ceric compounds

71. Which of following is used as oxidizing agent in volumetric analysis ?
(A) Ceric compounds (B) CeO_2
(C) Oxides of lanthanoids (D) Gadolinium sulphate

72. Which of following is used in preparation of optical glass of camera having high refractive index ?
(A) ceric compounds (B) CeO_2
(C) Oxides of lanthanoids (D) Gadolinium sulphate

73. Which of following is used to produce very low temperature by magnetic field ?
(A) Pyrophoric misch metal (B) Uranium
(C) Thorium (D) Gadolinium sulphate

74. What is the constitution of metals in pyrophoric misch metal ?
(A) ce-50%, ca-40%, Fe-10% (B) Ce-50%, La-40%, Fe-7%, other-5%
(C) Ce-40%, La-50%, Fe-5%, other-5% (D) Ce-40%, La-50%, Fe-10%

75. What would be emergy order of d-orbitals of tetra hedral complexes when they undergo splitting ?
(A) $d_{xy} \cong d_{y_2} \cong d_{xz} < d_{x^2-y^2} \cong d_{z^2}$ (B) $d_{x^2-y^2} \cong d_{z^2} < d_{xy} \cong d_{yz} \cong d_{xy}$
(C) $d_{xy} \cong d_{z^2} < d_{yz} \cong d_{xz} \cong d_{x^2-y^2}$ (D) $d_{x^2-y^2} \cong d_{xz} < d_{xy} \cong d_{yz} \cong d_{z^2}$

76. Which of following statement is wrong ?
(A) Atoms of all transition elements are paramagnetic.
(B) All transition elements are metals.
(C) All elements of d-block are transition elements.
(D) d-block elements are present in between s & p block elements in periodic table.

77. Why do theoritical value of magnetic moment differ from their practical value ?
(A) Due to decrease in volume of metal ion.
(B) Due to unsymmetrical arrangement of dipoles in orbital.
(C) Due to rotation-orbital combination.
(D) Both are different methods to calculate magnetic moment.

78. What is the value of magnetic moment of central metal ion in K_2MnO_4 ?
(A) 0.0 BM (B) 1.73 BM
(C) 2.83 BB (D) 3.87 BM

79. Which of group of ions has coloured ions ? [PMT-2001]
(1) Cu^{2+} (2) Ti^{4+} (3) Co^{2+} (4) Fe^{2+}
(A) 1, 2, 3, 4 (B) 3, 4
(C) 2, 3 (D) 1, 2

80. Which of following pair of elements has $(n-1)d^{10}ns^2$ electronic configuration ? [Pb CET-1996]
(A) Fe, Co, Ni (B) Cu, Ag, Au
(C) Zn, Cd, Hg (D) Sc, Y, La

81. Which is correct increasing order of ionic radii of Ce^{3+}, La^{3+}, Pm^{3+}, Yb^{3+} ? [AIEEE-2002]
(A) $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$ (B) $Yb^{3+} < PM^{3+} < Ce^{3+} < La^{3+}$
(C) $La^{3+} = Ce^{3+} < Pm^{3+} < Yb^{3+}$ (D) $Yb^{3+} < PM^{3+} < La^{3+} < Ce^{3+}$

82. The atomic no. of V, Cr, Mn and Fe are 23, 24, 25 & 26 respectively. Which of following has highest value of their second ionization enthalpy ? [AIEEE-2003]
(A) V (B) Cr (C) Mn (D) Fe

83. If the radius of La^{3+} is 1.06 Å, than what will be the approximate value of radius of Lu^{3+} from the following ? [AIEEE-2003]
(A) 1.40 Å (B) 1.40 Å (C) 0.85 Å (D) 1.60 Å

84. How many d-electrons are their in Fe^{2+} (Z = 26) [AIEEE-2003]
(A) 4 (B) 5 (C) 6 (D) 3

85. What will be obtained when managanese dioxide is fused with KOH in presence of oxidizing agent like KNO_3 ? What will be the colour of product ? (AIEEE-2003)
(A) K_2MnO_4 Dark green (B) $KMnO_4$, Violet
(C) Mn_2O_3, Grey (D) Mn_2O_4, Black

86. Which of following group of transition metal is used to prepare currency coins ?
(A) Cu, Ag, Au (B) Ru, Rh, Pd
(C) Fe, Co, Ni (D) Os, Ir, Pt

87. Ce is an important member of Lanthenoid series which of following is wrong statement for Ce ? [AIEEE-2004]

(A) The general oxidation state of Ce is +3 and +4.

(B) +3 oxidation state of Ce is more stable than +4.

(C) +4 oxidation state of Ce is not available in its aqueous solution.

(D) Ce (IV) behave as oxidizing agent.

88. Correct order of theoritical value of magnetic moment [AIEEE-2004]

(A) $[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$

(B) $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$

(C) $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$

(D) $[Fe(CN)_6]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$

89. The canthanide contraction is responsible for the fact that ..... [AIEEE-2005]

(A) Zn and Zr have the same oxidation state.

(B) Zr and Hf have same covalent and ionic radius.

(C) Zr and Nb have same oxidation state.

(D) Zr and Yb have same covalent and ionic radius.

90. In which of following group, all ions have $3d^2$ configuration ? [PMT-2004]
[Atomic No. Ti = 22, V = 23, Cr = 24, Mn = 25]

(A) Ti^{3+}, V^{2+}, Cr^{3+} Mn^{4+} (B) Ti^{+}, V^{4+}, Cr^{6+} Mn^{7+}

(C) Ti^{4+}, V^{3+}, Cr^{2+} Mn^{3+} (D) Ti^{2+}, V^{3+}, Cr^{4+} Mn^{5+}

91. Lanthanide contraction is caused due to..... [AIEEE-2006]

(A) The appreciable shilding on outer electrons by 4f electrons from the nuclear charge.

(B) The appreciable shilding on outer electrons by 5d electrons from the nuclear charge.

(C) The same effective nuclear charge from Ce to Lu.

(D) The poor shilding on outer electrons by 4f electrons from the nucluear charge.

92. The actinides exhibit more number of oxidation states in general than the lanthanide, because.....
[AIEEE-2007, 2008, PMT-2005, 2006]

(A) The 5f-orbitals are more spread in place than the 4f orbitals.

(B) Energy differnce between 5f and 6d orbitals is less than that of 4f and 5d orbitals.

(C) Energy difference between 5f and 6d orbital is more than that of 4f and 5d orbitals.

(D) Actinides are more reactive than that of lanthanides.

93. The general oxidation state of Lanthanide elements is +3. Which of following is incorrect statement for them ? [AIEEE-2009]

(A) Ln (III) hydroxides are mainly basic in character.

(B) Because of the large size of the Ln (III) ions, the bonding in its compounds is ionic in character.

(C) Ln (III) Compounds are generally colourless.

(D) The ionic sizes of Ln (III) decreases with increase in atomic number.

94. Which of following statement is wrong for transition element ? [AIEEE-2009]

(A) Once the d^5 configuration nis exceeded the tendency to involve all the 3d electrons in bonding decreases.

(B) In addition to the normal oxidation states, the zero oxidation state is also shown by these elements in complexes.

(C) In the highest oxidation states, the transition metals show basic.

(D) In the highest oxidation states of the first five (transition elements (Sc to Mn) all the 4s & 3d electrons are used for bonding ?

95. Which of following is wrong statement ?

(A) $La(OH)_3$ is less basic than $Lu(OH)_3$.

(B) In lanthanide series, ionic radius decreases while moving Ce^{3+} to Lu^{3+} ion.

(C) La is actually tranusition element.

(D) Due to Lanthanide contraction atomic radius of Zn and Hfare same.

96. In which of the following pairs are both the ions coloured in aqueous solution ? [PMT-2006]

[Atomic No. SC=21, Ti=22, Co=27, Ni=28, Cu=29]

(A) Ni^{2+}, Cu^{+} (B) Ni^{2+}, Ti^{3+}

(C) SC^{3+}, Ti^{3+} (D) SC^{3+}, CO^{2+}

97. Which of the following ion is most stable in aqueous solution ? [PMT-2007]

(A) $_{22}V^{3+}$ (B) $_{22}Ti^{3+}$ (C) $_{25}Mn^{3+}$ (D) $_{24}Cr^{3+}$

98. In which of the following outer most orbit will show maximum number of oxidation states ? [PMT-2009]

(A) $3d^5\ 4s^2$ (B) $3d^2\ 4s^2$

(C) $3d^3\ 4s^2$ (D) $3d^5\ 4s^1$

99. Mention the colourless pair from $[Ti\ F_6]^{2-}$, $[Co\ F_6]^{3-}$, $Cu_2\ Cl_2$ & $[NiCl_4]^{2}$ [PMT-2009]

(A) $[Ti\ F_6]^{2-}$, and $Ca_2\ Cl_2$ (B) $[Co\ F_6]^{3-}$, and $[Ni\ Cl_4]^{2}$

(C) $[Ti\ F_e]^{2-}$, and $[Co\ F_6]^{3}$ (D) Ca_2Cl_2 and $[Ni\ Cl_4]^{2-}$

100. German silver is alloy of [AIIMS-2000]

(A) Fe, Cr, Ni (B) Aq, Cu, Au

(C) Cu, Zn, Ni (D) Cu, Zn, Sn

101. What is oxidation no. of Cr in $K_2 Cr_2 O_7$ [AIIMS-2001]

(A) +2 (B) +4 (C) +6 (D) +7

102. Which of following Lanthanide element has +2 and +3 general oxidation state. [AIIMS-2003]

(A) La (B) Nd (C) Ce (D) Eu

103. Which of following compound is coloured ? [AIIMS-2008]

(A) $TiCl_3$ (B) $FeCl_3$ (C) $CoCl_2$ (D) All above

104. Which of following statement is correct for transition elements ? [AFMC - 2002]

(A) They are very active.

(B) They show variable valencies.

(C) They show lower melting point.

(D) They are stong electropositive elements.

105. A element having atomic no. 56 is included in [AFMC-2003]

(A) Lanthanides (B) Actindies

(C) Alkaline earth metals (D) None of above

106. What is percentage proportion of silver in german silver ? [AFMC-2004]

(A) 0% (B) 1%

(C) 5% (D) None of above

107. Which of similarity is seen in Lanthanoids & actinides ?

(A) Electronic configuration (B) Oxidation states

(C) Ionisation energy (D) Formation of complexes

108. Which of following is correct order of magnetic moment (In BM) for Mn^{2+}, Cr^{2+} & V^{2+}

(A) $Mn^{2+} > V^{2+} > Cr^{2+}$ (B) $V^{2+} > Cr^{2+} > Mn^{2+}$

(C) $Mn^{2+} > Cr^{2+} > V^{2+}$ (D) $Cr^{2+} > V^{2+} > Mn^{2+}$

109. Which of following is proper reason for stability of Gd^{3+} ion. (Tamilnadu-CET-2002)

(A) 4f orbital is completely filled

(B) 4f orbital is half filled

(C) show electronic configuration similar to inert gas.

(D) 4f orbital is completely vacant

110. Which of ion can not show d-d transition ? (Gujarat-2007)

(A) Ti^{4+} (B) Cr^{3+} (C) Mn^{2+} (D) Cu^{2+}

111. Which of following electronic configuration can show highest oxidation state ? (Gujarat-2007)

(A) $(n-1)\,d^5\ ns^2$ (B) $(n-1)\,d^8\ ns^2$

(C) $(n-1)\,d^5\ ns^1$ (D) $(n-1)\,d^3\ ns^2$

112. Which of following is use of potassium dichromate ? [Gujarat-2008]

(A) To oxidise ferrous ions into ferric ions in acidic medium as an oxidizing agent.

(B) As an insecticide (C) In electroplating

(D) As a reducing agent

113. Which of Lanthanide compound is used in pigment ? (Gujarat-2009)

(A) $Tb(OH)_3$ (B) $Lu(OH)_3$ (C) $Ce(OH)_3$ (D) CeO_2

114. On which factor, does the stability of an oxidation state in lanthanide elements depend ? [Gujarat-2008]

(A) Combined effect of hyadration energy and ionization energy.

(B) Electronic configuration (C) Enthalpy (D) Internal energy

115. What is the atomic number of the element with M^{2+} ion having electronic configuration [Ar] $3d^8$ [Gujarat-2009]

(A) 26 (B) 27 (C) 28 (D) 25

116. Which of canthanide element show +2 and +3 oxidation state ? [AIIMS-2003]

(A) La (B) Nd (C) Ce (D) Eu

117. Which of following is correct order of ionic radii of Y^{+3}, La^{3+}, Eu^{3+}, Lu^{3+} ? [CBSE-PMT-2003]

(A) Y^{3+}, < La^{3+}, < Eu^{3+}, > Lu^{3+} (B) Y^{3+}, < Lu^{3+}, < Eu^{3+}, < La^{3+}

(C) Lu^{3+}, < Eu^{3+}, < La^{3+}, < Y^{3+} (D) La^{3+}, < Eu^{3+}, < Lu^{+3}, < Y^{3+}

118. Lanthanide contraction is observed due to increase in..... [Kerala MEE 2003]

(A) Atomic radii (B) Volume of 4f orbital

(C) Effective nuclear charge (D) Atomic number

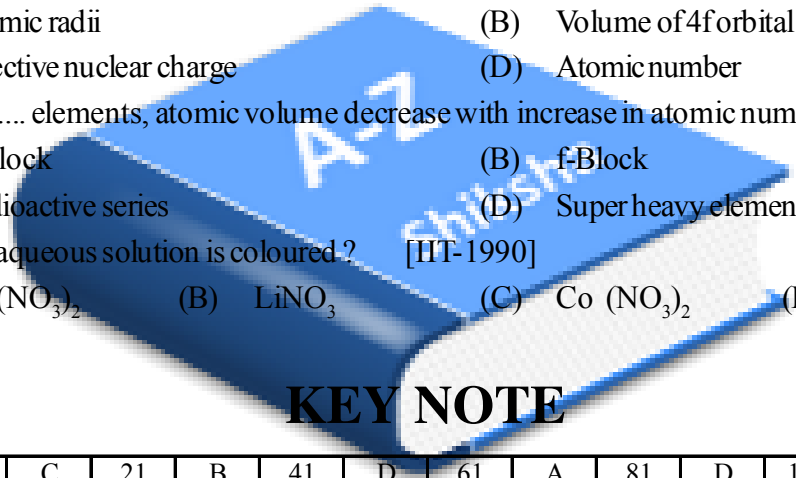
119. In..... elements, atomic volume decrease with increase in atomic number. [AIEEE-2003]

(A) p-Block (B) f-Block

(C) Radioactive series (D) Super heavy elements

120. Which of aqueous solution is coloured ? [IIT-1990]

(A) $Zn(NO_3)_2$ (B) $LiNO_3$ (C) $Co(NO_3)_2$ (D) Potash Alum



KEY NOTE

1	C	21	B	41	D	61	A	81	D	101	C
2	A	22	D	42	A	62	D	82	B	102	D
3	B	23	B	43	B	63	B	83	C	103	D
4	C	24	C	44	B	64	C	84	C	104	B
5	C	25	B	45	C	65	D	85	A	105	C
6	A	26	B	46	A	66	A	86	A	106	A
7	D	27	B	47	C	67	B	87	A	107	B
8	B	28	D	48	C	68	C	88	A	108	C
9	A	29	B	49	A	69	A	89	B	109	B
10	B	30	A	50	C	70	B	90	D	110	A
11	C	31	D	51	C	71	A	91	D	111	A
12	D	32	C	52	A	72	C	92	B	112	A
13	A	33	A	53	D	73	D	93	B	113	D
14	B	34	A	54	C	74	B	94	C	114	A
15	C	35	D	55	B	75	D	95	A	115	C
16	D	36	B	56	D	76	A	96	B	116	D
17	B	37	B	57	B	77	C	97	D	117	C
18	D	38	D	58	B	78	B	98	A	118	C
19	C	39	B	59	A	79	B	99	A	119	B
20	A	40	A	60	A	80	C	100	C	120	C