



## CHEMISTRY

### BOOKS - NIKITA CHEMISTRY (HINGLISH)

#### D-AND F-BLOCK ELEMENTS

#### MULTIPLE CHOICE QUESTIONS

1. Which of the following has maximum number of unpaired electrons ?





**Answer: A**



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2. The number of incomplete shells in transition elements are

A. 0

B. 1

C. 2

D. 3

**Answer: C**



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**3. The number of transition series in the periodic table are**

A. 4

B. 3

C. 5

D. 2

**Answer: A**



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4. The first elements of first, second and third transition series respectively are

A. Zn, Cd, Hg

B. Sc, Y, La

C. Cu, Ag, Au

D. Sc, Y, La

**Answer: B**

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5. The lightest transition element is

A. Hg

B. Sc, Y, La

C. Fe

D. Ti

**Answer: B**



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**6. Which of the following has maximum I.E ?**

A. Zn

B. Mn

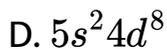
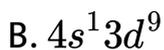
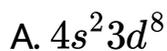
C. Co

D. Ni

**Answer: A**

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7. The electronic configuration of  ${}_{46}\text{Pd}$  is :



**Answer: C**

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8. First I.E. 5d elements are higher than those of 3d and 4d elements. This is due to

1) greater effective nuclear charge action on outer valence electrons.

2) greater effective nuclear charge is experience because of weak shielding effect of 4-f orbitals

A. only 1

B. only 2

C. 1 and 2

D. none is correct

**Answer: C**



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9. Pick out the incorrect statement for transition metals,

A. They form alloys

B. transition metals do not exhibit variable oxidation states

C. transition metal ions are coloured

D. transition metals and majority of their compounds are paramagnetic.

**Answer: B**



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10. Select incorrect statement (s)

- A.  $Ni^{2+}$  compounds tends to be thermodynamically more stable than  $Pt^{2+}$
- B.  $Pt^{4+}$  compounds are relatively more stable than  $Ni^{4+}$  compounds
- C.  $K_2PtCl_6$  exist
- D.  $K_2NiCl_6$  exist

**Answer: D**

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**11. Pick out the incorrect statement for transition metals**

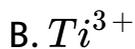
- A. they have low melting and boiling points (or low enthalpies of atomization)
- B. 5d-elements have higher energies than 3d or 4d-elements
- C. Zr and Hf have almost identical atomic and ionic radii
- D. they form interstitial compounds.

**Answer: A**

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**12.** Magnetic moments  $2.84B$ .  $M$  is given by :

(At. nos. ni = 28, Ti = 22, Cr = 24, Co = 27).



**Answer: A**



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**13.** Which one of the following statements is not true?

A. Transition metals form alloys

B. Transition metals form complexes

C. Zn, Cd and Hg are transition metals

D.  $K_2[PtCl_6]$  is a well known compound, but corresponding nickel compound is not known

**Answer: C**

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**14.** Non-stoichiometry is shown

1) due to variable valency of transition metals

2) due to defect in solid structure

3) reducing nature

Correct statemet (s) is /are

A. 1,2

B. 1,3

C. 2,3

D. 1,2,3

**Answer: A**



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**15. Number of unpaired electrons increases in 3d series up to**

A. Sc to Co

B. Sc to Mn

C. Sc to Ni

D. Sc to Cu

**Answer: B**



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**16.** The first ionisation energies of the elements of the first transition series ( $Ti \rightarrow Cu$ )

A. increases as the atomic number increases

B. decreases as the atomic number increases

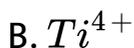
C. do not show any change as the addition of electrons takes place in the inner (n-1) d-orbitals

D. increases from Ti to Mn and then decreases from Mn to Cu..

**Answer: A**

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17. Which one of the following ions has the highest magnetic moment ?



**Answer: A**

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18. Equivalent weight of  $KMnO_4$  when it is convert into  $MnSO_4$  is

A.  $M/5$

B.  $M/6$

C.  $M/3$

D.  $M/2$

**Answer: A**



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19. Wh ich of the following is weak reducing agent ?

A. Nickel

B. Scandium

C. Copper

D. Titanium

**Answer: C**



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**20.** Which of the following has highest ionic radii

A.  $Cr^{3+}$

B.  $Mn^{3+}$

C.  $Fe^{3+}$

D.  $Co^{3+}$

**Answer: A**

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**21. Which of the following set has all the coloured ions ?**



**Answer: C**

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22. Which of the following statements is not true in regard to transition elements

- A. They readily form complex compounds
- B. They show variable valency
- C. All their ions are colourless
- D. Their ions contain partially filled d-electron levels

**Answer: C**

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23. Transition elements are coloured

- A. Due to small size

- B. Due to metallic nature
- C. Due to unpaired d-electrons
- D. All of these

**Answer: C**



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**24.** Which of the following alloys contain (s) Cu and Zn?

- A. Bronze
- B. Steel
- C. Alnico
- D. Brass

**Answer: D**

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**25.** Transition metals are often paramagnetic due to

- A. Their high m.p. and b.p.
- B. The presence of vacant orbitals
- C. The presence of one or more unpaired electrons in the system
- D. Their being less electropoitive than the elements of groups I-A and II-A

**Answer: C**

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26. Which of the following elements forms stable di-nuclear ions?

A. Zn

B. Cd

C. Hg

D. Fe

**Answer: C**

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27. Lower oxidation state in transition metals are stabilized by

A. CO

B. O

C. I

D. Br

**Answer: A**

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28. B.M is equal to

A.  $\frac{eh}{2\pi mc}$

B.  $\frac{eh}{4\pi mc}$

C.  $\frac{eV}{4\pi mc}$

D.  $\frac{eV}{2\pi mc}$

**Answer: B**



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**29.** Spin only of  $Mn^{2+}$  is

A. 7 B. M

B. 6 B.M

C. 1.5 B.M

D. 5.9 B.M

**Answer: D**

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**30. Which of the following is highest paramagnetic**

A. Mn

B. Zn

C. Cu

D. Co

**Answer: A**

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31. Colour of  $Cu_2O$  is due to

- A. d-d transition
- B. charge transfer
- C. f-f transition
- D. geometry of  $Cu_2O$

**Answer: B**



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32. An increase in both atomic and ionic radii with atomic number occurs in any group of the periodic table and in accordance with this, the ionic radii of Ti (IV) and Zr (IV) are  $0.68 \text{ \AA}$  and  $0.74 \text{ \AA}$  respectively, but for Hf (IV)

ion the ionic radius of  $0.75\text{\AA}$ , which is almost the same as that for Zr (IV) ion. This is due to

- A. greater degree of covalency in compounds of  $Hf^{4+}$
- B. lanthanide contraction
- C. difference in the coordination number of  $Zr^{4+}$  and  $Hf^{4+}$  in their compounds
- D. actinide contraction.

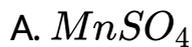
**Answer: B**



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**33.** Amongst the following, the lowest degree of paramagnetism per mole of the compound at 298 K will be

show by.



**Answer: B**



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**34.** Alloy forming tendency of transition element is due to

A. large difference in atomic size

B. small difference in atomic size

C. more number of oxidation state

D. defect in their crystal lattice

**Answer: B**



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**35.** Elements which generally exhibit multiple oxidation states and whose ions are usually coloured are

A. Metalloids

B. Transition elements

C. Non-metals

D. Gases

**Answer: B**

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**36. Which is wrong about transition metals?**

- A. They form complexes
- B. They show variable valency
- C. All transition metal compounds are paramagnetic
- D. They form coloured ions

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**37.** Which of the following elements does not belong to the first transition series?

A. Fe

B. V

C. Ag

D. Cu



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**38.** Transition elements, in general, exhibit the following properties, except one. Name that property

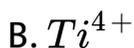
- A. variable oxidation property
- B. naturela radioactivity
- C. tendency to form complexes
- D. formation of alloys

**Answer: B**



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**39. Which of the following ions is coloured in solution ?**



D.  $V^{2+}$

**Answer: D**

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**40.** The maximum magnetic moment is shown by the ion with electronic configuration

A.  $3d^8$

B.  $3d^5$

C.  $3d^7$

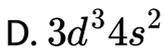
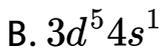
D.  $3d^9$

**Answer: B**



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41. The highest oxidation state is shown by transition elements with electronic configuration



**Answer: C**



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42. Which radical can bring about the highest oxidation state of a transition metal ?



**Answer: A**



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43. Ziegler-Natta catalyst is:



B.  $TiCl_4 / Al(C_2H_5)_3$

C.  $Pt / Rh$

D. Pt

**Answer: B**



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**44.** Zeigler-Natta catalyst is used

A. in the polymerization of ethene to produce polyethene

B. for oxidizing alcohols to aldehydes

C. in the polymerization of alkyne to give benzene

D. in the Ostwald process for converting  $NH_3$  into NO

**Answer: A**

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45. Resemblance between Nb and Ta is because they

- A. belong to same group of periodic table
- B. have the same mineral source
- C. have almost same ionic and covalent radii
- D. are transition metals

**Answer: C**

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46. The most stable oxidation state of chromium is

A. +6

B. +4

C. +3

D. +2

**Answer: A**



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47. Which of the following states is strong reducing agent?

A.  $Cr(+III)$

B.  $Cr(+VI)$

C.  $Mo(+VI)$

D.  $MO(+III)$

**Answer: D**



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**48.** The most stable oxidation state for Mo and W are respectively

A. +6, +6

B. +6, +5

C. +3, +3

D. +3, +6

**Answer: A**



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**49.** Manganese show oxidation state from +2 to +7. The most oxidizing state known in aqueous solution is

A. +2

B. +3

C. +4

D. +7

**Answer: D**



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50.  $Ag^+$  is isoelectronic with



**Answer: C**



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51. The  $Cu^{2+}$  having  $3d^9$  configuration,  $Cu^{+}$  having  $3d^{10}$  configuration. The  $Cu^{2+}$  is ,

- A. is more stable
- B. is less stable
- C. is equally stable
- D. stability depends upon the nature of copper salt

**Answer: B**

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52.  $CuCl_2$  is used as catalyst in

- A. the conversion of  $(CH_3)_2SiCl_2$  to linear silicones

B. making  $Cl_2$  from HCl in Deacon's process

C. the oxidation of the following metals does not dissolve in aqua-regia ?

D. in oxidation of alcohols

**Answer: B**



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**53. Maximum atomization enthalpy is found in**

A. Mn

B. Fe

C. Zn

D. V

**Answer: D**

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**54.** For which element of first transition series the oxidation potential value ( $M \rightarrow M^{2+} + 2e^{-}$ ) is lowest

A. Mn

B. Fe

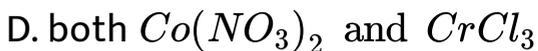
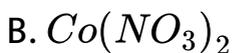
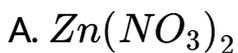
C. Ni

D. Cu

**Answer: D**

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55. The aqueous solutions of the following salts will be coloured in case of



**Answer: D**

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56. Soft d-block elements occurs as

- A. silphide ore
- B. oxide ore
- C. nitride ore
- D. hydroxide ore

**Answer: A**

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57. Mercury is the only metal which is liquid at  $0^{\circ}C$ . This is due to its

- A. very high ionization energy and weak metallic bond

B. low ionization potential

C. high atomic mass

D. high vapour pressure

**Answer: A**



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**58.** Which of the following compounds is not coloured ?

A. AgBr

B. AgI

C.  $Cu_2O$

D.  $ZnCl_2$

**Answer: D**

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**59. Which metal has highest density ?**

A. Pt

B. Hg

C. Os

D. Ir

**Answer: C**

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60. The number of unpaired electrons in ferrous ion is

A. 5

B. 4

C. 3

D. 2

**Answer: B**



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61. The element with lowest melting and boiling point is

A. Ti

B. Cu

C. Zn

D. V

**Answer: C**



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**62.** Fe, Co and Ni have valuable catalytic properties in process involving

A. Inorganic compound

B. Oxidation

C. Hydrogenation

D. Compounds of hydrogen

**Answer: C**



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**63.** Oxidation state of in  $Fe_3O_4$  is

A. +3

B. +8

C.  $+8/3$

D.  $+3/8$

**Answer: C**



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64. Which of the following compounds is not coloured ?

A.  $CuCl$

B.  $CuBr$

C.  $CuSO_4$

D.  $CuI$

**Answer: A**



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65. Which of the following statement is not correct about transition metals

A. They have low M.P

B. They shows variable O.S

C. They tend to adopt closely packed structures

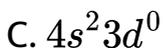
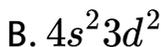
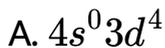
D. They have high lattice energy

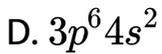
**Answer: A**



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**66.** The valence shell electronic configuration of  $Cr^{2+}$  ion is





**Answer: A**

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**67.** In the first transition series, the highest b.p. and m.p. is of

A. Cr

B. V

C. Ni

D. Fe

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68. Which of the following is for oxidation of  $SO_2$  to  $SO_3$  in contact process ?



D. Fe and Mo

**Answer: A::C**



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69. Amongst  $Cu^{+1}$ ,  $Fe^{+2}$  and  $Cr^{+3}$

(At. No.  $Cu = 29$ ,  $Fe = 26$ ,  $Cr = 24$ )

- A.  $Cu^{+1}$  is colourless,  $Fe^{+2}$  and  $Cr^{+3}$  are coloured
- B. all are coloured
- C. all are colourless
- D. only  $Cr^{+3}$  is coloured,  $Cu^{+1}$  and  $Fe^{+2}$  are colourless

**Answer: A**



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70. In the following transition elements, the lowest m.p. and b.p.

A. Hg

B. Cr

C. Cu

D. Fe

**Answer: A**



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71. Manganese belongs to

A. 1<sup>st</sup> transition series

B. 2<sup>nd</sup> transition series

C. 3<sup>rd</sup> transition series

D. 4<sup>th</sup> transition series

**Answer: A**



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**72.** Colour of the  $Cu_2O$  is due to

A. d-d transition

B. p-p transition

C. charge transfer

D. f-f transition

**Answer: C**

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**73. Which of the following ion is coloured ?**



**Answer: D**

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74. The transition metals have last electron entering into  $(n-1)$  d-orbital, where d-orbitals are degenerate. Colour of transition metal ions is due to absorption of light of some wavelength. This results in transition of electron which is

- A. d-s transition
- B. d-d transition
- C. d-p transition
- D. both 'a' and 'b'

**Answer: B**



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75. Transition elements have greater tendency to form complexes because

- A. they contain partially filled d-orbitals
- B. nuclear charge to atomic size ratio is quite high
- C. both 'a' and 'b'
- D. they are metals and all metals form complexes

**Answer: C**



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76. The electrons which take part in order to exhibit variable oxidation states by transition metals are

- A. ns electrons
- B. (n-1) d-electrons
- C. ns and (n-1) d-electrons
- D. (n+1) d-electrons

**Answer: C**



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**77.** Variable oxidation state is shown by

- A. normal elements
- B. metallic elements
- C. nonmetallic elements

D. transition elements.

**Answer: D**

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**78.** Which of the following is wrong about interstitial compounds ?

A. their M.P. is higher than parent metals

B. their density is higher than parent metals

C. their hydrides are powerful reducing agent than parent metals.

D. these are neither ionic nor covalent

**Answer: B**

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79. The number of d-electrons retained in  $Fe^{2+}$  (At. No. Fe=26) ions are:

A. 3

B. 2

C. 4

D. 5

**Answer: C**

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80. The colour of transition metal ion is attributed to:

- A. small-size of metla ions
- B. absorption of light in UV region
- C. complete ns sub-shell
- D. incomplete (n-1) d orbital

**Answer: D**

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81. Which one of the following ions is colourless ?

- A.  $Cu^+$

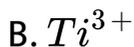


**Answer: A**



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**82.** Which of the following transition metal ion will have magnetic moment ?





**Answer: B**

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**83.** If  $n$  is the number of unpaired electrons, the magnetic moment (in BM) of transition metal/ion is given by

A.  $\sqrt{n(n + 2)}$

B.  $\sqrt{2n(n + 1)}$

C.  $\sqrt{n(n - 2)}$

D.  $\sqrt{n^2(n - 1)}$

**Answer: A**

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84. Which is the set of non stoichiometric compounds

A.  $NaCl$ ,  $FeO$ ,  $MgCl_2$

B.  $Fe_3O_4$ ,  $NaCl$ ,  $CuS$

C.  $Fe_3H$ ,  $TiC$ ,  $VH$

D.  $CuCl$ ,  $CuS$ ,  $MgO$

**Answer: C**

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85. Which of the following has highest ionisation energy ?

A. Cr

B. Zn

C. V

D. Fe

**Answer: B**



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**86.** A transition element  $X$  has a configuration  $[Ar]3d^4$  in its +3 oxidation state. Its atomic number is

A. 25

B. 26

C. 22

D. 19

**Answer: A**



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**87.**  $Fe^{+3}$

A. is isoelectronic with  $Cu^2$

B. is isoelectronic with  $Co^{2+}$

C. is isoelectronic with  $Mn^{2+}$

D. is isoelectronic with  $Ni^{2+}$

**Answer: C**



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**88.** Which of the following is not correct about transition metals

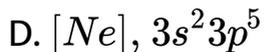
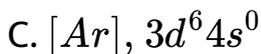
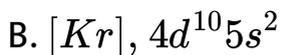
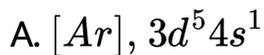
- A. Their melting and boiling points are high
- B. Their compounds are generally colored
- C. They can form ionic or covalent compounds
- D. They do not exhibit variable valency

**Answer: D**



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89. Ground state electronic configuration of Cr atom is :

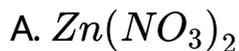


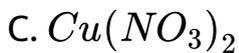
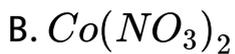
**Answer: A**



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90. The aqueous solution of the following salts will be coloured in the case of





D. both b and c

**Answer: D**



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**91.** The no. of unpaired electrons in  $Mn^{7+}$  ions (At. No of Mn =25) is

A. 0

B. 1

C. 2

D. 3

**Answer: A**

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**92.** The first and last element of the second transition series respectively are

A. Y, Cd

B. La, Hg

C. Cd, Y

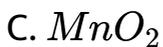
D. none of the above

**Answer: A**



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93. The highest oxidation state of  $Mn$  is shown by

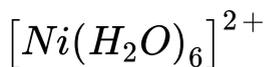


**Answer: A**



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94. Number of unpaired electrons present in



A. zero

B. 2

C. 4

D. 8

**Answer: B**



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95. Zinc does not show variable valency Because of:

A. complete d subshell

B. iocomplete d subshell

C.  $4s^2$  sub shell

D. non of the above

**Answer: A**



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**96.** Common oxidation state of Scandium, a transition element is /are (At. No =21)

A. +4

B. +1

C. +2 and +3

D. +4 and +1

**Answer: C**

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97. Oxidation number of osmium (*Os*) in  $OsO_4$  is

A. +4

B. +6

C. +7

D. +8

**Answer: D**

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98. The purple colour of  $[Ti(H_2O)_6]^{+3}$  ion is due to

- A. unpaired d-electron
- B. transfer of an electron
- C. presence of water molecules
- D. all of them

**Answer: A**



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99. From +6 to +1 oxidation state is shown by the element of ..... group

A. V-B

B. VI-B

C. VII-B

D. VIII

**Answer: B**



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**100.** *Zn* and *Hg* do not show variable valency like *d* – block elements because-

A. They are soft

B. Their d-shells are complete

C. They have only two electrons in the outemost subshell

D. Their d-shell are incomplete

**Answer: B**

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**101.** The number of unpaired electrons in cobalt atoms is  
(atomic number of Co= 27)

A. 2

B. 3

C. 4

D. 1

**Answer: B**

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**102.** Cuprous ion is colourless, while cupric ion is coloured because

- A. both have half filled p and d-orbitals
- B. cuprous ion has incomplete d-orbital and cupric ion has complete d-orbitals
- C. both have unpaired electrons in d-orbitals

D. cuprous ion has a complete d-orbital and cupric ion has an incomplete d-orbitals

**Answer: D**

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**103.** The valence shell of transition element consists of

- A. nd-orbitals
- B.  $(n - 1)$  d-orbitals
- C. ns nd-orbitals
- D.  $(n - 1)$  d ns-orbitals

**Answer: D**



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**104.** Transition metal usually exhibit highest oxidation states in their

A. chlorides

B. hydrides

C. fluorides

D. iodides

**Answer: C**



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**105.** The catalytic activity of the transition metals and their compound is ascribed to:

- A. their chemical reactivity
- B. their unfilled d-orbitals
- C. their ability to adopt multiple oxidation states in their complex ion
- D. none of these

**Answer: C**



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**106.** In the ground state, an element has 13 electrons in its 'M' shell. The element is

A. Cu

B. Mn

C. Ni

D. Fe

**Answer: B**



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**107.** In the ground state configuration of Co, how many electrons are present in 'M' shell ?

A. 13

B. 2

C. 15

D. 3

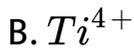
**Answer: C**



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**108.** If the colours of salts of transition elements are due to the presence of unpaired electrons in the transition metal ions, which of the following ions will be colourless in aqueous solution

A.  $Ti^{3+}$



**Answer: B**



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**109.** The transition elements are so named because

- A. they shows reducing property
- B. their properties are similar to other elements
- C. their properties are different from other elements
- D. they have partly filled d-orbitals

**Answer: D**

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**110.** The atomic radii of transition series elements

- A. increases as thatomic number increases.
- B. decrease as atomic number increases.
- C. remains almost constant.
- D. increase as atomic mass decreases.

**Answer: B**

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111. Which one of the following elements exhibits highest valency ?

A. Mn

B. Os

C. W

D. Mo

**Answer: B**



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112. Which one of the following statements is false ?

A. Lead is a non-transition elements

B. Chromium is a transition elements

C. Sodium is a non-transition elements

D. Zinc is a inner transition elements

**Answer: D**



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**113.** Which of the following ions has  $d^5$  electronic configuration ?

A.  $Cr^{2+}$

B.  $Co^{3+}$

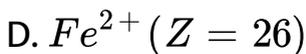
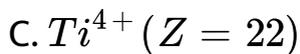
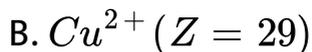
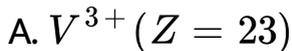
C.  $Mn^{3+}$



**Answer: D**

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**114.** Which of the following ions is colourless ?



**Answer: C**

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115. maximum number of variable oxidation state in a transition series are exhibited by

- A. extreme left elements
- B. extreme right elements
- C. middle elements
- D. all transition elements

**Answer: C**



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**116.** Which of the following metals exhibits more than one oxidation state ?

A. Fe

B. Zn

C. Cr

D. Both (a) and (c)

**Answer: D**



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**117.** Which of the following species is expected to be paramagnetic ?



**Answer: C**



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**118.** The density of Sc is



D.  $4.90\text{gm} / \text{ml}$

**Answer: D**

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**119.** In first transition series, the melting point of Mn is low because

- A. Due to  $d^{10}$  configuration, metallic bonds are strong
- B. Due to  $d^7$  configuration, metallic bonds are weak
- C. Due to  $d^5$  configuration, metallic bonds are weak
- D. none of these

**Answer: C**

120. Of the ions  $Zn^{2+}$ ,  $Ni^{2+}$  and  $Cr^{3+}$  [atomic number of  $Zn = 30$ ,  $Ni = 28$ ,  $Cr = 24$ ]

- A.  $Zn^{2+}$  is colourless and  $Ni^{2+}$  and  $Cr^{3+}$  are coloured
- B. all three are coloured
- C. all three are colourless
- D.  $Ni^{2+}$  is coloured and  $Zn^{2+}$  and  $Cr^{3+}$  are colourless

**Answer: A**

**121.** Paramagnetism is exhibited by molecules which

- A. not attracted in a magnetic field
- B. carrying a positive charge
- C. containing unpaired electrons
- D. containing only paired electrons

**Answer: C**



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**122.** Which one of the following is transition element ?

- A. Mg

B. Ca

C. Ni

D. Na

**Answer: C**



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**123.** Which of the following is a colourless ion?

A.  $Cu^{+2}$

B.  $Fe^{+3}$

C.  $Ti^{+3}$

D.  $Zn^{+2}$

**Answer: D**

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**124.** If a compound absorbs orange colour from the white light, then the observed colour of the compound is

- A. yellow
- B. orange
- C. blue
- D. violet

**Answer: C**

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**125.** The atomic radii of transition elements in a period are.

A. smaller than those of s-block as well as p-block elements

B. greater than those of s-block as well as p-block elements.

C. smaller than those of s-block but greater than those of p-block elements.

D. greater than those of s-block but smaller than those of p-block

**Answer: C**



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126. Which of the following d-block elements has  $d^{10}$  configuration ?

A. *Cu, Ag, Au*

B. *Zn, Cd, Hg*

C. *Fe, Co, Ni*

D. *Ru, Rh, Pd*

**Answer: B**



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127. The ore chromite contains FeO and

A.  $CrO_3$



**Answer: C**



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**128.** An atom with atomic number 21 belongs to the category of

A. s-block elements

B. p-block elements

C. d-block elements

## D. f-block elements

**Answer: C**

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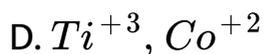
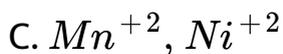
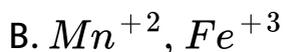
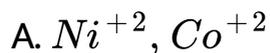
**129.** The highest magnetic moments is shown by the transition metal ion with the outermost electronic configuration is:



**Answer: B**

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**130.** Which of the following pair of ions have the same number of unpaired electrons



**Answer: B**

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**131.** A transition element  $X$  has a configuration  $[Ar]3d^4$  in its  $+3$  oxidation state. Its atomic number is

A. 25

B. 26

C. 22

D. 10

**Answer: A**



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**132.** The maximum number of transition metal elements that can be accommodated in any series

A. 4

B. 6

C. 8

D. 10

**Answer: D**



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**133.** The pair of atoms with anomalous (exceptional) electron configurations

A. *Cu, Cr*

B. *Cu, Zn*

C. *Cr, Cd*

D. *Cr, Zn*

**Answer: A**



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**134.** The transition metals possess strong binding force because of

A. unfilled 'p' orbital

B. incomplete 'd' orbitals

C. filled 'd' orbitals

D. filled 's' and 'd' orbitals

**Answer: B**

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**135.** Least paramagnetic property is shown by

A. Fe

B. Mn

C. Ni

D. Cu

**Answer: D**

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**136.** Transition metals form

- A. Ionic bonds
- B. Ionic, covalent and coordinate covalent bonds
- C. Covalent bonds
- D. Coordinate covalent bonds

**Answer: B**

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**137.** Which one of the following represents the electronic configuration of  $2^{nd}$  transition elements

A.  $4d^{10}, 5s^2$

B.  $4d^{1-10}, 5s^{0-2}$

C.  $4f^{14}, 5d^{1-10}, 6s^2$

D.  $5f^{14}, 5d^{10}, 7s^2$

**Answer: B**



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**138.** Transition metals are less reactive because of their

A. high ionization potential and low m.p.

B. high ionization potential and high m.p.

C. low ionization potential with low m.p.

D. low ionization potential and high m.p.

**Answer: B**

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**139.** The number of d-electrons in  $Fe^{+2}$  ion is equal to that of

- A. d-electrons in  $Ni^{2+}$
- B. d-electrons in  $V^{2+}$
- C. d-electrons in  $CO^{3+}$
- D. d-electrons in  $Cr^{+}$

**Answer: C**

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**140.** Which one of the following is an example of non-typical transition elements?

A. *Li, K, Na*

B. *Be, Al, Pb*

C. *Zn, Cd, Hg*

D. *Ba, Ca, Sr*

**Answer: C**



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**141.** Transition metal exhibits an oxidation state greater than +2 due to loss of

- A. p-electron
- B. s and p-electrons
- C. p and d-electrons
- D. s and d-electrons

**Answer: D**



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**142.** The stable oxidation state likely to be shown by first row transition metals is

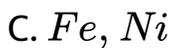
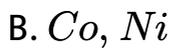
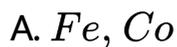




**Answer: D**

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**143.** Interstitial compounds are formed by



D. all of these

**Answer: D**



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**144.** The pair of elements which can show +1 oxidation state.

A. *Cr, Zn*

B. *Fe, Zn*

C. *Cr, Cu*

D. *Cu, Zn*

**Answer: C**



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145. Transition elements show generally positive oxidation state due to

- A. large atomic size
- B. low ionization energy
- C. low electronegativity
- D. high electronegativity

**Answer: C**



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146. The most stable oxidation state of copper is

- A. +1

B. +2

C. +3

D. +4

**Answer: A**



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**147.** The common oxidation state of transition elements is

A. +2

B. +4

C. +3

D. +7

**Answer: A**

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**148.** Which of the following transition elements does not exhibit variable oxidation states ?

A. Sc

B. Fe

C. Ni

D. Zn

**Answer: D**

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**149.** The transition element that has stable configuration in +1 oxidation state is

A. Cu

B. Zn

C. Sc

D. Mn

**Answer: A**



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**150.** Which of the following is not used as a catalyst ?

A. Fe

B. Ni

C. Pt

D.  $Cl_2$

**Answer: D**



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**151.** the catalyst used in the hydrogenation of oils is :

A. Zn

B. Ni

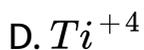
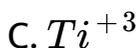
C. Mo

D. Fe

**Answer: B**

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152. Which of the following ions is paramagnetic ?



**Answer: C**

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153. In which of the following ions, d-d transition is not possible



**Answer: A**



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154. The lowest magnetic moment is shown by the transition metal ion with the configuration

A.  $3d^2$

B.  $3d^3$

C.  $3d^7$

D.  $3d^9$

**Answer: D**



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**155.** The magnetic nature of  $Zn^{+2}$

A. diamagnetic

B. paramagnetic

C. ferro magnetic

D. none

**Answer: A**



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**156.** Which of the following atom would be rappeded by magnetic filed ?

A. Ti

B. Cr

C. Ni

D. Zn

**Answer: D**

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157. The number of unpaired electrons in  $Zn^{2+}$  is

A. 2

B. 3

C. 4

D. 0

**Answer: D**

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158. One of the following is diamagnetic

A. Cu

B.  $Cu^+$

C.  $Cu^{2+}$

D. all the above

**Answer: B**



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**159.** The common oxidation states of Ti are

A. +2

B. +3

C. +4

D. +5

**Answer: C**

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**160.** Transition metals:

- A. exhibit diamagnetism
- B. undergo inert pair effect
- C. do not form alloys
- D. show variable oxidation states

**Answer: D**

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161. Among  $TiF_6^{2-}$ ,  $CoF_6^{3-}$ ,  $Cu_2Cl_2$  and  $NiCl_4^{2-}$  (At. No.  $Ti = 22$ ,  $Co = 27$ ,  $Cu = 29$ ,  $Ni = 28$ ), the colourless species are -

- A.  $CoF_6^{3-}$  and  $NiCl_4^{2-}$
- B.  $TiF_6^{2-}$  and  $NiCl_4^{2-}$
- C.  $Cu_2Cl_2$  and  $NiCl_4^{2-}$
- D.  $TiF_6^{2-}$  and  $Cu_2Cl_2$

**Answer: D**

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**162.** Mercury is the only metal which is liquid at  $0^\circ\text{C}$ . This is due to its

- A. very high ionization energy and weak metallic bond
- B. Low ionisation potential
- C. High atomic weight
- D. High vapour pressure

**Answer: A**

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**163.** The magnetic moment (in BM) of  $\text{Zn}^{2+}$  ion according to spin-only formula is

A. zero

B. 1.73

C. 2.84

D. 3.87

**Answer: A**



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**164.** The metal ion which does not form coloured compound is

A. Cr

B. Fe

C. Zn

D. Mn

**Answer: C**



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**165.** Which of the following element has maximum, first ionisation potential?

A. V

B. Ti

C. Cr

D. Mn

**Answer: D**



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**166.** Which metal common in brass and bronze ?

A. Zn

B. Mg

C. Cu

D. Al

**Answer: C**



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**167.** The 3d-series elements ranges

A.  $Z = 21 - 30$

B.  $Z = 22 - 30$

C.  $Z = 20 - 30$

D.  $Z = 31 - 40$

**Answer: A**



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**168.** The elements which exhibit both vertical and horizontal similarities are:

A. inert gas elements

B. representative elements

C. rare elements

D. transition elements

**Answer: D**



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**169.** The number of unpaired electron in  $Mn^{4+}$  ( $Z = 25$ )

is :-

(a). Four

(b). Two

(c). Five

(d). Three

A. 5

B. 4

C. 3

D. 2

**Answer: A**



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**170.** Number of unpaired electrons in  $Fe^{3+}$  ( $Z = 26$ ) is

A. 5

B. 6

C. 3

D. 4

**Answer: A**



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**171.** The number of unpaired electrons in a nickel atom (ground state) are (At. No. of Ni=28)

A. 2

B. 5

C. 3

D. 7

**Answer: A**



**172.** Match list I with list II and select the correct answer using the codes given below the lists

List I

List II

Metal Ions

Magnetic moment (B,M)



1.  $\sqrt{35}$



2.  $\sqrt{30}$



3.  $\sqrt{24}$



4.  $\sqrt{15}$

5.  $\sqrt{8}$

A.  $A - 1, B - 3, C - 5, D - 4$

B.  $A - 2, B - 3, C - 5, D - 1$

C.  $A - 4, B - 3, C - 5, D - 1$

D.  $A - 4, B - 5, C - 3, D - 1$

**Answer: C**

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**173.** Which of the following compounds is used at the starting material for the preparation of  $K_2Cr_2O_7$ ?

- A. Chrome alum
- B. Chromo yellow
- C. Chromit ore
- D. Chrome red

**Answer: C**

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174. In  $Cr_2O_7^{2-}$ ,  $Cr - O - Cr$  bond angle is

A.  $109^\circ$

B.  $126^\circ$

C.  $180^\circ$

D.  $90^\circ$

**Answer: B**



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175. Solid  $KmnO_4$  on heating with  $H_2$  forms

A. MnO

B. KOH

C.  $H_2O$

D. all of these

**Answer: D**



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**176.**  $KMnO_4$  is

A. oxidizing agent

B. reducing agent

C. both 'a' and 'b'

D. none of these

**Answer: A**

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177. Potassium permanganate acts as an oxidant in neutral, alkaline as well as acidic media. The final product obtained from it in three condition are respectively:

- A.  $MnO_2$ ,  $MnO_2$ ,  $Mn^{2+}$
- B.  $MnO_2$ ,  $Mn^{3+}$ ,  $Mn^{2+}$
- C.  $MnO_2$ ,  $MnO_4^{2-}$ ,  $Mn^{3+}$
- D.  $MnO$ ,  $MnO_4$ ,  $Mn^{2+}$

**Answer: A**

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178. In  $Cr_2O_7^{2-}$  every Cr atom is linked to

- A. one oxygen atom
- B. two oxygen atom
- C. three oxygen atom
- D. four oxygen atom

**Answer: D**



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179. Acidified potassium dichromate is treated with hydrogen sulphide. In the reaction, the oxidation number

of chromium

A. Increases from +3 to +6

B. Decrease from +6 to +3

C. Remains unchanged

D. Decreases from +6 to +2

**Answer: B**



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**180.** Ethylene reacts with alkaline  $KMnO_4$  to form-

A. Ethanol

B. Ethane 1,2-diol

C. Ethylene glycol

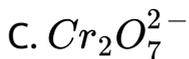
D. both 'b' and 'c'

**Answer: C**



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**181.** The yellow colour of chromates changes to orange on acidification due to the formation of



**Answer: C**

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**182.** Chromyl chloride test is used to detect



**Answer: C**

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183. The shape of  $CrO_4^{2-}$  is ...and Cr atom involves...hybridization.

A. square planar,  $dsp^2$

B. tetrahedral,  $sp^3$

C. square planar,  $d^2sp^3$

D. linear, sp.

**Answer: B**



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184. Pick out the incorrect statement about  $K_2Cr_2O_7$

A. It act as oxidising agent in basic medium

B. It dissolves in alkali to form chromate

C. It oxidizes  $FeSO_4$  solution to  $Fe_2(SO_4)_3$

D. It is used as cleansing agent for glassware etc. when mixed with cold conc  $H_2SO_4$ .

**Answer: A**



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**185.** Pick out incorrect statement about  $K_2Cr_2O_7$ .

A. It oxidizes KI to  $I_2$

B. It oxidizes  $KI$  to  $I_2$

C. It oxidizes  $SO_2$  to  $K_2SO_4$

D. It oxidizes  $SO_2$  to S

**Answer: D**

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**186.** The addition of acidic  $K_2Cr_2O_7$  to NaCl produces a colour

A. green

B. pink

C. red

D. violet

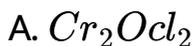
**Answer: C**

187. Which of the following compounds is formed when a mixture of  $K_2Cr_2O_7$  and  $KCl$  is heated with conc.  $H_2SO_4$  ?



**Answer: A**

188. Formula of chromyl chloride is-



Answer: D



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189. Pick out the incorrect statement.

A.  $MnO_4^{2-}$  is quite strongly oxidizing and stable only

in very strong alkalies. In dilute alkali, water or acidic

solutions , it disproportionates.

B. In acidic solutions,  $MnO_4^-$  is reduced to  $Mn^{2+}$  and

thus,  $KMnO_4$  is widely used as oxidizing agent

C.  $KMnO_4$  does not act as oxidizing agent in alkaline

medium

D.  $KMnO_4$  is manufactured by the fusion of pyrolusite

ore with KOH in presence of air or  $KNO_3$ . followed

by electrolytic oxidation in alkaline solution.

**Answer: C**

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190.  $MnO_4^-$  ions can be reduced in strongly alkaline medium to give



**Answer: C**



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191. On adding  $KMnO_4$  to cold conc.  $H_2SO_4$ , it gives



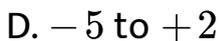


**Answer: C**



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**192.** In acidic medium oxidation state of Mn changes from



**Answer: A**



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**193.** The equivalent weights of  $KMnO_4$  as an oxidising agent in acidic and neutral media will be respectively (M = molecular weight of  $KMnO_4$  )

A.  $M/7$  and  $M/2$

B.  $M/5$  and  $M/3$

C.  $M/4$  and  $M/5$

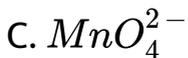
D.  $M/2$  and  $M/4$

**Answer: B**



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194. When  $KMnO_4$  solution is added to hot oxalic acid solution the decolourisation is slow in the beginning but becomes instantaneous after some time. This is because



**Answer: A**



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195. Equivalent weight of  $KMnO_4$  when it is convert into  $MnSO_4$  is

A.  $M/5$

B.  $M/6$

C.  $M/3$

D.  $M/2$

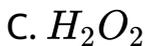
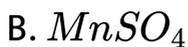
**Answer: A**



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196. Acidified  $KMnO_4$  solution is decolourized by

A. toluene

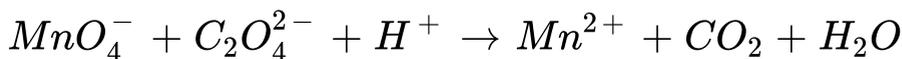


**Answer: C**

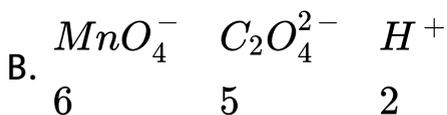
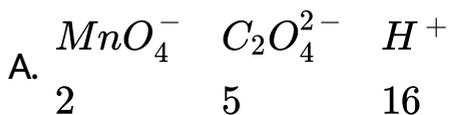


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**197.** For the redox reaction,



the correct coefficients of the reactants for the balanced reaction are



- C.  $MnO_4^-$      $C_2O_4^{2-}$      $H^+$   
           5            16            2
- D.  $MnO_4^-$      $C_2O_4^{2-}$      $H^+$   
           2            16            5

**Answer: A**

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**198.** Potassium manganite ( $K_2MnO_3$ ) is formed when

- A. chlorine is passed into aqueous  $KMnO_4$  solution
- B. manganese dioxide is fused with potassium hydroxide  
     in air
- C.  $MnSO_4$  is reacted with aq.  $KMnO_4$
- D.  $K_2MnO_4$  on red heat

**Answer: D**

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**199.** Which of the following statements is not true ?

- A. An acidified solution of  $K_2Cr_2O_7$  liberated  $I_2$  from KI
- B. In acidic medium, dichromate ion is present
- C. Neutral  $KMnO_4$  oxidises KI to  $I_2$
- D. Potassium dichromate is an oxidising agent

**Answer: C**

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200. Baeyer's reagent is:

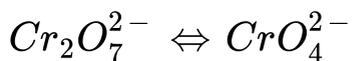


**Answer: B**



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201. Following ions are equilibrium at



A.  $pH - 4$

B.  $pH - 9$

C.  $pH - 7$

D.  $pH - 10$

**Answer: C**



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**202.** The mineral from which potassium permagnate is manufactured

A. pyrolusite,  $MnO_2$

B. braunite,  $Mn_2O_3$

C. hausmannite,  $Mn_3O_4$

D. manganite,  $Mn_2 \cdot H_2O$ .

**Answer: A**



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203.  $MnO_4^{2-}$  is

A. Diamagnetic

B. Ferromagnetic

C. paramagnetic

D. nonmagnetic

**Answer: C**



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204. The reaction,  $MnO_4^{2-} + e^- \rightleftharpoons MnO_4^-$  is shifted to right in

- A. an acidic medium
- B. a basic medium
- C. a netural medium
- D. both acidic and bisic media

**Answer: A**



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205. Equivalent mass of  $KMnO_4$  in alkaline medium is

A. 158

B. 52.6

C. 49

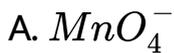
D. 79

**Answer: B**



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206. When an acidified solution of ferrous sulphate is treated with potassium permanganate solution, the ion which is oxidised is



**Answer: C**



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**207.** The shape of  $MnO_4^-$  ion and the hybridisation of Mn in  $MnO_4^-$  is



C.  $sp$

D.  $sp^3d^2$

**Answer: A**



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208.  $MnO_4^{2-}$  has \_\_\_\_\_ geometry

A. Trigonal

B. Tetrahedral

C. Octahedral

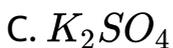
D. Pyramidal

**Answer: B**



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209. At red heat  $KMnO_4$  decompose into,



Answer: B



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210.  $KMnO_4$  act as oxidising agent in netural medium. It accept how many electrons to convert  $MnO_2$ .

A. 2

B. 3

C. 4

D. 5

**Answer: B**



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211.  $KMnO_4$  is heated with conc.  $H_2SO_4$  gives

A.  $Mn_2O_7$

B.  $MnO_2$

C.  $MnSO_4$

D.  $MnO$

**Answer: C**



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**212.** Molecular mass of  $KMnO_4$  is

A. 158

B. 294

C. 198

D. 134

**Answer: A**



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**213.**  $MnO_4^{2-}$  can be converted to  $MnO_4^-$

1) by oxidation of  $Cl_2$

2) by oxidation of  $CO_2$

3) by oxidation of  $H_2SO_4$

4) by oxidations of  $O_3$

5) by electrochemical oxidation at anode

A. 1, 2, 3

B. 1, 3, 5

C. 1, 2, 3, 5

D. 1, 2, 3, 4, 5

**Answer: D**

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**214.** When  $SO_2$  is passed through an acidified  $K_2Cr_2O_7$  solution, the oxidation state of sulphur changes from

A. +4 to +6

B. +6 to +4

C. +4 to 0

D. +4 to +2

**Answer: A**



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215. Which one of the following is reduced by hydrogen peroxide in acid medium?

A. Potassium permagnete

B. Potassium iodide

C. Ferrous sulphate

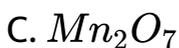
D. Potassium ferrocyanide

**Answer: A**



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216. Traces of  $MnO_4^-$  in conc.  $H_2SO_4$  may be changed to `



**Answer: B**



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217. Pyrolusite in  $MnO_2$  is used to prepare  $KMnO_4$ .

steps are



A. I=Fused with KOH/air II=electrolytic oxidation

B. I=Fused with KOH/air II=Electrolytic reduction

C. I=Fused with conc.  $HNO_3$ /air II=electrolytic  
oxidation

D. I=Fused with conc.  $HNO_3$ /aire II=electrolytic  
reduction

**Answer: A**

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**218.** Which statement is not correct

A. Potassium permanganate is a powerful oxidising substance

B. Potassium permanganate is a weaker oxidising substance than potassium dichromate

C. Potassium permanganate is a stronger oxidising substance than potassium dichromate

D. Potassium dichromate oxidises a secondary alcohol into a ketone

**Answer: B**



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219. In acidic medium  $MnO_4^{2-}$

- A. Disproportionates to  $MnO_4^-$  and  $MnO_2$
- B. It oxidised to  $MnO_4^-$
- C. It reduced to  $MnO_2$
- D. It reduced to  $Mn^{2+}$

**Answer: A**

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220. Which is not true statement about  $KMnO_4$

- A. it's solution is unstable in acidic medium

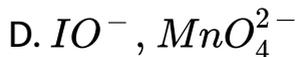
- B. its small quantity added to conc.  $H_2SO_4$  a colourless solution containing  $Mn^{2+}$  ion
- C.  $MnO_4^-$  changes to  $Mn^{2+}$  ion in basic medium
- D. it act as oxidising agent in acidic, basic and netural medium

**Answer: C**

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**221.** The product of oxidation of  $I^-$  with  $MnO_4^-$  in alkaline medium is

A.  $IO_3^-$ ,  $MnO_2$



**Answer: A**



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**222.** The colour of  $K_2Cr_2O_7$  changes from red-orange to lemon-yellow on treatment with  $KOH_{(aq.)}$ , because of:

A. The reduction of  $Cr^{VI}$  to  $Cr^{III}$

B. The formation of chromium hydroxide

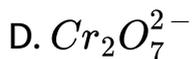
C. The conversion of dichromate to chromate

D. The oxidation of potassium hydroxide to potassium peroxide

**Answer: C**

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223. At  $pH = 4$ ,  $Cr_2O_7^{2-}$  existas



**Answer: D**



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224. At  $pH = 12$ ,  $Cr_2O_7^{2-}$  changes to:



**Answer: C**



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225. When  $KMnO_4$  reacts with acidified  $FeSO_4$

- A. Only  $FeSO_4$  is oxidised
- B. Only  $KMnO_4$  is oxidised
- C.  $FeSO_4$  is oxidised and  $KMnO_4$  is reduced
- D. none of these

**Answer: C**

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x and y can be :

- A. 4 and 5
- B. 4 and 8

C. 8 and 4

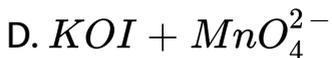
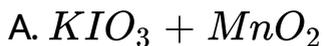
D. 8 and 10

**Answer: C**



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**227.**  $KMnO_4$  reacts with KI in acidic medium gives



**Answer: B**



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228. Acidic  $KMnO_4$  oxidises  $SO_2$  to

A. S

B.  $SO_3$

C.  $H_2SO_4$

D.  $MnSO_4$

Answer: C



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229. Acidic  $K_2Cr_2O_7$  oxidises KI to

A. KOI

B.  $KOI_3$

C. HI

D.  $I_2$

**Answer: D**



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**230.** Acidic  $K_2Cr_2O_7$  oxidises  $S_2$  to  $K_2SO_4$  and itself reduced into

A.  $Cr_2(SO_4)_3$

B.  $CrO_3$



**Answer: A**

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**231.** f-block elements are placed in

A. 2<sup>nd</sup> group, 4<sup>th</sup> and 5<sup>th</sup> row

B. 3<sup>rd</sup> group, 6<sup>th</sup> and 7<sup>th</sup> row

C. 4<sup>th</sup> group 4<sup>th</sup> and 5<sup>th</sup> row

D. 5<sup>th</sup> group, 4<sup>th</sup> and 7<sup>th</sup> row

**Answer: B**



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232.  $f$  – block elements (sometimes called inner transition elements) are the elements in which the last electron enters the \_\_\_\_\_ orbitals.

- A. electrons are added in  $(n - 3)$  f shell
- B. electrons are added in  $(n - 1)$  f shell
- C. electrons are added in  $(n - 2)$  f shell
- D. electrons are added in  $(n - 2)$  d shell

**Answer: C**



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233. f-block elements are divided into

A. 1 series

B. 2 series

C. 3 series

D. 4 series

**Answer: B**



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234. Lanthanides and actinides are

A. s-block elements

B. p-block elements

C. d-block elements

D. f-block elements

**Answer: A**



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**235.** Lanthanides are known as

A. rare earth elements

B. 4-f series elements

C. 1<sup>st</sup> inner transition elements

D. all of these

**Answer: D**



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236. Actinides are known as

- A. 5-f series elements
- B. 2<sup>nd</sup> inner transition elements
- C. radio active elements
- D. all of these

**Answer: D**



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237. The elements present in actinide series are

A. 14

B. 15

C. 16

D. 17

**Answer: A**



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**238.** The elements present in actinides series are

A. 14

B. 15

C. 16

D. 17

**Answer: A**

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**239.** Lanthanum is

A. d-block element

B. f-block element

C. s-block element

D. p-block element

**Answer: A**

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**240.** 4-f series start from

A. La to Lu

B. Ce to Lu

C. Gd to Lu

D. Pr to Lu

**Answer: B**



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**241.** In 4-f series penultimate shell contain how many electrons ?

A.  $d^{0\text{to}1}$

B.  $d^{1\text{to}10}$

C.  $d^0$

D.  $d^{10\text{to}0}$

**Answer: A**



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**242.** In 4-f series outermost shell contains how many electrons ?

A. 1

B. 2

C. 3

D. 4

**Answer: B**



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**243.** In 4-f series anti penultimate shell contains how many electrons ?

A. 1 to 14

B. 0 to 14

C. 2 to 7

D. 2 to 8

**Answer: A**



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**244.** In lanthanide and actinide, the penultimate shell is

A. s

B. p

C. d

D. f

**Answer: C**



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245. General valence shell electronic configuration of  $f$  – block elements is

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

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

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

D.  $(n - 1)f^{1-14}, (n - 1)d^1, ns^2$

**Answer: B**

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246. The last filled orbital in lanthanides is

A.  $6s$

B. 5s

C. 4s

D. 3s

**Answer: A**



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**247.** The last filled orbital in actinides is

A. 6s

B. 7s

C. 5s

D. 4s

**Answer: B**

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**248.** Lantanide series arises due to

- A. stability of 6s-orbitals
- B. stability of 5d-orbitals
- C. stability of 4f-orbitals
- D. equal stability of 5d and 4f-orbitals

**Answer: C**

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**249.** Actinide series is arises due to

- A. stability of 5f-orbitals
- B. stability of 7s-orbitals
- C. stability of 6d-orbitals
- D. equal stability of 6d and 5f-orbitals

**Answer: A**



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**250.** Actinide series start from

- A. Ac to Lr
- B. Th to Lr

C. U to Lr

D. Cf to Lr

**Answer: B**



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**251.** Actinum is

A. f-block element

B. d-block element

C. p-block element

D. s-block element

**Answer: B**



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252. Which of the following is radioactive element among the 4-f series ?

A. Ce

B. Pm

C. Ho

D. Yb

**Answer: B**



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**253.** Lanthanide series start from the elements with atomic number

A. 27 to 71

B. 58 to 71

C. 56 to 70

D. 60 to 74

**Answer: B**



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**254.** The atomic number of elements of first transition series lie in the range of

A. 90 to 103

B. 89 to 103

C. 91 to 104

D. 90 to 104

**Answer: A**



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**255.** The first element of rare earth metals is

A. lanthanum

B. uranium

C. actinium

D. cericum

**Answer: D**

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**256.** Last element of lanthanide series is:

A. Yb

B. Lu

C. Lr

D. Th

**Answer: B**

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257. The first element in actinide series is

A. Ac

B. Th

C. Pu

D. Cm

**Answer: B**



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258. The last element in actinide series is

A. No

B. Bk

C. Lr

D. Fm

**Answer: C**



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**259.** Actinium is the element of

A. transition series

B. inner transition series

C. 5f series

D. none of these

**Answer: A**



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**260.** Californium is the member of

A. 4f series

B. 5f series

C. p-block

D. d-block

**Answer: B**



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## 261. Actinides

- A. are all synthetic elements
- B. including elements of atomic number 104
- C. have only short lived isotopes
- D. have variable valency

**Answer: D**

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262. No is the member of 5f series. The other members of this group are

- A. Th and Pm

B. Cm and Sm

C. Tm and Th

D. Am and Fm

**Answer: D**



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**263.** The position of neodymium is between

A. Eu and Tb

B. Ho and Tm

C. Pr and Pm

D. Pm and Eu

**Answer: C**

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**264.** Which of the following element belong to actinide series ?

A. La

B. Lu

C. Gd

D. Th

**Answer: D**

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265. The position of actinides is suggested by

A. Van Hevesy

B. Seaborg

C. Biot

D. Pasture

**Answer: B**

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266. Total number of transuranic elements present in periodic table are `

A. 11

B. 25

C. 29

D. 20

**Answer: B**



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**267.** First transuranium element is

A. Np

B. Uup

C. Uuo

D. Uut

**Answer: A**



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**268.** From La to Lu ionisation potential

A. decreases

B. increases

C. constant

D. first increases than decreases

**Answer: B**



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269. Which of the following is most electropositive

A. Yb

B. Lu

C. Sm

D. Dy

**Answer: C**



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270. Among the lanthanides,  $La^{3+}$  and  $Lu^{3+}$  ions are

A. paramagnetic

B. diamagnetic

C. ferromagnetic

D. all of these

**Answer: B**



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**271.** How many shells are present in lanthanide

A. 6

B. 8

C. 7

D. 5

**Answer: A**



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272. Completely filled shells in lanthanides are

A. first 4

B. first 2

C. first 3

D. first 5

**Answer: C**



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273. The last three orbitals are partially filled in which of the following ?

A. 5<sup>th</sup> and 6<sup>th</sup>

B. 6<sup>th</sup>

C. 4<sup>th</sup>

D. 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>

**Answer: D**



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274. Total number of shells in actinides

A. 4

B. 5

C. 6

D. 7

**Answer: D**



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**275.** Completely filled shells in actinides are

A. first two

B. first three

C. first four

D. first five

**Answer: C**

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**276.** Partially filled shells in actinides are

A.  $6^{th}$  and  $7^{th}$

B.  $6^{th}$

C.  $5^{th}$

D.  $5^{th}$ ,  $6^{th}$ ,  $7^{th}$

**Answer: D**

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277. The artificially prepared element from lanthanide series is

- A. europium
- B. thulium
- C. promethium
- D. gadolinium

**Answer: C**



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278. Lanthanum the first member of the lanthanide series has

- A. only 3d-orbital is filled
- B. 3d and 4d-orbitals are unfilled
- C. 4d and 4f-orbitals are unfilled
- D. 4f and 5d-orbitals are unfilled

**Answer: D**



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**279.** Lanthanide series belongs to

- A. 6<sup>th</sup> period
- B. 7<sup>th</sup> period
- C. 5<sup>th</sup> period

D. 4<sup>th</sup> period

**Answer: A**

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**280.** Which of the following belong to actinide series ?

A. Cm

B. La

C. Lu

D. Gd

**Answer: A**

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**281.** Usually lanthanide forms

- A. ionic compounds
- B. covalent compounds
- C. co-ordinate compounds
- D. chelate compounds

**Answer: A**



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**282.** In actinides incoming electron enters into

- A. 4f-orbital

B. 5f-orbital

C. 3f-orbital

D. 6f-orbital

**Answer: B**



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**283.** All actinides are

A. metalloid

B. inert

C. radioactive

D. nonradioactive

**Answer: C**

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**284.** The number of incomplete shells in transition elements are

A. 0

B. 1

C. 2

D. 3

**Answer: D**

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**285.** The last electron of an atom in inner transition element are called

- A. s-electrons
- B. p-electrons
- C. d-electrons
- D. f-electrons

**Answer: D**



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**286.** The individual members of the lanthanide series is called as

- A. lanthanides
- B. lanthanons q
- C. 4f elements
- D. all of these

**Answer: D**



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**287.** The individual members of the actinide series is called as

- A. actinides
- B. actinons

C. 2<sup>nd</sup> inner transition elements

D. all of these

**Answer: D**



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**288.** Lanthanum is the first element of the lanthanide series has

A. only 6s-orbital is filled

B. 4d and 4f-orbitals are unfilled

C. 3d and 5d-orbitals are unfilled

D. 4f-and 5d-orbitals are filled

**Answer: A**

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**289.** Which of the following are not transuranium elements ?

A. Th and Pa

B. Cf and Bk

C. Md and Lr

D. Am and Np

**Answer: A**

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**290.** In case of actinides

- A. first five shells are completely filled
- B. first four shells are completely filled
- C. last shell is partially filled
- D. last two shells are partly filled

**Answer: B**



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**291.** Element of lanthanide series belonging to

- A. III A

B. III B

C. IV A

D. IV B

**Answer: B**



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**292.** Which element cannot be termed as f-block element ?

A. only Lu

B. only Lu and Ce

C. only La and Lu

D. only La and Ac

**Answer: D**

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**293.** The f-block elements are also called as

- A. transition elements
- B. inner transition elements
- C. rare earth elements
- D. both 'b' and 'c'

**Answer: D**

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**294.** The last three orbitals are partially filled in which of the following ?

A. transition elements

B. s-block elements

C. p-block elements

D. f-block elements

**Answer: D**

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**295.** 4f and 5f-series has total number of elements

A. 13

B. 12

C. 14

D. 28

**Answer: D**



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**296.** In lanthanides, the differential electron is filled in

A. sf-orbital

B. 4d-orbital

C. 6f-orbital

D. 4f-orbital

**Answer: D**

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**297.** Which of the following 5f-series elements has fully filled 5f-orbitals ?

- A. Only nobelium and americium
- B. Only nobelium and lawrencium
- C. Only americium and lawrencium
- D. Only americium and curium

**Answer: B**

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**298.** Which one of the following has radioactive properties ?

A. Praseodymium

B. Samarium

C. Promethium

D. Neodymium

**Answer: C**

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**299.** The element present in after Gd in lanthanide series is

A. Sm

B. Tm

C. Nd

D. Pr

**Answer: B**



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**300.** The position of actinides is between

A. Ac and Sg

B. Ac and Db

C. Ac and Rf

D. Ac and Hs

**Answer: C**



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**301. The most common lanthanoid is :**

A. Sm

B. Pm

C. Ce

D. Ho

**Answer: B**



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302. Why the  $f$ -block elements are called inner transition elements?

- A. transition elements
- B. inert elements
- C. representative elements
- D. innertransition elements

**Answer: D**

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303. All lanthanide mineral contains all elements except

- A. Er

B. Eu

C. Pm

D. Tb

**Answer: C**



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**304.** Among the lanthanides the one obtained by synthetic method is

A. Lu

B. Pm

C. Pr

D. No

**Answer: B**



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**305.** Transuranium elements are the elements of actinide series, which follows ?

A. Curium

B. Plutonium

C. Neptunium

D. Uranium

**Answer: D**



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**306.** Natural radioactive elements of actinide series are

- A. up to thorium
- B. up to uranium
- C. up to curium
- D. up to protactinium

**Answer: B**



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**307.** How many transuranium elements present in 5f series ?

A. 10

B. 11

C. 12

D. 13

**Answer: B**



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**308.** Synthetic radioactive elements present in actinides are

A. 9

B. 10

C. 11

D. 12

**Answer: C**



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**309.** Naturally occurring radio active elements present in second inner transition series

A. 3

B. 4

C. 5

D. 6

**Answer: A**



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**310.** Which of the following is transuranium element ?

A. U

B. Ta

C. Pa

D. Am

**Answer: D**



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**311.** Lanthanide elements are called as rare earth because

- A. their oxides are difficult to decompose
- B. the elements are rarely found in the earth crust
- C. they were few in nature
- D. they element were very light

**Answer: B**



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**312.** The transuranic elements are prepared by

A. addition reaction

B. decomposition reaction

C. decarboxylation

D. nuclear reaction

**Answer: D**



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**313.** Which element is not naturally occurring ?

A. Th

B. U

C. Ac

D. Am

**Answer: D**



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**314.** Which of the following, is prepared artificially?

A. Ce

B. Pm

C. Pr

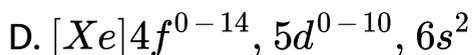
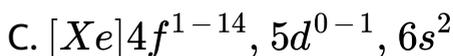
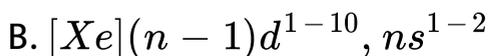
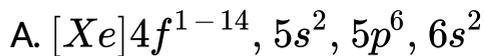
D. Am

**Answer: B**



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315. The lanthanide have general electronic configuration

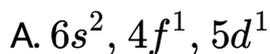


Answer: C



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316. The outer electronic configuration of cerium is



B.  $6s^2, 4f^2, 5d^0$

C.  $6s^2, 4f^7, 5d^1$

D.  $6s^2, 4f^{13}, 5d^0$

**Answer: B**



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**317.** Match list I and II and select the correct answer using the code given below the list.

List-I

At.no. of elements

A. 60

B.61

C. 62

D.63

List-II

Names of the elements

1. Neodymium

2. Samarium

3. Europium

4.Promethium

A. 

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	2	3	4

- B.  $A \ B \ C \ D$   
1 3 2 4
- C.  $A \ B \ C \ D$   
1 4 2 3
- D.  $A \ B \ C \ D$   
4 3 2 1

**Answer: C**



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**318.** Which of the following elements shows  $6s^2, 4f^7 5d^1$  electronic configuration ?

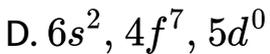
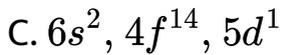
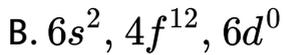
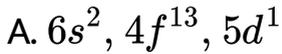
- A. Eu
- B. Gd
- C. Tb

D. Dy

**Answer: B**

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**319.** Lutetium has electronic configuration



**Answer: C**

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320. Gadolinium contain one electron in 5d-orbital due to

- A. stability of  $4f^0$  configuration
- B. stability of  $4f^7$  configuration
- C. stability of  $4f^{14}$  configuration
- D. none of these

**Answer: B**



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321. In which of the following elements one electron is present in 5d orbitals ?

A. Gd and Yb

B. Gd and Tm

C. Gd and Lu

D. Ho and Lu

**Answer: C**

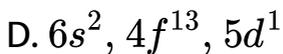
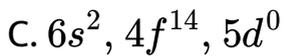


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**322.** Which of the following is expected electronic configuration of europium ?

A.  $6s^2, 4f^7, 5d^0$

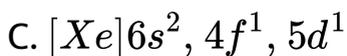
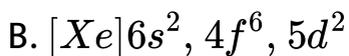
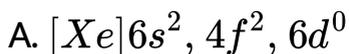
B.  $6s^2, 4f^6 5d^1$



**Answer: B**

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**323.** The expected electronic configuration of cerium is



D. none of these

**Answer: C**



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**324.** How many unpaired electrons present in 4f-orbital of lutetium ?

A. 1

B. 2

C. 0

D. 4

**Answer: C**



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**325.** As atomic number increases from 57 to 71 in tripositive lanthanon, the number of unpaired electrons

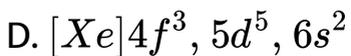
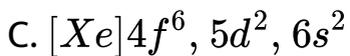
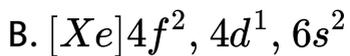
- A. increases regularly from 0 to 14
- B. first increases from 0 to 7 and then fall to zero
- C. increases from 0 to 5 and then fall to zero
- D. increase from 0 to 6 and then fall all zero

**Answer: B**

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**326.** The electronic configuration of gaedolinium.

- A.  $[Xe]4f^8, 5d^9, 6s^2$



**Answer: B**



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**327.** Which of the following has  $4f^7$  configuration

A. Pr

B. Gd

C. Nd

D. Am

**Answer: B**



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**328.** How many total number of unpaired electrons in Gd are

- A. 7 unpaired electrons
- B. 8 unpaired electrons
- C. 6 unpaired electrons
- D. 5 unpaired electrons

**Answer: B**



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**329.** The electronic configuration of actinides Cannot be assigned with degree of certainty because of

- A. overlapping of inner orbitals
- B. small energy difference between 5f and 6d orbitals
- C. free movement of electrons over all the orbitals
- D. all of these

**Answer: B**

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**330.** The outer electronic configuratio of actinide elements is

A.  $7s^2 \cdot 5t^{0-14}, 6d^0$

B.  $7s^2, 5f^{1-14}, 6d^{0-1}$

C.  $7s^2, 5f^{1-14}, 6d^{-10}$

D.  $7s^2, 5f^{1-14}, 6d^{10}$

**Answer: B**

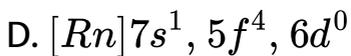
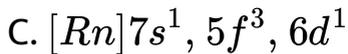


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**331.** Which one of the following is an electronic configuration of thorium?

A.  $[Rn]7s^2, 5f^0, 6d^2$

B.  $[Rn]7s^2, 5f^1, 6d^1$



**Answer: A**

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**332.** Americium does not contain 6d electrons due to

A. stability of  $f^0$  configuration

B. stability of  $f^7$  configuration

C. stability of  $f^{14}$  configuration

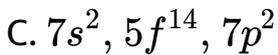
D. radioactive nature

**Answer: B**



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333. The outer electronic configuration of lawrencium is



**Answer: A**



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**334.** Match list I and II and select the correct answer using the codes given below the lists

List-I

At. no. of elements

A.96

B.97

C. 98

D.99

List-II

Names of the elements

1. Berkelium

2. Curium

3. Californium

4. Einsteinium

A. 

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
	1	2	1	1

B. 

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
	4	3	2	3

C. 

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
	4	3	1	3

D. 

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
	2	1	3	4

**Answer: C**



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335. Which of the following element involves the gradual filling of 5f level ?

A. Pm

B. Cm

C. Sm

D. Tm

**Answer: B**



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336. The electronic configuration of  $Am^{2+}$  is

A.  $7s^0, 5f^6, 6d^0$

B.  $7s^0, 5f^5, 6d^0$

C.  $7s^0, 5f^7, 6d^0$

D.  $7s^0, 5f^4, 6s^0$

**Answer: C**



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**337.** The penultimate shell of f-block elements contains how many electrons ?

A. 19 to 32

B. 8 to 9

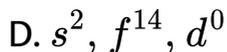
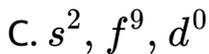
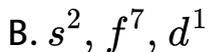
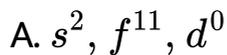
C. 8 to 14

D. 19 to 36

**Answer: B**

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**338.** Holonium closely resembles with Einstenium having observe electronic configuration



**Answer: A**



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**339.** The outer expected electronic configuration  $5f^5, 6d^1, 7s^2$  is of the element

A. Ac

B. Am

C. No

D. Tb

**Answer: D**



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340.  $4f^7, 5d^0, 6s^2$  represents electronic configuration of

A. Gd

B. Sm

C. Eu

D. Tb

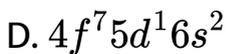
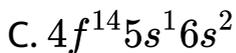
**Answer: C**



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341. Ytterbium has electronic configuration

A.  $4f^7 5d^0 6s^2$

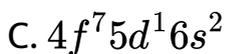
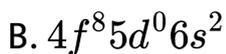
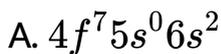


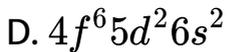
**Answer: B**



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**342.** An element belonging to lanthanide has at. No. 64, its electronic configuration is





**Answer: C**

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**343.** Which of the following lanthanoide shows stable electronic configuration ?

- A. Only Eu and Gd
- B. Only Eu, Gd and Yb
- C. Only Eu, Gd, and Yb
- D. Only Gd, Yb and Lu

**Answer: C**



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**344.** Which of the following elements has half filled f-orbitals ?

- A. only Eu
- B. only Eu and Yb
- C. Only Gd
- D. only Eu and Gd

**Answer: D**



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**345.** Which of the following has fully filled f-orbitals ?

A. Only Eu and Yb

B. Only Gd and Eu

C. Only Gd and Lu

D. Only Yb and Lu

**Answer: D**



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**346.** The electronic configuration  $4f^0 5d^1 6s^2$  represents

A. actinium

B. lanthanum

C. cerium

D. praseodymium

**Answer: B**



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**347.** Which of the following has  $5f^7 6d^0 7s^2$  configuration ?

A. curium

B. americium

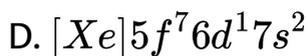
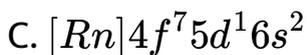
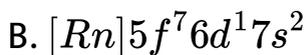
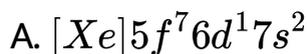
C. nobelium

D. lawrencium

**Answer: B**

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**348.** The actinoid with atomic number 96 has electronic configuration



**Answer: B**

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**349.** The actinides which has half filled 5f-orbitals are

A. only Am

B. only Cm

C. both Am and No

D. Both Am and Cm

**Answer: D**



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**350.**  $5f^3 6d^1 7s^2$  represents electronic configuration of

A. thorium

B. uranium

C. neptunium

D. protactinium

**Answer: B**



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**351.**  $4f^{14}5d^06s^2$  represents configuration of which of the following

A. Lu

B. Eu

C. Yb

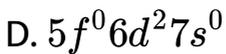
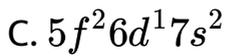
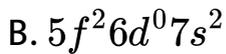
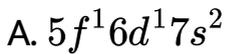
D. Gd

**Answer: C**



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**352.** Which one of the following is an electronic configuration of thorium?



**Answer: A**



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**353.** Which of the following f-block elements has half filled electrocin configuration having at. No. ?

A. 95,96,102 and 103

B. 70,71, 102 and 103

C. 63,64,95 and 96

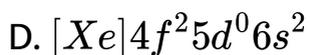
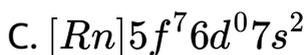
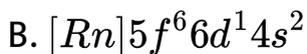
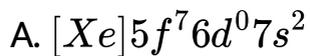
D. 63,64,70 and 71

**Answer: C**



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**354.** The f-block element having at n. 95 has electronic configuration



**Answer: C**



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**355.** The number of partially filled shell in f-block elements are

A. 2

B. 3

C. 4

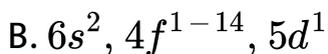
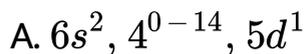
D. 5

**Answer: B**



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**356.** The expected general, electronic configuration of lanthanons is



C.  $6s^2, 4f^{0-14}, 5d^{0-1}$

D.  $6s^2, 4f^{1-14}, 5d^{0-1}$

**Answer: B**

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**357.** The most accepted observed electronic configuration of lanthanide is

A.  $6s^2, 4f^{0-14}, 5d^1$

B.  $6s^2, 4f^{1-14}, 5d^{0-1}$

C.  $6s^2, 4f^{2-14}, 5d^{0-1}$

D.  $6s^2, 4f^{2-14}, 5d^1$

**Answer: B**

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**358.** An element has electronic configuration  $(Xe)6s^24f^{13}, 5d^0$ . In which group it is placed

A. second

B. third

C. fourth

D. fifth

**Answer: B**

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**359.** The number of unpaired electrons present in Am are

A. 2

B. 3

C. 4

D. 7

**Answer: B**



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**360.** The most accepted electronic configuration of f-block element is

A.

$$(n - 2)s^2, p^6, d^{10}, f(0 - 14), (n - 1)s^2, p^6 d^{0-1}, ns^{0-2}$$

B.  $(n - 2)s^2, p^6, d^{10}, f^{1-14}, (n - 1)s^2, p^6 d^{0-1}, ns^2$

C.  $(n - 2)s^2, p^6, d^{10}, f^{0-14}, (n - 1)s^2, p^6 d^1, ns^{0-1}$

D.  $(n - 2)s^2, p^6, d^{10}, f^{0-14}, (n - 1)s^2, p^6 d^1, ns^2$

**Answer: B**



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**361.**  $\text{ln}^{3+}$  contain

A. 1 to 6 4-f unpaired electrons

B. 1 to 5 4-f unpaired electrons

C. 1 to 7 4-f unpaired electrons

D. all of these

**Answer: D**



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**362.** All lanthanides exhibit a stable valency of

A. 2

B. 3

C. 4

D. 6

**Answer: B**



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**363.** Which of the following forms stable +4 oxidation state ?

A. La

B. Gd

C. Eu

D. Ce

**Answer: D**



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**364.** Which of the following show maximum number of different oxidation state in its compounds ?

A. Eu

B. Gd

C. La

D. Nd

**Answer: D**



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**365.** The number of unpaired electrons in  $Ce^{3+}$  ion is 0

A. 0

B. 1

C. 2

D. 3

**Answer: B**



**View Text Solution**

**366.** The most characteristic oxidation state of lanthanide is

A. +2

B. +3

C. +4

D. +6

**Answer: B**



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**367.** Lanthanides shows variable oxidation state, because they release electron from the following orbitals

A. 4f

B. 6s

C. 5d

D. all of these

**Answer: D**

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368. In aqueous solutions  $\text{Eu}^{2+}$  acts as

- A. an oxidising agent
- B. an reducing agent
- C. either of these
- D. redox agent

**Answer: B**

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369.  $\text{Sm}^{3+}$  acts as

A. an oxidising agent

B. an reducing agent

C. either

D. neither

**Answer: B**



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**370.** Atomic number  ${}_{64}Gd$ ,  ${}_{66}Dy$ ,  ${}_{69}Tm$ ,  ${}_{71}Lu$ . which of the following does not have unpaired electron ?

A.  $Gd^{3+}$

B.  $Dy^{3+}$

C.  $Tm^{3+}$

D.  $Lu^{3+}$

**Answer: D**

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**371.** Which of the following element show +2 oxidation state in  $4f^7$  configuration ?

A. Pm

B. Tb

C. Eu

D. Ho

**Answer: C**

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**372. Stable oxidation state of Yb is**

A. +2

B. +3

C. +4

D. +6

**Answer: A**

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373.  $Ce^{4+}$  ion is

- A. oxidising agent
- B. reducing agent
- C. redox agent
- D. one of the above

**Answer: A**

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374. Cerium shows +4 oxidation state, in which of the following configuration ?

A.  $f^0$

B.  $f^6$

C.  $f^7$

D.  $f^{14}$

**Answer: A**



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**375.**  $Yb^{2+}$  is

A. reducing agent

B. oxidising agent

C. redox agent

D. one of the above

**Answer: A**

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**376.** Ytterbium show +2 oxidation state, in which of the following configuration ?

A.  $f^0$

B.  $f^7$

C.  $f^{14}$

D.  $f^8$

**Answer: C**

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377.  $Eu^{3+}$  ion is isoelectronic with



**Answer: D**

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378. How many f-electrons are present in Tb when it show +3 oxidation state ?

A. 6

B. 7

C. 8

D. 9

**Answer: C**



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**379.** The number of unpaired electrons in  $\text{Lu}^{3+}$  are

A. 0

B. 2

C. 6

D. 7

**Answer: A**

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**380.** In first inner-transition series, the highest oxidation state exhibited by

A. Pm

B. Eu

C. Sm

D. Nd

**Answer: D**

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**381.** Which of the following has highest paired 4f electrons ?



**Answer: A**



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**382.** Which of the following show the oxidation state of +4 ?

A. Pm

B. Eu

C. Sm

D. Tb

**Answer: D**



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**383.** Neodymium show +2, +3, and +4 oxidation state of +4 oxidation state. The most oxidising state known in aqueous solution is

A. +2

B. +3

C. +4

D. none of these

**Answer: B**



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**384.** Which of the following has all of its electrons paired ?

A.  $Pr^{3+}$

B.  $Ce^{3+}$

C.  $Tb^{4+}$

D. none of these

**Answer: D**



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**385.** Which of the following lanthanide elements form tetrapositive ion in aqueous solution ?

A. Sm

B. Gd

C. Pm

D. Ce

**Answer: D**



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386. Which one of the following is good oxidising agent ?



**Answer: C**



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387. Dipositive Pm is isoelectronic with



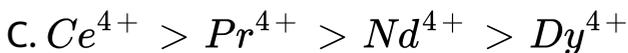
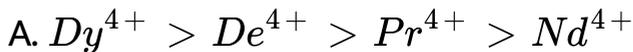


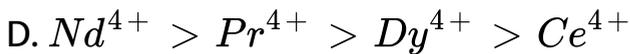
**Answer: D**



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**388.** Decreasing order of oxidising property of tetrapositive lanthanide is

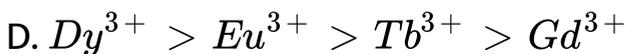
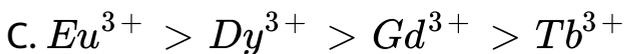
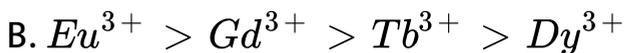
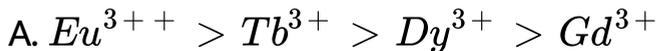




**Answer: B**

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**389.** Decreasing order of reducing properties of  $Ln^{3+}$



**Answer: A**

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390. All  $\text{In}^{3+}$  ions are strong reducing agent in solid and aqueous medium. Which is due to

A. high I.P.

B. high lattice energy

C. high hydration energy and high negative value of reduction potential

D. all of these

**Answer: D**



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**391.** High negative value of reduction potential, indicates lanthanides are

- A. oxidising agent
- B. reducing agent
- C. high complex forming tendency
- D. high magnetic property

**Answer: B**

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**392.** The electronic configuration of holmium is  $+3$  oxidation state

A.  $6s^0, 4f^{11}, 5d^0$

B.  $6s^0, 4f^{14}, 5d^0$

C.  $6s^0, 4f^{10}, 5d^0$

D.  $6s^0, 4f^{12}, 5d^0$

**Answer: C**



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**393.** Which of the following elements shown +2 O. S. in  $f^7$  configuration ?

A. Eu and Gd

B. Eu and Tb

C. Eu and Yb

D. Eu and Lu

**Answer: A**



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**394.** The oxidation state of Lu in  $4f^{14}$  configuration is

A. +2

B. +3

C. +4

D. +6

**Answer: B**



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395.  $La^{3+}$  is isoelectronic with

A.  $Tb^{3+}$

B.  $Eu^{3+}$

C.  $Ce^{4+}$

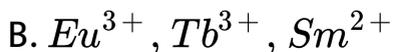
D.  $Sm^{3+}$

**Answer: C**



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396. Which of the following ion posses six unpaired electrons ?

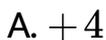


**Answer: B**



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397. The common oxidation state of actinides is



B. +5

C. +3

D. +7

**Answer: C**



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**398.** +4 oxidation state is most important for

A. Pa

B. Np

C. Cm

D. Th

**Answer: D**

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**399.** Stable oxidation state of No is

A. +2

B. +3

C. +4

D. +7

**Answer: D**

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**400.** The main reason for larger number of oxidation state exhibited by the actinides than the corresponding lanthanides, is

- A. more energy difference between 5f and 6d orbitals than 4f and 5d orbitals
- B. less energy difference between 5f and 6d orbitals than 4f and 5d orbitals
- C. larger atomic size of actinides
- D. more reactive nature of actinides than lanthanides

**Answer: B**



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**401.** Most stable oxidation state of Pa is

A. +2

B. +3

C. +5

D. +7

**Answer: C**



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**402.** Which of the following statement is incorrect regarding lanthanides and actinides?

- A. Oxidation state +3 is most common in both the series
- B. In both series f-orbitals are progressively filled
- C. The elements of there series are radioactive
- D. Both series show contraction effect

**Answer: C**

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**403.** In the 5f series highest oxidation state is exhibited by

- A. U and Np
- B. Np and Pu

C. Pu and Am

D. Cm and Fm

**Answer: B**

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**404.** The correct order of oxidising property of  $\text{Ln}^{4+}$  ion is

A.  $Dy > Tb > Nd > Pr > Ce$

B.  $Dy > Nd > Pr > Tb > Ce$

C.  $Dy > Nd > Tb > Ce > Pr$

D.  $Nd > Dy > Tb > Pr > Ce$

**Answer: B**



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**405.** The unstable oxidation of Sm is

A. +4 and +3

B. +4

C. +3

D. +2

**Answer: D**



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**406.** Stable oxidation state of Berkelium is

A. +3

B. +4

C. +2

D. +6

**Answer: B**

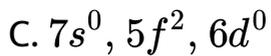


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**407.** The outer electronic configuration of plutonium in +6 oxidation state is

A.  $7s^0, 5f^5, 6d^0$

B.  $7s^0, 5f^1, 6d^0$



**Answer: C**



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**408.**  $Cf^{3+}$  is isoelectronic with



**Answer: D**



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409. Oxidation state of uranium in  $UO_2^{2+}$  is

A. +4

B. +5

C. +6

D. +7

**Answer: C**



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410. The most stable oxidation state of thorium is

A. +3

B. +4

C. +5

D. +6

**Answer: B**



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**411.** Electronic configuration of  $Pu^{7+}$

A.  $7s^0, 5f^{14}, 6d^0$

B.  $7s^0, 5f^3, 6d^0$

C.  $7s^0, 5f^0, 6d^0$

D.  $7s^0, 5f^1, 6d^0$

**Answer: B**

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412.  $Np^{7+}$  is

A. oxidising agent

B. reducing agent

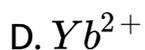
C. coloured ion

D. all of these

**Answer: C**

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413. Which of the following ion is easily reduced



**Answer: B**



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414. Which of the following ion is easily oxidised



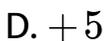
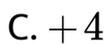
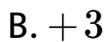
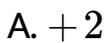


**Answer: A**



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**415.** The principal oxidation state of lanthanide is



**Answer: B**

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**416.** Samarium shows the oxidation state

- A. +3 and +4
- B. +2, +3 and +4
- C. +2, and +3
- D. only +3

**Answer: C**

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**417.** Lanthanide do not show oxidation state

A. +3

B. +4

C. +6

D. +2

**Answer: C**



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**418.** The lanthanum exhibits which of the following oxidation state ?

A. only +2

B. +2 and +3

C. only +3

D. only +3 and +4

**Answer: D**



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**419.** Lanthanides are able to show oxidation states

A. only +3

B. only +4

C. only +2 and +3

D. both +2, +3 and +4

**Answer: D**

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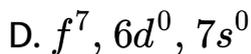
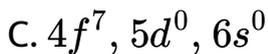
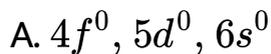
**420.**  $4f^0, 5d^0 6s^0$  represents which one of the following



**Answer: C**

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421.  $Gd^{+3}$  ions has electronic configuration



Answer: C



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422.  $4f^{14}5d^06s^0$  represents which of the followig ?

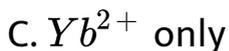
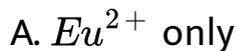




**Answer: B**

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**423.** Which of the following  $M^{2+}$  ions have stable configuration ?



**Answer: B**

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**424.** Which lanthanoid deposite ions has strong tendency of donation electron ?

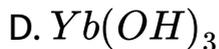
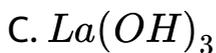
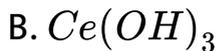


D. none of these

**Answer: A**

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425. The most basic hydroxide is



Answer: C



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426. Which of the  $M^{4+}$  ion has more tendency to gain single electron ?



B.  $Dy^{4+}$

C.  $Pr^{4+}$

D.  $Nd^{4+}$

**Answer: B**



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**427.** The lanthanoide which shows all i.e., +2, +3 and +4 oxidation state is

A. europium

B. samarium

C. neodymium

D. gadolinium

**Answer: C**

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**428.** The lanthanoide ion used as oxidizing agent is

A.  $Eu^{3+}$

B.  $Yb^{3+}$  and  $Ce^{3+}$

C.  $Eu^{3+}$  and  $Tb^{3+}$

D. none of these

**Answer: D**

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429.  $Tb^{+4}$  has electronic configuration  $4f^7 5d^0 6s^0$ .

Because of this it has strong tendency to

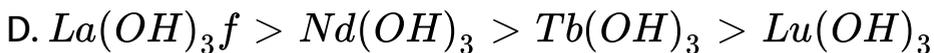
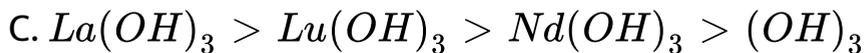
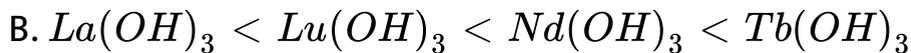
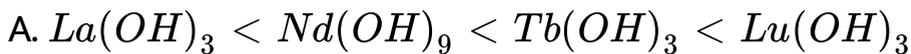
- A. loose electrons
- B. undergo oxidation
- C. gain electron
- D. high hydration

**Answer: C**



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430. What is the correct order of basicity of hydroxide ?



**Answer: D**



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**431.**  $Eu^{2+}$  ion has strong tendency to

A. gain electron

B. lose electron

C. undergo reduction

D. none of these

**Answer: B**

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**432.** The lanthanoide ion with e.c.  $4f^{14}5d^06s^0$  has tendecny to

A. under goes reduction

B. gain electron

C. lose electron

D. all of these

**Answer: C**



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**433.** Actinides exhibits oxidation state

A. +3 and +4

B. +4 and 5

C. +5 and +6

D. +2 to +7

**Answer: D**



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434.  $4f^2 5d^0 6s^0$  is the electronic configuration of lanthanoide ion

- A. only  $Eu^{2+}$
- B. only  $Gd^{3+}$  and  $Eu^{2+}$
- C. only  $Eu^{2+}$ ,  $Gd^{3+}$  and  $Tb^{4+}$
- D. only  $Eu^{2+}$  and  $Tb^{2+}$

**Answer: C**

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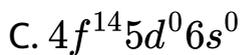
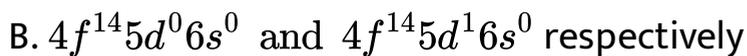
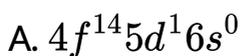
435. Which of the following  $M^{2+}$  is not a stable oxidation state ?

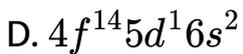


**Answer: D**

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**436.** The  $Yb^{2+}$  and  $Lu^{3+}$  ion has electronic configuration





**Answer: C**

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**437.** Which of the following  $M^{4+}$  cations does not have stable electronic configuration ?



D. Both a and b

**Answer: B**

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438. The ions having  $4f^0, 5d^0 6s^0$  stable electronic configuration are

A.  $La^{3+}$  and  $Ce^{4+}$

B.  $La^{3+}$  and  $Ce^{3+}$

C. only  $Ce^{4+}$

D. only  $La^{3+}$

**Answer: A**

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**439.** Lanthanides does not show +4 O. S. in which of the following configuration

A.  $f^0$

B.  $f^7$

C.  $f^{14}$

D. all of these

**Answer: C**



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**440.** Erbium shows was oxidations state

A. only +4

B. +3, +4

C. only +3

D. +2, +3

**Answer: C**



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**441.** Cerium shows most common oxidation state

A. +2, +4

B. +3, +4

C. +2, +3

D. +4, +5

**Answer: B**

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**442.** Which of the following tripositive ion has half filled 4f subshell ?

A. Gd

B. Am

C. Pr

D. Yb

**Answer: A**

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443.  $Ce^{4+}$  is used as oxidising agent because

- A. it has tendency to attain +2, O.S.
- B. it has tendency to attain +3, O.S.
- C. it has tendency to attain +5, O.S.
- D. it does not gain electron

**Answer: B**

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444. +2 and +3 oxidation state is stable in which of the following respectively

- A. *Eu, Lu*

B. *Ce, Lu*

C. *Eu, Nd*

D. *Ce, Eu*

**Answer: A**



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**445.** In aqueous solution, cerium shows stable O.S.

A. +2

B. +4

C. +3

D. +5

**Answer: B**



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**446.** In aqueous solution, Eu shows stable O.S.

A. +3

B. +4

C. +3

D. +5

**Answer: B**



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447.  $\text{In}^{2+}$  ions are used as

A. oxidising agent

B. reducing agent

C. either

D. neither

**Answer: B**



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448.  $\text{In}^{4+}$  ions are used as

A. oxidising agent

B. reducing agent

C. either

D. neither

**Answer: A**



**View Text Solution**

**449.**  $\text{In}^{3+}$  ions are

A. reducing agent

B. oxidising agent

C. either

D. neither

**Answer: A**



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450.  $Lu(OH)_3$  is less basic than  $La(OH)_3$ . This is due to

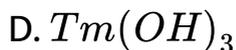
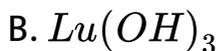
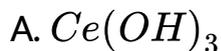
- A. decrease in ionic character of M-OH bond
- B. ionic size decrease due to lanthanide contraction
- C. increase in covalent character of M-OH bond
- D. all of these

**Answer: D**



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451. Which of the following hydroxide is more ionic and more basic in nature ?



**Answer: A**



**View Text Solution**

452. The +4 ion of which one of the following has half filled 4f subshell.

A. Gd

B. Tb

C. Tm

D. Sm

**Answer: B**



**View Text Solution**

**453.** The stable O.S. of uranium is

A. +3

B. +4

C. +5

D. +6

**Answer: D**

 [View Text Solution](#)

**454.** Stable oxidation state of nobelium is

A. +2

B. +3

C. +4

D. +5

**Answer: A**

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455. tripositive actinides ions are

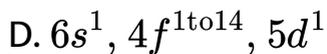
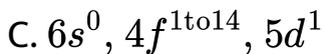
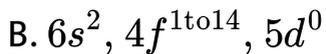
- A. with three protons
- B. with three neutrons
- C. with three electrons
- D. with three electrons less than its atomic number

**Answer: D**

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456.  $LN^{3+}$  has electronic configuration

A.  $6s^0, 4f^{1\text{to}14}5d^0$



**Answer: A**



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**457.** Since, lanthanides released electron from 4f, 5d and 6s orbitals, they show

A. fixed oxidation state

B. variable oxidation state

C. two oxidation state

D. one oxidation state

**Answer: B**

 [View Text Solution](#)

**458.** Which element show the maximum difference in the oxidation state of its compounds ?

A. La

B. Sm

C. Gd

D. Am

**Answer: D**

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459. The number of unpaired electrons in  $Yb^{3+}$  is found to be

A. zero

B. one

C. two

D. six

**Answer: B**

 [View Text Solution](#)

460. In lanthanide the nuclear charge

- A. increases from Ce to Lu
- B. decreases from Ce to Lu
- C. remain same
- D. increases up to Ce to Gd and then decreases

**Answer: A**

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461. The shield effect of electron decreases in the order

A.  $f > d > p > s$

B.  $s > p > d > f$

C.  $s > d > p > f$

D.  $p > d > s > f$

**Answer: B**



**View Text Solution**

**462.** The lanthanide contraction is due to

A. perfect shielding of f-orbitals

B. perfect shielding of d-orbitals

C. imperfect shielding of f-orbitals

D. imperfect shielding of d-orbitals

**Answer: C**

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**463.** As atomic number increases, the ionic radii of  $\text{Ln}^{3+}$  ion

- A. increases
- B. first increases and then decreases
- C. decreases
- D. first decreases and then increases

**Answer: C**

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464. The decrease in the size of inner transition element is

q

- A. more
- B. less
- C. not regular
- D. none of these

**Answer: B**



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465. Lanthanide contraction is related to

- A. valence electron

B. ionic radii

C. densities

D. nuclear mass of various members of the series

**Answer: B**



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**466.** From Ce to Lu atomic size decreases

A. 18 Pm

B.  $8Pm$

C.  $12Pm$

D.  $10Pm$

**Answer: D**

 [View Text Solution](#)

**467.** Which of the following ion has smallest radii ?



**Answer: A**

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**468.** Lanthanide contraction is due to increase in

- A. ionic radii
- B. shielding of 4f electrons
- C. effective nuclear charge
- D. size of 4f orbitals

**Answer: C**



[View Text Solution](#)

**469.** The correct order of ionic radius of

$Yb^{3+}$ ,  $La^{3+}$ ,  $Eu^{3+}$ ,  $Lu^{3+}$  is

- A.  $Yb < Lu < Eu < La$

B.  $La < Eu < Lu < Yb$

C.  $Lu < Eu < La < Yb$

D.  $Yb < La < Eu < Lu$

**Answer: A**



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**470.** Because of lanthanoide contraction, which of the following pairs of elements have nearly same atomic radii ?

(Numbers in the parenthesis are atomic numbers )

A. Ti (22) and Zr (40)

B. Zr (40) and Nb (41)

C. Zr (40) and Hf (72)

D. Zr (40) and Ta (73)

**Answer: C**

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**471.** A reduction of atomic size with increase in atomic number is a characteristic of elements of

A. radioactive series

B. high atomic mass

C. f-block

D. all of these

**Answer: C**



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**472.** As increase in both atomic and ionic radii with atomic number occurs in any group of the periodic table and in accordance with this, the ionic radii of  $Ti^{4+}$  and  $Zr^{4+}$  ion are 68 pm and 74 pm respectively. But for  $Hf^{4+}$  ion, the ionic radius is 75 pm. Which is most same as that for  $Zr^{4+}$  ion. This is due to

- A. greater degree of covalency in compound of  $Hf^{4+}$
- B. lanthanide contraction

C. difference in co-ordination number of

$Zr^{4+}$  and  $Hf^{4+}$  in their compound

D. actinide contraction

**Answer: B**



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**473.** The lanthanide contraction is responsible for the fact that

A. Zr and Yb have same size

B. Zr and Nb have same oxidation state

C. Zr and Hf have same radius

D. Zr and Zn have same oxidation state

**Answer: C**

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**474.** Tantalum and niobium have similar ionic radii because

- A. of diagonal relationship
- B. both are in same group
- C. they have same chemical properties
- D. of lanthanide contraction

**Answer: D**



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475. The properties of  $3^{rd}$  transition series elements and  $2^{nd}$  transition series elements are same because of

- A. both belong to d-block
- B. both belong to same group of the periodic table
- C. both have same number of electrons
- D. both have same radii

**Answer: D**



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**476.** The properties of tungsten and molybdenum are similar because

- A. both belong to d-block
- B. both belong to same group of the periodic table
- C. both have same number of electrons
- D. both have same radii

**Answer: D**

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**477.** Which of the following pair of atoms have similar

- A. Hf and Os

B. W and Mo

C. Hf and Nb

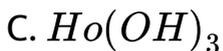
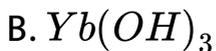
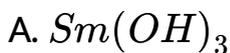
D. Ta and Mo

**Answer: B**



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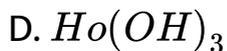
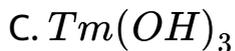
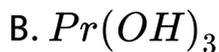
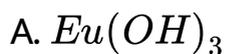
**478.** Which of the following is more basic hydroxide ?



**Answer: A**

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**479.** Which of the following is more ionic hydroxide ?



**Answer: B**

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480. Which of the following  $\text{Ln}^{3+}$  ion is strongest reducing agent ?

A. Sm

B. Tb

C. Pm

D. Lu

**Answer: C**

 [View Text Solution](#)

481. Which of the following is chemical twins ?

A. Zr and Ta

B. Nb and W

C. Ta and Nb

D. Tc and Os

**Answer: C**



**View Text Solution**

**482.** Lanthanide contraction due to

A. poor shielding of 5f orbitals

B. poor shielding of 3f orbitals

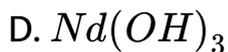
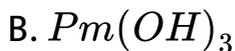
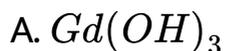
C. perfect shielding of 4f orbitals

D. poor shielding of 4f orbitals

**Answer: D**

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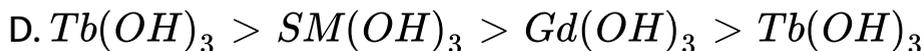
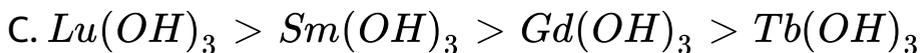
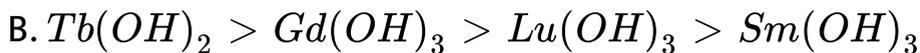
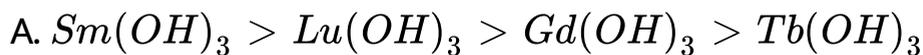
**483.** Which of the following hydroxide has more covalent character ?



**Answer: C**

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484. Decreasing order of ionic character of  $\text{Ln}(\text{OH})_3$  is



Answer: A

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485. Which of the following f-block element are not able to form oxocations ?

A. cerium and samarium

B. uranium and thorium

C. neptunium and protactinium

D. nobelium and fermium

**Answer: A**



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**486.** Actinide form

A. ionic compounds

B. covalent compounds

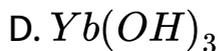
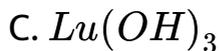
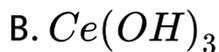
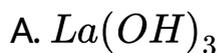
C. co-ordinate compounds

D. chelates

**Answer: B**

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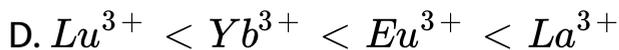
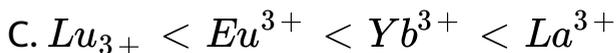
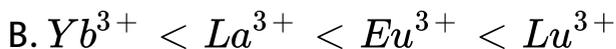
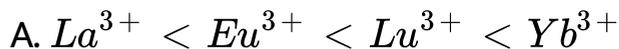
**487.** Among the following strongest base is



**Answer: A**

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**488.** The correct order of ionic radii of the ion is



**Answer: D**



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**489.** With increase in atomic number, the atomic size or ionic size go on decreasing in case of

A. d-block elements

B. s-block elements

C. f-block elements

D. p-block elements

**Answer: C**



**View Text Solution**

**490.** Basic nature of compounds of

A. lanthanide  $>$  actinide

B. lanthanide  $<$  actinide

C. lanthanide = actinide

D. none is correct

**Answer: B**

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**491.** Which element among the lanthanide has smallest atomic size ?

A. Ce

B. Lu

C. Eu

D. Gd

**Answer: B**

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492. Lanthanide contraction is due to increase in

- A. shielding of 4f electrons
- B. effective nuclear charge
- C. atomic number
- D. size of 4f orbital

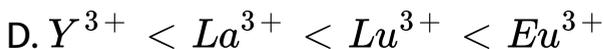
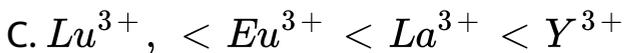
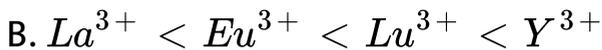
Answer: B

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493. The correct order of ionic radii of

$Y^{3+}$ ,  $La^{3+}$ ,  $Eu^{3+}$  and  $Lu^{3+}$  is

A.  $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$



**Answer: A**



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**494.** Lanthanides are

A. 14 elements in the 7<sup>th</sup> period filling 4f orbitals

B. 14 elements in the 5<sup>th</sup> period filling 5t orbitals

C. 14 element in the 5<sup>th</sup> period filling 5t orbitals

D. 14 elements in the 4<sup>th</sup> period that are filling 4f orbitals

**Answer: B**

 [View Text Solution](#)

**495.** Chemical twins are present in which of the transition series

A. 2<sup>nd</sup> and 3<sup>rd</sup>

B. 1<sup>st</sup> and 2<sup>nd</sup>

C. 3<sup>rd</sup> and 4<sup>th</sup>

D. none of these

**Answer: A**



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**496.** The steady decrease in atomic size in lanthanide series is called lanthanide contraction and in all amounts to

A. 150 Pm

B.  $10Pm$

C.  $20Pm$

D.  $40Pm$

**Answer: B**



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497. Lanthanoide contraction affects on

- A. basicity of lanthanoide hydroxides
- B. atomic and ions radii of post lanthanoide
- C. similarty in properties of 2<sup>nd</sup> and 3<sup>rd</sup> row transition elements
- D. all of these

**Answer: D**



**View Text Solution**

**498.** Which of the following pair of elements are called chemical twins ?

- A. Zr and Hf
- B. No and Ta
- C. Mo and W
- D. all of these

**Answer: D**



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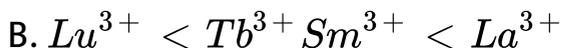
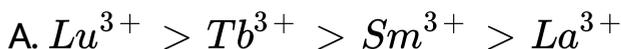
**499.** From  $La(OH)_3$  to  $LuOH - (3)$  which of the following is wrong statement ?

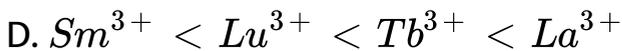
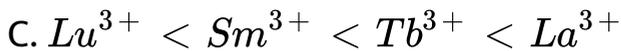
- A. Ionic character decreases
- B. Covalent character increases q
- C. Ionic radius of  $M^{3+}$  ion increases
- D. Basic character decreases

**Answer: C**

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**500.** What is the correct order of ionic size of lanthanoid ions ?





**Answer: B**

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**501.** The pair of elements which are not having similarly in atomic and ionic radii are

A. Zr and Hf

B. Mo and Ta

C. Nb and Ta

D. Mo and W

**Answer: B**

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502. The pair of elements like Zr - Hf, Nb - Ta and Mo - W.

Due to lanthanoide contraction

- A. having similarly in atomic and ionic size
- B. these are called chemical twins
- C. these elements have similar properties
- D. all of these

**Answer: D**

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503. The pair of lanthanoid ions used as reducing agents is/are

- A.  $Eu^{3+}$  and  $Ce^{4+}$
- B.  $Ce^{4+}$  and  $Tb^{4+}$
- C.  $Eu^{2+}$  and  $Dy^{4+}$
- D.  $Nd^{2+}$  and  $Sm^{2+}$

**Answer: D**



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504. Actinides form oxocation because of

- A. actinide contraction

B. radioactive nature

C. reducing property

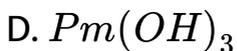
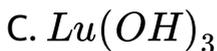
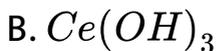
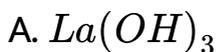
D. high charge density in higher oxidation state

**Answer: D**



**View Text Solution**

**505.** The least basic hydroxide is



**Answer: C**

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506. Which of the following lanthanoid ion used as oxidizing agent ?

- A. only  $Tb^{3+}$
- B. only  $Ce^{2+}$
- C. only  $Ce^{4+}$  and  $Tb^{4+}$
- D. only  $Tb^{2+}$  and  $Dy_{3+}$

**Answer: C**

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**507.** In lanthanoides the increase in at. No. 14 results in decrease of atomic radii by only 10 pm. Because of

- A. gradual decrease in nuclear charge
- B. gradual decrease in nuclear charge
- C. 4f-orbitals provides less shielding effect
- D. 4f-orbitals provides more shielding effect

**Answer: C**

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**508.** The steady decrease in ionic size in lanthanides due to lanthanide contraction and in all amount to

A. 10 pm

B. 40 pm

C. 18 pm

D. 50 pm

**Answer: C**



**View Text Solution**

**509.** Which of the following is correct about actinides ?

A. They form stable oxidation state +2

B. They do not form oxocation

C. They shows only +2 oxidation state

D. Stability of +3 oxidation state increase as atomic number increases.

**Answer: D**

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510. Which of the following has poor shielding effect ?

A. s

B. p

C. 4 f

D. 5 f

**Answer: D**



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511. Most of the ions of lanthanide and actinide series have unpaired electrons in  $(n - 2f)$  orbitals and hence they are

- A. diamagnetic
- B. paramagnetic
- C. ferromagnetic
- D. none of these

**Answer: B**



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512. Basic characters of  $\text{Ln}^{3+}$  ion is

- A. increases with ionic size increases
- B. decreases with ionic size decreases
- C. increases with nuclear charge increases
- D. increases with atomic number increases

**Answer: B**

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513. Which of the following oxocation is not possible





**Answer: B**

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**514.** Basicity of the lanthanides depends upon

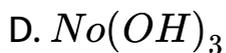
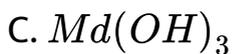
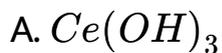
- A. gain of electrons
- B. loss of electrons
- C. sharing of electrons
- D. coupling of electrons

**Answer: B**



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515. Which of the following has lowest basicity ?



**Answer: A**



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