



CHEMISTRY

BOOKS - DISHA PUBLICATION CHEMISTRY (HINGLISH)

THE D- AND F- BLOCK ELEMENTS

Jee Main 5 Years At A Glance

1. When XO_2 is fused with an alkali metal hydroxide in presence of an oxidizing agent such as KNO_3 a dark green product is formed which disproportionates in acidic solution to afford a dark purple solution. X is:

A. Mn

B. Cr

C. V

D. Ti

Answer: A



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2. Which of the following ions does not liberate hydrogen gas on reaction with dilute acids ?

A. Ti^{2+}

B. V^{+2}

C. Cr^{2+}

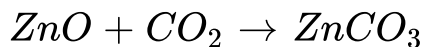
D. Mn^{2+}

Answer: D

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3. In the following reactions, ZnO is respectively acting as

a/an



A. base and acid

B. base and base

C. acid and acid

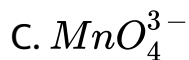
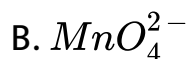
D. acid and base

Answer: D



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4. Which one of the following species is stable in aqueous solution ?



Answer: B



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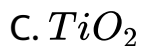
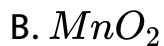
5. The transition metal ions responsible for color in ruby and emerald are, respectively :



Answer: C

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6. Which of the following compounds is metallic and ferromagnetic ?

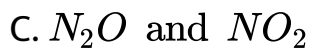


Answer: D



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7. The reaction of zinc with dilute and concentrated nitric acid, respectively, produce

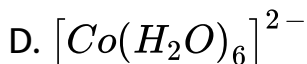


D. NO_2 and NO

Answer: C

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8. When concentrated HCl is added to an aqueous solution of $CoCl_2$. Its colour changes from reddish pink to deep blue. Which complex ion gives blue colour in this reaction ?



Answer: A



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9. Which of the following statements is false ?

A. $Na_2Cr_2O_7$ is less soluble than $K_2Cr_2O_7$

B. $K_2Cr_2O_7$ is primary standard in volumetry

C. CrO_4^{2-} is tetrahedral in shape

D. $Cr_2O_7^{2-}$ has a Cr-O-Cr bond

Answer: A



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10. Chloro compound of Vanadium has only spin magnetic moment of 1.73 BM. This Vanadium chloride has the formula

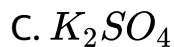
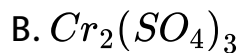


Answer: B



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11. Which of the following is not formed when H_2S reacts acidic $K_2Cr_2O_7$ solution ?

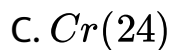
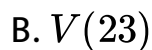
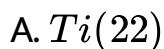


Answer: A



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12. Which one of the following exhibits the large number of oxidation states ?



D. $Mn(25)$

Answer: D



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Exercise 1 Concept Builder Topic Characteristics Of D Block Elements

1. Which of the following is not a condition for complex formation?

- A. Small atomic size
- B. High nuclear charge
- C. Variable oxidation states

D. Availability of vacant d orbitals

Answer: C

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2. The stability of particular oxidation state of a metal in aqueous solution is determined by

- A. enthalpy of sublimation of the metal
- B. ionisation energy
- C. enthalpy of hydration of the metal ion (
- D. all of these

Answer: D





3. In general the melting and boiling points of transition metals

A. increases gradually across the period from left to right.

B. decrease gradually across the period from left to right .

C. first increases till the middle of the period and then decreases towards the ends.

D. first decreases regulary till the middle of the period and then towards the end .

Answer: C



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4. Which of the following is used in the preparation of chlorine?

- A. Only MnO_2
- B. Only $KMnO_4$
- C. Both MnO_2 and $KMnO_4$
- D. Either MnO_2 or $KMnO_4$

Answer: C



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5. Chloro compound of vanadium has only spin magnetic moment of 1.73 BM. This vanadium chloride has the formula :- (at no. of V=23)



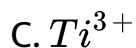
Answer: A



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6. The aqueous solution containing which one of the following ions will be colourless

(Atomic number $Sc = 21$, $Fe = 26$, $Ri = 22$, $Mn = 25$)



Answer: A



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7. Among the transition elements the element with lowest melting point belongs to

A. Group 3

B. Group 11

C. Group 6

D. Group 12

Answer: D



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8. Which of the following ions does not liberate hydrogen gas on reaction with dilute acids ?

A. Ti^{2+}

B. V^{2+}

C. Cr^{2+}

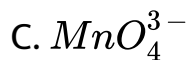
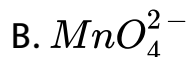
D. Mn^{2+}

Answer: D



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9. Which one of the following species is stable in aqueous solution ?



Answer: B



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10. Which transition metal has lowest density ?

A. Sc

B. Ti

C. Zn

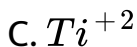
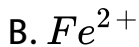
D. La

Answer: A

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11. which of the following ions has the maximum magnetic moment ?

A. Mn^{+2}

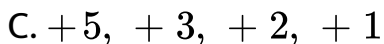
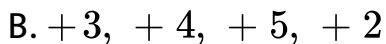
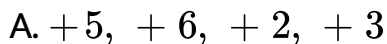


Answer: A



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12. The maximum oxidation state shown by $V(Z = 23)$, $Cr(Z = 24)$, $Co(Z = 27)$, $Sc(Z = 21)$, are respectively

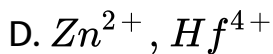
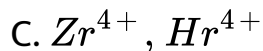
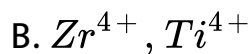
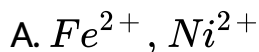


D. +4 in each case

Answer: A

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13. Which of the following pairs has the same size ?



Answer: C

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14. For the four successive transition elements (Cr, Mn, Fe, and Co), the stability of +2 oxidation state will be there in which of the following order ?

(At. Nos. Cr = 24, Mn = 25, Fe = 26, Co = 27)

A. $Mn > Fe > Cr > Co$

B. $Fe > Mn > Co > Cr$

C. $Co > Mn > Fe > Cr$

D. $Cr > Mn > Co > Fe$

Answer: A



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15. Which one of the following does not correctly represent the correct order of the property indicated against it

A. $Te < V < Cr < Mn$: : increasing number of oxidation states

B. $Te^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$: increasing magnetic moment

C. $Ti < V < Cr < Mn$: increasing melting points

D. $Ti < V < Mn < Cr$: increaing 2nd ionization enthalpy

Answer: C

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16. Four successive members of the first series of the transition metals are listed below. For which one of them the standard potential $\left(E_{M^{2+}/M}^{\circ}\right)$ value has a positive sign?

A. *Co* ($Z = 27$)

B. *Ni* ($Z = 28$)

C. *Cu* ($Z = 29$)

D. *Fe* ($Z = 26$)

Answer: C



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17. The catalytic activity of transition metals and their compounds is mainly due to

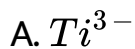
- A. their magnetic behaviour
- B. their unfilled d-orbitals
- C. their ability to adopt variable oxidation state
- D. their chemical reactivity

Answer: C

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18. Magnetic moments $2.84B$. M is given by :

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



Answer: D



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19. The number of d-electrons in Fe^{2+} ($Z=26$) is not equal to the number of electrons in which one of the following ?

A. p-electrons in Cl ($Z=17$)

B. d-electrons in Fe ($Z=26$)

C. p-electrons in Ne ($Z=10$)

D. s-electrons in Mg ($Z=12$)

Answer: A



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20. The angular momentum of electron in 'd' orbital is equal to:

A. $\sqrt{2}h$

B. $2\sqrt{3}h$

C. $0h$

D. $\sqrt{6}h$

Answer: D



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Exercise 1 Concept Builder Topic 2 Compounds Of Transition Metals

1. From a solution $CuSO_4$ the metal used to recover copper is

A. Na

B. Ag

C. Hg

D. Fe

Answer: D



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2. Anhydrous cobalt(II) chloride is blue in colour but on dissolving in water it changes to pink in colour because

- A. Its oxidation state changes.
- B. Its magnetic character changes
- C. Its coordination number changes.
- D. In water it shows fluorescence

Answer: C



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3. Which of the following can be employed for the conversion of potassium manganate to potassium

permanganate?

A. O_3

B. Cl_2

C. Elctrolysis

D. All

Answer: D



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4. In vapour state $Cu(NO_3)_2$ and $Cu_2(CH_3COO)_4 \cdot 2H_2O$

exist as

A. Dimer, monomer

B. Monomer, dimer

C. Monomer, monomer

D. Dimer, Dimer

Answer: B



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5. Which of the following is false

A. Molten lead and zinc are miscible.

B. Silver is more soluble in molten zinc than lead.

C. Zinc-silver alloy is volatile.

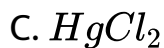
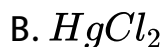
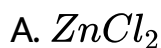
D. Zinc-silver alloy is heavier and gets solidified later than lead.

Answer: D



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6. Which of the following is used as purgative in medicine?



Answer: C



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

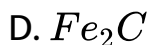
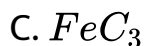
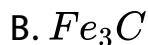
- A. Very high ionisation energy and weakly metallic bond.
- B. Low ionisation potential
- C. High atomic weight.
- D. High vapour pressure.

Answer: A



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8. Which compound is formed when iron reacts with carbon?



Answer: B



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9. The aqueous solution of transition metal salt changes colour from pink to blue, when concentrated hydrochloric acid is added to it. The changes in colour is due to:

- A. evolution of hydrogen that changes the oxidation state of the metal ion.
- B. change in the coordination number of the metal ion from 6 to 4 and formation of new species in solution.
- C. formation of a coordination complex of the metal ion with hydrochloric acid.
- D. protonation of the metal ion

Answer: B

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10. Which of the comparison Zn, Cd, Hg is/are incorrect?

(I) $ZnCl_2$ is ionic whereas $CdCl_2$ and $HgCl_2$ is covalent

(II) Zn and Cd dissolves in dilute acid HCl liberating H_2 but Hg can not

(III) Zn and Cd forming with ppt. of $Zn(OH)_2$ and $Cd(OH)_2$ but Hg forms coloured ppt. of $Hg(OH)_2$.

(IV) All form A_2^{2+} type ion

A. only III

B. I,III,IV

C. I and III

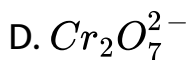
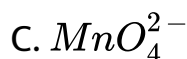
D. all of these

Answer: B



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11. The oxoanion in which the oxidation state of the central atom is same as its group number in the periodic table is:



Answer: D



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12. When an aqueous solution of copper (II) sulphate is saturated with ammonia, the blue compound crystallises on evaporation. The formula of this blue compound is:

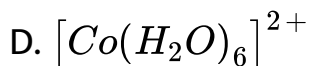
- A. $[Cu(NH_3)SO_4 \cdot H_2O]$ (square planar)
- B. $[Cu(NH_3)_4]SO_4$ (Tetrahedral)
- C. $[Cu(NH_2)_6]SO_4$ (Octahedral)
- D. $[Cu(SO_4)(NH_3)_5]$ (Octahedral)

Answer: A

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13. When concentrated HCl is added to an aqueous solution of $CoCl_2$. Its colour changes from reddish pink to deep blue. Which complex ion gives blue colour in this reaction?

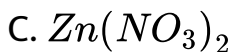
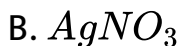




Answer: A

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14. Colourless solutions of the following four salts are placed separately in four different test tubes and a strip of copper is dipped in each one of these. Which solution will turn blue?



D. $ZnsO_4$

Answer: B

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15. The correct statements of the following

A. FeI_3 is stable in aqueous solution.

B. An acidified solution of K_2CrO_4 gives yellow precipitate on mixing with lead acetate.

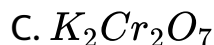
C. The species $[CuCl_4]^{2-}$ exists but $[C \underline{\quad} (4)]^{2-}$ does not.

D. Both copper (I) and copper (II) slats are known in aqueous solution .

Answer: C

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16. Among the following, the compound that is both paramagnetic and coloured is :-



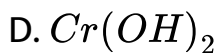
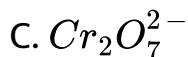
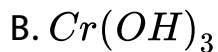
D. All are coloured

Answer: B



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17. $K_2Cr_2O_7$ on heating with aqueous NaOH gives



Answer: A



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18. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid ?

- A. $Cr_2O_7^{2-}$ and H_2O are formed
- B. CrO_4^{2-} is reduced to + 3 state of Cr
- C. CrO_4^{2-} is oxidized to + 7 state of Cr
- D. Cr^{3+} and $Cr_2O_7^{2-}$ are formed

Answer: A

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19. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is :

A. +3

B. +2

C. +6

D. +4

Answer: A



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20. The final products formed on the addition of KI to copper sulphate solution are:

A. K_2SO_4 , I_2

B. K_2SO_4 , Cu_2I_2 and I_2

C. K_2SO_4 and Cu_2O

D. K_2SO_4 , CuO and I_2

Answer: B

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21. $KMnO_4$ (acidic / alkaline) is not decolourised by

A. mohr salt

B. oxalic acid

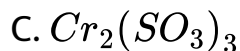
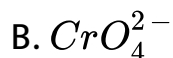
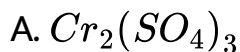
C. benzene

D. propene

Answer: C

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22. Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it. This is due to the formation of :



Answer: A



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23. $KMnO_4$ can be prepared from K_2MnO_4 as per the reaction: 

The reaction can go the completion by removing OH^{\ominus} ions by adding.

A. KOH

B. CO_2

C. SO_2

D. HCl

Answer: B



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24. The pair of compounds that can exist together is:

A. $FeCl_3, SnCl_2$

B. $HgCl_2, SnCl_2$

C. $FeCl_2, SnCl_2$

D. $FeCl_3, KI$

Answer: C



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25. In acidic medium, H_2O_2 changes $Cr_2O_7^{-2}$ to CrO_5 which has two ($-O-O-$) bonds. Oxidation state of Cr in CrO_5 is

A. +5

B. +3

C. +6

D. - 10

Answer: C

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26. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives :

A. Mn^{4+} and O_2

B. Mn^{2+} and O_2

C. Mn^{2+} and O_3

D. Mn^{4+} and MnO_2

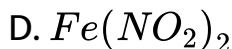
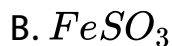
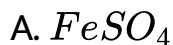
Answer: B

27. Which of the following processes does not involve oxidation of iron ?

- A. Decolourization of blue $CuSO_4$ solution by iron
- B. Formation of $Fe(CO)_5$ from Fe
- C. Liberation of H_2 from steam by iron at high temperature
- D. Rusting of iron sheets

Answer: B

28. Assuming complete ionization, same moles of which of the following compounds will require the least amount of acidified $KMnO_4$ for complete oxidation.



Answer: A



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29. Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$ solution?

- A. The solution turns blue
- B. The solution is decolourized
- C. SO_2 is reduced
- D. Green $Cr_2(SO_4)$ is formed

Answer: D

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30. Name the gas that can readily decolourise acidified $KMnO_4$ solution:

- A. SO_2
- B. NO_2
- C. P_2O_5

D. CO_2

Answer: A



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Exercise 1 Concept Builder Topic 3 Lanthanoids And Actinoids

1. The radius La^{3+} ($Z= 57$) is 106 pm . Which one of the following given values will be closet to the radius of Lu^{3+} ($Z = 71$) ?

A. 160 Pm

B. 140 pm

C. 106 pm

D. 85 pm

Answer: D



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2. Which of the following can be associated with the concept of Lanthanoid contraction?

A. 5d series elements have a higher IE_1 than 3d or 4d series .

B. Zr and Hf have a comparable size.

C. Zr and Hf occurs together in the earth crust in their minerals.

D. High density of the sixth period elements .

Answer: D



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3. What is the percentage of lanthanoid metal in mischmetall ?

A. 90 %

B. 20 %

C. 5 %

D. 95 %

Answer: D



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4. Among the lanthanoids, the one obtained by synthetic method is

A. Lu

B. Pm

C. Pr

D. Gd

Answer: B



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5. Which of the following elements shows maximum number of different oxidation states in its compounds ?

A. E

B. La

C. Gd

D. Am

Answer: D



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6. Which of the following factors may be regarded as the main cause of lanthanide contraction?

A. Greater shielding of 5d electrons by 4f electrons

B. Poorer shielding of 5d electrons by 4f electrons

C. Effective shielding of one of 4f electrons by another in the subshell

D. Poor shielding of one of 4f electrons by another in the subshell

Answer: B

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7. The heaviest atom amongst the following is

A. uranium

B. radium

C. lead

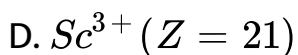
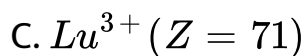
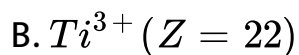
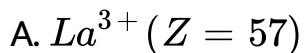
D. mercury

Answer: A



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8. Which of the following ions will exhibit colour in aqueous solution ?



Answer: B



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9. Which of the following exhibit only + 3 oxidation state ?

A. U

B. Th

C. Ac

D. Pa

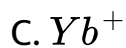
Answer: C



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10. Which of the following lanthanoid ions is diamagnetic ?

(At nos . `Ce = 58 , Sm = 62, Eu = 63 , Yb =70)



Answer: C



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11. Reason of lanthanoid contraction is

A. Negligible screening effect of f orbitals

B. Increase in nuclear charge

C. Decreasing nuclear charge

D. Decreasing screening effect

Answer: A

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12. Because of lanthanoid contraction, which of the following pair of elements have nearly same atomic radii ?
(Numbers in the parenthesis are atomic numbers)

A. Zr(40) and Nb(41)

B. Zr (40) and Hf(72)

C. Zr(40) and Ta (73)

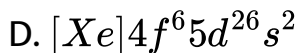
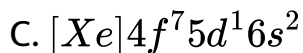
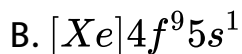
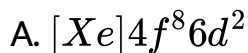
D. Ti (22) and Zr (40)

Answer: B



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13. Gadolinium belongs to 4f series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium?

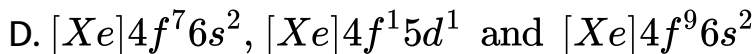
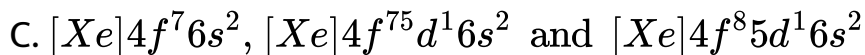
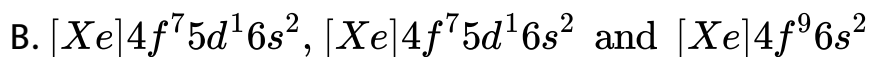
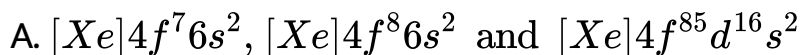


Answer: C



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14. The electronic configuration of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are -



Answer: D



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15. The reason for greater range of oxidation state in actinoids is attributed to:

- A. actinoid contraction
- B. 5f, 6d and 7s levels having comparable energies
- C. 4f and 5d levels being close in energies
- D. the radioactive nature of actinoids

Answer: B

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16. Non - lanthanoid atom is

- A. La

B. Lu

C. Pr

D. Pm

Answer: A



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17. Which of the following lanthanoid ions is diamagnetic ?

(At nos Ce = 58, Sm, =62, Eu =63, Yb = 70)

A. Sm^{2+}

B. Eu^{2+}

C. Yb^{+}

D. Ce^{2+}

Answer: C



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18. Lanthanoid contraction can be observed in

A. At

B. Gd

C. Ac

D. Lw

Answer: B



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19. Which is not correct statements ?

(At. Nos. Ce = 58, Lu = 71 , Yb =70)

A. Colour of Yb^{3-} ion is pink.

B. La^{3+} is diamagnetic

C. Ce^{4+} has f^0 configuration

D. Lu^{3+} had f^{14} configuration .

Answer: A



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20. Which of the following statement concerning lanthanides elements is false.

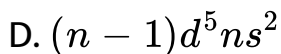
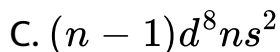
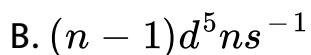
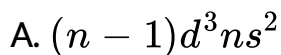
- A. Lanthanoids are separated from one another by ion exchange methods
- B. The ionic radii of trivalent Lanthanoids steadily increase with increase in atomic number
- C. All Lanthanoids are highly dense metals
- D. Most typical oxidation of Lanthanoids is + 3

Answer: B

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Exercise 2 Concept Applicator

1. Of the following outer electronic configurations of atoms, the highest oxidation state is achieved by which one of them ?

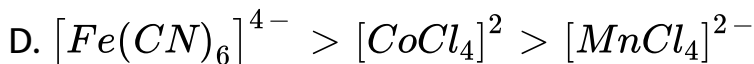
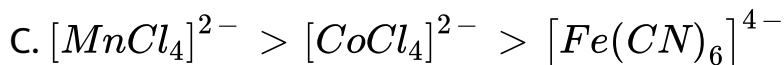
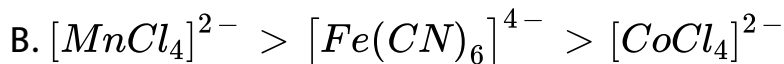
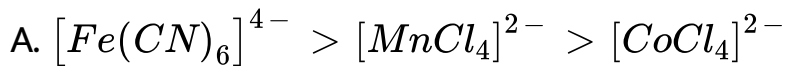


Answer: D



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2. The correct order of magnetic moments (spin only values is B.M) among is



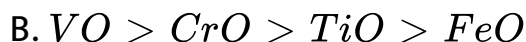
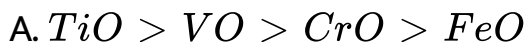
Answer: C



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3. The basic character of the transition metal monoxides follows the order.

(Atomic Nos, Ti = 22, V = 23, Cr=24, Fe = 26)



C. $CrO > VO > FeO > TiO$

D. $TiO > FeO > VO > CrO$

Answer: A

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4. Four successive members of the first row transition elements are listed below with their atomic number. Which one of them is expected to have the highest third ionisation enthalpy ?

A. Vanadium (Z= 23)

B. Chromium (Z=24)

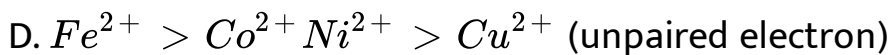
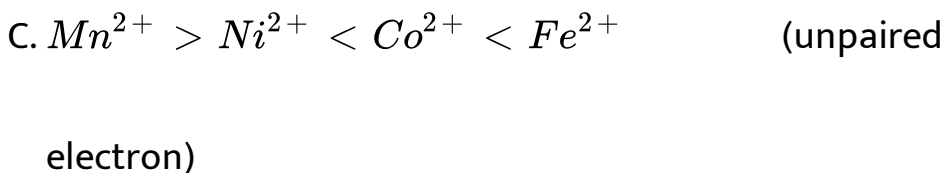
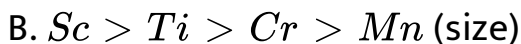
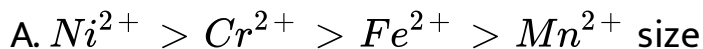
C. Manganese (Z = 25)

D. Iron (Z=26)

Answer: C

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5. Which of the following does not represent the correct order of the properties indicated ?



Answer: A



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6. 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 outermost subshell.

D. their d-shells are incomplete

Answer: B



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7. Which of the following statement is incorrect

A. Across a period from Sc to Cu the densities increase with increasing atomic number

B. The melting point of transition elements rise to a maximum from Sc to Cr and then decreases from Fe to Zn.

C. Transition elements have high enthalpies of atomization

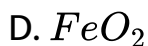
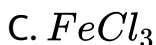
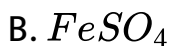
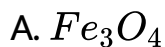
D. On going down a group from 3d to 6d series the stability of higher oxidation state increases with increasing atomic number.

Answer: C



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8. A compound of iron exists as a dimer in vapour state. It is hygroscopic in nature and dissolves in water giving brown acidic solution. The compound is



Answer: C



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9. Which of the following statements is wrong ?

A. An acidified solution of $K_2Cr_2O_7$ liberates iodine form iodides.

B. In acidic solution dichromate ions are converted to chromate ions.

C. Ammonium dichromate on heating undergo exothermic decomposition to give Cr_2O_3 .

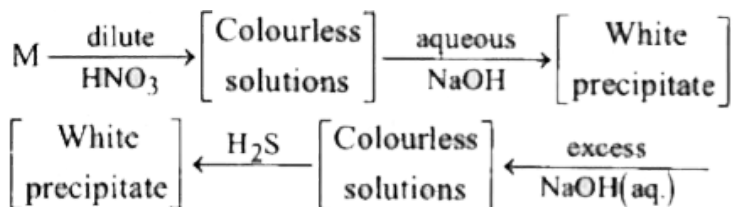
D. Potassium dichromate is used as a titrant for Fe^{2+} ions

Answer: B



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10. A metal M and its compounds can give the following observable changes in a consequence of reaction



- A. Mg
- B. Pb
- C. Zn
- D. Sn

Answer: C



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11. Which two sets of reactants best represent the amphoteric character of $Zn(OH)_2$?

1. $Zn(OH)_2(s)$ and $OH^-(aq)$

set 2. : $Zn(OH)_2(s)$ and $H_2O(l)$

Set 3 : $Zn(OH)_2(s)$ and $NH_3(aq)$

A. 1 and 2

B. 1 and 3

C. 2 and 4

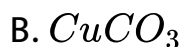
D. 3 and 4

Answer: B



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12. Copper is very slowly oxidised on the surface in moist air, giving a green coating of verdigris is



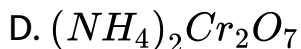
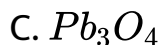
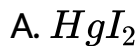
Answer: C



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13. A red solid is insoluble in water. However, it becomes soluble if some KI is added to water. Heating the red solid in a test tube results in liberation of some violet coloured

fumes and droplets of a metal appear on the cooler parts of the test tube. The rod solid is:

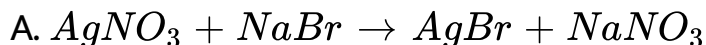


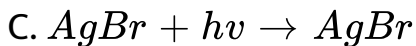
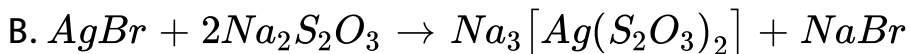
Answer: A



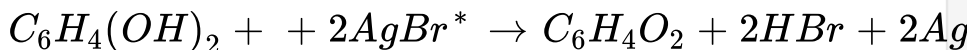
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14. Which of the following reactions represents "developing" in photography?





D.

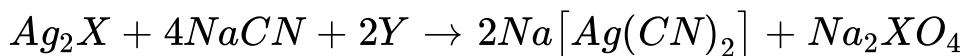


Answer: D



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15. In the extraction of silver from argentite ore the ore is treated with dilute solution of NaCN in water in the presence of Y, whereby the following reaction takes place



X and Y in this reaction are represented by

A. Cl and S

B. S and O_2

C. O and O_2

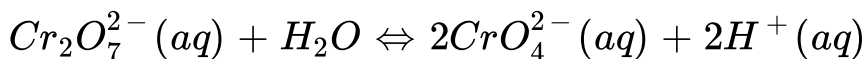
D. O and S

Answer: B



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16. The dichromate ion is in equilibrium with chromate ion in aqueous solution as:



The oxonium has

A. same oxidizing property in acidic and alkaline solutions

B. better oxidizing property in acidic solution.

C. etter oxidizing property in alkaline solution.

D. no oxidizing property in acidic or alkaline solution.

Answer: B

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17. A blue colouration is not obtained when

A. ammonium hydroxide dissolves in copper sulphate

B. copper sulphate solution reacts with $K_4[Fe(CN)_6]$

C. Ferric chloride reacts with sod. Ferrocyanide.

D. anhydrous $CuSO_4$ is dissolved in water.

Answer: B



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18. When potassium ferrocyanide crystals are heated with conc. sulphuric acid, the gas evolved is

A. sulphur dioxide

B. ammonia

C. carbond monoxide

D. carbon dioxide

Answer: C



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19. Precipitate of AgCl is soluble in liquid NH_3 the compound forms



Answer: D



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20. Which of the following products are obtained when Na_2CO_3 is added to a solution of copper sulphate ?

- A. Basic copper carbonate $[CuCO_3 \cdot Cu(OH)_2]$, sodium sulphate and CO_2
- B. Copper hydroxide, sodium sulphate and CO_2
- C. Copper carbonate, sodium sulphate and CO_2
- D. Copper carbonate and sodium sulphate.

Answer: A

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21. Which of the following statement is not correct?

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

B. In lanthanide series ionic radius of Ln^{3+} ions decreases.

C. La is actually an element of transition series rather than lanthanide series.

D. Atomic radii of Zr and Hf are same because of lanthanide contraction.

Answer: A



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22. The reason for the stability of Gd^{3-} ion is

A. 4f subshell - half filled

B. 4f subshell - completely filled

C. Possesses the general electronic configuration of noble gases.

D. 4f - subshell empty

Answer: A

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23. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statement is incorrect?

- A. The ionic size of Ln (III) decrease in general with increasing atomic number .
- B. Ln (III) compounds are generally colourless.
- C. Ln (III) compounds are mainly basic in character.
- D. Because of the large size of the Ln (III) ions in character.

Answer: B

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24. The incorrect statement among the following is:

- A. 4f and 5 f orbital are equally shielded.

B. d-Block elements show irregular and erratic chemical properties among themselves.

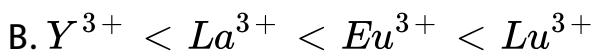
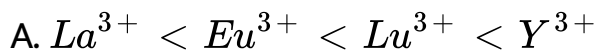
C. La and Lu have partially filled d-orbitals and no other partially filled orbitals.

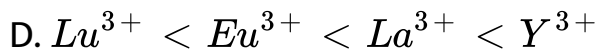
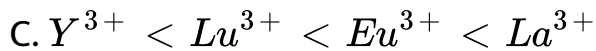
D. The chemistry of various lanthanoids is very similar .

Answer: A

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25. The correct order of ionic radii Y^{3+} , La^{3+} , Eu^{3+} and Lu^{3+} is (AT. No: $Y = 39$, $La = 57$, $Eu = 63$, $Lu = 71$)



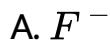


Answer: C



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26. The deep red colour of $Fe(SCN)_6^{3-}$ and is destroyed by addition of



Answer: A



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27. The actinoids exhibit more number of oxidation states in general than the lanthanoids. This is because

- A. the 5f orbitals extend further from the nucleus than the 4f orbitals
- B. the 5f orbitals are more buried than the 4f orbitals
- C. there is a similarity between 4f and 5f orbitals in their angular part of the wave function
- D. the actinoids are more reactive than the lanthanoids.

Answer: A

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28. The colour of the following ions

V^{2+} , V^{3+} , V^{4+} , Fe^{2+} , Fe^{3+} are respectively

A. green, violet, blue, green, yellow

B. yellow, green, violet, green, blue

C. violet, green, yellow, green, blue

D. violet, green, blue, green, violet

Answer: D

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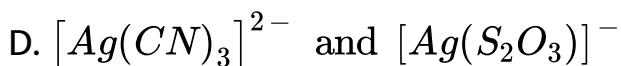
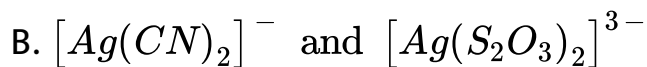
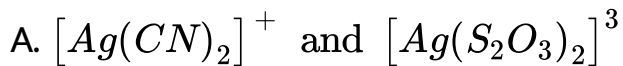
29. In the dichromate dianion, the nature of bonds are

- A. four equivalent Cr-o bonds
- B. six equivalent Cr-O bonds and one O- O bond
- C. six equivalent Cr-O bonds and one Cr- Cr bond
- D. six equivalent Cr- O bonds and one Cr - O- Cr bond

Answer: D

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30. AgBr dissolves in the excess of KCN and $Na_2S_2O_3$ solutions due to the formation of complex ions. The ions are respectively



Answer: B



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