CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA CHEMISTRY (GUJRATI ENGLISH)

THE D-AND F-BLOCK ELMENTS

Example

1. On what ground can you say that scandium (Z=21) is a transition element but zinc (Z=30) is not?

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2. Why do the transition elements exhibit higher enthalples of atomisation?

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3. Name a transition elements which does not exhibit variable oxidation states.

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4. Why is Cr^{2+} reducing and Mn^{3+} oxidising when both have d^4 configuration?

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5. How would you account for the increasing oxidising power in the series $VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$?

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6. For the first row transition metals the E° values are:

Explain the irregularity in the above values.

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7. Why is the E° value for the Mn^{3+}/Mn^{2+} couple much more positive than that for Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} ? Explain

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8. Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25

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9. What is meant by 'disproportionation' of an oxidation state? Give an example

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10. Name a member of the lanthanoid series which is well known to exhibit $+4$ oxidation state

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Section A Questions

1. What are d-block and f-block elements?

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2. Give classification of d-block and f-block elements

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3. Why the d-block elements are known as 'Transition" elements?

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4. Why zinc, cadmium and mercury are not considered transition elements?

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Section A Position In The Periodic Table

1. Discuss the positive of d-block elements in the perioidc table.

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Section A Electronic Configurations Of The D Block Elements

1. Write a brief note on the electronic configuration of the transition elements

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2. Which characteristic properties are shown by d-block elements? Why?

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3. Why the chromium (Cr) and copper (Cu) have exceptional Electronic configuration?

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Section A General Properties Of The Transition Elements D Block

1. Enlist the physical properties of transition elements

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2. Why the transition elements are hard and have high melting and boiling points?

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3. What is enthalpy of atomisation ? Explain

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4. Write a note on enthalpy of atomisation

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5. Explain the variations in atomic radii of transition elements along the period

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6. Explain the variations in atomic radii of transition elements in group

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7. Explain on what factors the ionization enthalpies of elements having d^{10} configuration depends upon?

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8. Explain the variation in ionization enthalpies of transition elements in 3d series.

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9. Why do the transition elements exhibits variable oxidation states?

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10. How do the oxidation states of the elements vary in the transition series?

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11. Explain the stability of m^{2+} ions in aqueous medium.

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12. Explain trends in M^{2+}/M standard electrode potentials

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13. Explain the trends in M^{3+} / M^{2+} electrode potentials

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14. Write a note on halide compounds of transition elements

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15. Write a note on oxides and oxoanions of transition elements

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16. Discuss the magnetic properties of transition elements

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17. Why transition elements form a coloured compounds?

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18. Why the transition elements form a large number of complex compounds?

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19. Discuss the catalytic properties of transition elements

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20. Write a note on interstitial compounds

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21. Write a note on alloys

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Section A Some Important Compounds Of Transition Elements

1. Give preparation of potassium dichromate and state its uses

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2. Give the structures of chromate and dichromate ions. How chromates and dichromates can be inter converted?

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3. Give the chemical reactions showing oxidizing nature of potassium dichromate

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4. Give preparation of potassium permanganate

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5. State physical properties of potassium permanganate and state its uses

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6. Explain structures of manganate and permanganate ions

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7. Discuss chemical properties of potassium permanganate

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8. Give chemical reactions showing oxidizing character of $KMnO_4$

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9. Give application of d-block elements

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Section A The Lanthanoids

1. State the general electronic configuration of lanthanoids. Why there are irregularities in the electronic configuration of lanthanoids?

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2. Explain the lanthanoid contraction

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3. State the consequences of lanthanoid contraction

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4. Discuss physical properties of lanthanoids.

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5. Explain the formation of coloured ions by lanthanoids

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6. Write a note on oxidation states shown by lanthanoids

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7. Discuss trends in ionization enthalpies of lanthanoids

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8. Discuss chemical properties of lanthanoids

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9. Give uses of lanthanoids and its compounds

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Section A The Actinoids

1. State the genral electronic configuration of elements of actinoid series.

Why there are irregularities in the electronic configurations?

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2. Explain actinoid contraction

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3. Discuss trends in oxidation states shown by actinoids

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4. Explain general characteristics of actinoids

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5. Discuss similarities and dissimilarities in properties of lanthanoids and actinoids.

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Section A Some Application Of D And F Block Elements

1. State the applications of d and f-block elements and their compounds

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2. State the applications of the d and f-block elements or compounds:

(i) In Steel or Iron (ii) In Pigmentation (iii) In Batteries (iv) In Currency Coins (v) As a Catalyst

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Section B Intext Questions And Answers

1. Silver atom has completely filld d-orbitals $\left(4^{10}\right)$ in its ground state. How can you say that it is a transition element?

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2. In the series Sc (Z=2) to Zn (Z=30), the enthalpy of atomisation of zinc is the lowest, i.e., 126kJ mol^{-1}. Why?

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3. Which of the 3d series of the transition metals exhibits the largest number of oxidation states and why?

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4. The $E^{\Theta}\left(M^{2+}/M\right)$ value for copper is positive (+0.34V). What is possible reason for this?

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5. How would you account for the irregular variation of ionisation enthalpies (first and second) in the first series of the transition elements?

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6. Why is the highest oxidation state of a metal exhibited in its oxide or fluoride only?

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7. Which is a stronger reducing agent Cr^{2+} or Fe^{2+} and why?

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8. Calculate the 'spin only' magnetic moment of $M_{(aq)}{}^{2+}$ ion (Z=27)

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9. Explain why Cu^{+} ion is not stable in aqueous solution?

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10. Actinoid contraction is greater from elements to element than landthanoid contraction. Why?

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Section C Textual Exercise

1. Write down the electronic configuration of:

(i)

$Cr^{3+}(ii)Pm^{3+}(iii)Cu^{+}(iv)Ce^{4+}(v)Co^{2+}(vi)Lu^{2+}(vii)Mn^{2+}(viii)Th^{4}$

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2. Why are Mn^{2+} compounds more stable than Fe^{2+} towards oxidation to their +3 state?

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3. Explain briefly how +2 state becomes more and more stable in the first half of the first row transition elements with increasing atomic number?

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4. To what extent do the electronic configurations decided the stability of oxidation states in the first series of the transition elements?

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5. What may be the stable oxidation state of the transition element with the following d-electron configuration in the ground state of their atoms: $3d^3, 3d^5, 3d^8$ and $3d^4$?

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6. Name the oxometal anions of the first series of the transition metals in which the metal exhibits the oxidation state equal to its group number.

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7. What are the characteristics of the transition elements and why are they called transition elements? Which of the d-block elements may not be regarded as the transition elements?

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8. In what way is the electronic configuration of the transition elements different from that of the non-transition elements?

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9. What are the different oxidation states exhibited by the lanthanoids?

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10. Explain giving reasons:

(i) Transition metals and many of their compounds show paramagnetic behaviour.

(ii) The enthalpies of atomisation of the transition metals are high.

(iii) The transition metals generally form coloured compounds.

(iv) Transition metals and their many compounds act as good catalyst.

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11. How is the variability in oxidation states of transition metals different from that of the non transition metals? Illustrate with examples.

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12. Describe the preparation of potassium dichromate from iron chromite ore. What is the effect of increasing pH on a solution of potassium

dichromate?

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13. Describe the oxidising action of potassium dichromate and write the ionic equations for its reaction with: (i) iodide (ii) iron (II) solution and (iii) H_2S

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14. Describe the preparation of potassium permanganate. How doe the acidified permanganate solution react with (i) iron (II) ions (ii) SO_2 and (iii) oxalic acid? Write the ionic equations for the reactions.

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15. For M^{2+}/M and M^{3+}/M^{2+} systems the E° values for some metals are as follows:

Cr^{2+}/Cr	$-0.9V$	Cr^{3}/Cr^{2+}	$-0.4V$
Mn^{2+}/Mn	$-1.2V$	Mn^{3+}/Mn^{2+}	$+1.5V$
Fe^{2+}/Fe	$-0.4V$	Fe^{3+}/Fe^{2+}	$+0.8V$

Use this data to comment upon: (i) the stability of Fe^{3+} in acid solution as compared to that of Cr^{3+} or Mn^{3+} and

(ii) the ease with which iron can be oxidised as compared to a similar process for either chrmoium or magnganess metal.

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16. Predict which of the following will be coloured in aqueous solution? $Ti^{3+}, V^{3+}, Cu^{+}, Sc^{3+}, Mn^{2+}, Fe^{3+}$ and Co^{2+}. Give reason for each

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17. Compare the stability of $(+2)$ oxidation state for the elements of the first transition series.

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18. Compare the chemistry of actinoids with that of the lanthanoids with special reference to:

(i) Electronic configuration (ii) Atomic and ionic sizes (iii) Oxidation state (iv) Chemical reactivity

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19. How would you account for the following:

(i) Of the d^4 species, Cr^{2+} is strongly reducing while manganese (III) is strongly oxidising.

(ii) Cobalt (II) is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised.

(iii) The d^1 configuration is very unstable in ions

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20. What is meant by 'disproportionation? Give two examples of disproportionation reaction in aqueous solution.

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21. Which metal in the first series of transition metals exhibits (+1) oxidation state most frequently and why?

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22. Calculate the number of unpaired electrons in the following gasesous ions: Mn^{3+}, Cr^{3+}, V^{3+} and Ti^{3+}. Which one of these is the most stable in aqueous solution?

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23. Give examples and suggest reasons for the following features of the transition metal chemistry:

(i) The lowest oxide of transition metal is basic, the highest is amphoteric/acidic.

(ii) A transition metal exhibits highest oxidation state in oxides are

fluorides.

(iii) The highest oxidation state is exhibited in oxoanions of a metal.

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24. Indicate the steps in the preparation of:

(i) $K_2Cr_2O_7$ from chromite ore.

(ii) $KMnO_4$ from pyrolusite ore.

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25. What are alloys? Name an important alloy which contains some of the lanthanoid metals. Mention its uses.

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26. What are inner transition elements ? Decide which of the following atomic numbers are the atomic numbers of the inner transition

elements: 29,59,74,95,102,104

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27. The chemistry of the actinoid elements is not so smooth as that of the lanthanoids. Justify this statement by giving some examples from the oxidation state of these elements.

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28. Which is the last element in the series of the actinoids ? Write the electronic configuration of this element. Comment on the possible oxidation state of this element.

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29. Use Hund's rule to derive the electronic configuration of Ce^{3+} ion, and calculate its magnetic moment on the basis of spin-only formula

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30. Name the members of the lanthanoid series which exhibit (+4) oxidation states and those which exhibit (+2) oxidation states. Try to correlate this type of behaviour with the electronic configurations of these elements.

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31. Write the electronic configuration of the elements with the atomic number 61,91,101 and 109

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32. Compare the general characteristics of the first series of the transition metals with those of the second and third series metals in the respective vertical columns. Give special emphasis on the following points:

(i) electronc configurations (ii) oxidation states (iii) ionisation enthalpies (iv) atomic sizes.

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33. Write down the number of 3d electrons in each of the follwing ions: $Ti^{2+}, V^{2+}, Cr^{3+}, Mn^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}$ and Cu^{2+}. Indicate how would be expect the five 3d orbitals to be occupied for these hydrated ions (octahedrall).

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34. Comment on the statement that elements of the first transition series possess many properties different from those of heavier transition elements.

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35. What can be inferred from the magnetic moment values of the following complex species?

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Section D Multiple Choice Questions

1. Electronic configuration of a transition element X in (+3) oxidation state is $[Ar]3d^5$. What is its atomic number?

A. 25

B. 26

C. 27

D. 24

Answer: B

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2. The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following is correct?

A. Cu(II) is more stalbe

B. Cu(II) is less stable

C. Cu(I) and Cu(II) are equally stable

D. Stability of Cu(I) and Cu(II) depends on nature of copper salts

Answer: A

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3. Metallic radii of some transition elements are given below. Which of these elements will have highest density?

A. Fe

B. Ni

C. Co

D. Cu

Answer: D

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4. Generally transition elements form coloured salts due to the presence of unpaired electrons. Which of the following compounds will be coloured in solid state?

A. Ag_2SO_4

B. CuF_2

C. ZnF_2

D. Cu_2Cl_2

Answer: B

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5. On addition of small amount of $KMnO_4$ to concentrated H_2SO_4, a green oily compound is obtained which is highly explosive in nature. Identify the compound from the following.

A. Mn_2O_7

B. MnO_2

C. $MnSO_4$

D. Mn_2O_3

Answer: A

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6. The magnetic nature of elements drpends on the presence of unpaired electrons. Identify the configuration of transition element, which shows highest magnetic moment.

A. $3d^7$

B. $3d^5$

C. $3d^8$

D. $3d^2$

Answer: B

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7. Which of the following oxidation state is common for all lanthanoids?

A. $+2$

B. $+3$

C. $+4$

D. $+5$

Answer: B

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8. Which of the following reactions are disproportionation reactions?

(a) $Cu^{+} \rightarrow Cu^{2+} + Cu$

(b) $MnO_4^{2-} + 4H^{+} \rightarrow 2MnO_4^{-} + MnO_2 + 2H_2O$

(c) $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

(d) $2MnO_4^{-} + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^{+}$

A. a,b

B. a,b,c

C. b,c,d

D. a,d

Answer: A

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9. When $KMnO_4$ solution is added to oxalic acid solution, the decolourization is slow in the beginning but becomes instantaneous

after some time because....

A. CO_2 is formed as the product

B. Reaction is exothermic

C. MnO_4^- catalyses the reaction

D. Mn^{2+} acts as autocatalyst

Answer: D

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10. There are 14 elements in actinold series. Which of the following elements does not belong to this series?

A. U

B. Np

C. Tm

D. Fm

Answer: C

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11. $KMnO_4$ acts as an oxidising agent in acidic medium. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphide ions in acidic solution is.....

A. $\frac{2}{5}$

B. $\frac{3}{5}$

C. $\frac{4}{5}$

D. $\frac{1}{5}$

Answer: A

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12. Which of the following is amphoteric oxide ?

$Mn_2O_7, CrO_3, Cr_2O_3, CrO, V_2O_5, V_2O_4$

A. V_2O_5, Cr_2O_3

B. Mn_2O_7, CrO_3

C. CrO, V_2O_5

D. V_2O_5, V_2O_4

Answer: A

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13. Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadollinium?

A. $[Xe]4f^7 5d^1 6s^2$

B. $[Xe]4f^6 5d^2 6s^2$

C. $[Xe]4f^8 6d^2$

D. $[Xe]4f^{9}5s^{1}$

Answer: A

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14. Intersititial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not th echaracteristic property of interstitial compounds?

A. They have high melting points in comparison to pure metals

B. They are very hard

C. They retain metallic conductivity

D. They are chemically very reactive

Answer: D

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15. The magnetic moment is associated with its spin angular momentum and orbital angular momentum, Spin only magnetic moment value of Cr^{3+} ion is...

A. 2.87BM

B. 3.87BM

C. 3.47BM

D. 3.57BM

Answer: B

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16. $KMnO_4$ acts as an oxidising agent in alkaline medium. When alkaline $KMnO_4$ is treated with KI, iodide ion is oxidised to .....

A. I_2

B. IO^-

C. IO_3^-

D. IO_4^-

Answer: C

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17. Which of the following statements is not correct?

A. Copper liberats hydrogen from acids

B. In its higher oxidation states, manganese forms stable compounds with oxygen and fluorine.

C. Mn^{3+} and Co^{3+} are oxidising agents in aqueous solution

D. Ti^{2+} and Cr^{2+} are reducing agents in aqueous solution

Answer: A

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18. When acidified $K_2Cr_2O_7$ solution is added to Sn^{2+} salts then Sn^{2+} changes to .....

A. Sn

B. Sn^{3+}

C. Sn^{4+}

D. Sn^{+}

Answer: C

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19. Highest oxidation state of manganese in fluoride is (+4) (MnF_4) but highest oxidation state in oxides is (+7) (Mn_2O_7) because.....

A. Fluorine is more electronegative than oxygen

B. Fluorine does not possess d-orbitals

C. Fluorine stabilises lower oxidation state

D. In covalent compounds fluorine can form single bond only while oxygen forms double bond

Answer: D

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20. Although Zirconium belongs to 4d transition series and Hafnium to 5d transition series even then they show similar physical and chemical properties because.....

A. Both belong to d-block

B. Both have same number of electrons

C. Both have similar atomic radius

D. Both belong to the same group of the periodic table

Answer: C

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21. Why is HCl not used to make the medium acidic in oxidation reactions of $KMnO_4$ in acidic medium?

A. Both HCl and $KMnO_4$ act as oxidising agents

B. $KMnO_4$ oxidises HCl into Cl_2 which is also an oxidising agent

C. $KMnO_4$ is a weaker oxidising agent than HCl.

D. $KMnO_4$ acts as a reducing agent in the presence of HCl

Answer: B

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Section D Multiple Choice Questions More Than One Options

1. Generally transition elements and their salts are coloured due to the presence of unpaired electrons in metal ions, which of the following compounds are coloured?

A. $KMnO_4$

B. $Ce(SO_4)_2$

C. $TiCl_4$

D. Cu_2Cl_2

Answer: A::B

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2. Transition elements show magnetic moment due to spin and orbital motion of electrons. Which of the following metallic ions have almost same spin only magnetic moment?

A. Co^{2+}

B. Cr^{2+}

C. Mn^{2+}

D. Cr^{3+}

Answer: A::D

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3. In the form of dichromate, Cr(VI) is a strong oxidising agent in acidic medium but Mo (VI) in MoO_3 and W(VI) in WO_3 are not because....

A. Cr(VI) is more stable than MO(VI) and W(VI)

B. Mo(VI) and W(VI) are more stable than Cr(VI)

C. Higher oxidation states of heavier members of group -6 of transition series are more stable

D. Lower oxidation states of heavier members of group -6 of transition series are more stable

Answer: A::B::C::D

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4. Which of the following actinoids show oxidation states upto $(+7)$?

A. Am

B. Pu

C. U

D. Np

Answer: A::B::D

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5. General electronic configuration of actionoids is $(n-2)f^{1-14}(n-1)d^{0-2}ns^2$. Which of the following actinoids have one electron in 6d orbital?

A. U(atomic no92)

B. Np (Atomic no.93)

C. Pu (Atomic no.94)

D. Am (Atomic no.95)

Answer: A::B::D

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6. Which of the following lanthanoids show (+2) oxidation state besides the characteristic oxidation state (+3) of lanthanoids?

A. Ce

B. Eu

C. Yb

D. Ho

Answer: A::B::C::D

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7. Which of the following ions show higher spin only magnetic moment value?

A. Ti^{3+}

B. Mn^{2+}

C. Fe^{2+}

D. Co^{3+}

Answer: A::B::C::D

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8. Transition element form binary compounds with halogens. Which of the following elements will form MF_3 type compounds?

A. Cr

B. Co

C. Cu

D. Ni

Answer: A::B::D

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9. Which of the following will not act as oxidising agents?

A. CrO_3

B. MoO_3

C. WO_3

D. CrO_4^{2-}

Answer: A::B::C::D

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10. Although (+3) is the characteristic oxidation state for lanthanoids but cerium also shows (+4) oxidation state because...

A. It has variable ionisation enthalpy

B. It has a tendency to attain noble gas configuration

C. It has a tendency to attain f^0 configuration

D. It resembles Pb^{4+}

Answer: A::B::C::D

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Section D Short Answer Type Questions

1. Why does copper not replace hydrogen from acids?

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2. Why E° values for Mn, Ni and Zn are more negative than expected?

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3. Why first ionisation enthalpy of Cr is lower than that of Zn?

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4. Transition elements show high melting points. Why?

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5. When Cu^{2+} ion is treated with KI, a while precipitate is formed. Explain the reaction with the help of chemical equation

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6. Out of Cu_2Cl_2 and $CuCl_2$ which is more stable and why?

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7. When a brown compound of manganese (A) is treated with HCl it gives a gas (B). The gas taken in excess, reacts with NH_3 to give an explosive compound (C). Identify compounds A, B and C

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8. Although fluorine is more electronegative than oxygen, but the ability of oxygen to stabilize higher oxidation states exceeds that of fluorine. Why?

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9. Although Cr^{3+} and Co^{2+} ions have same number of unpaired electrons but the magnetic moment of Cr^{3+} is 3.87 B.M and that of Co^{2+} is 4.87 B.M. Why?

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10. Ionisation enthalpies of Ce, Pr and Nd are higher than Th, Pa and U. Why?

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11. Although Zr belongs to 4d and Hf belongs to 5d transition series but it is quite difficult to separate them. Why?

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12. Although (+3) oxidation states is the characteristic oxidation state of lanthanoids but cerium shows (+4) oxidation state also. Why?

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13. Explain why does colour of $KMnO_4$ disappear when oxalic acid is added to its solution in acidic medium.

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14. When orange solution containing $Cr_2O_7^{2-}$ ion is treated with an alkali, a yellow solution is formed and when H^+ ions are added to yellow solution, an orange solution is obtained. Explain why does this happen?

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15. A solution of $KMnO_4$ on reduction yields either a colourless solution or a brown precipitate or a green solution depending on pH of the solution. What different stages of the reduction do these represent and how are they carried out?

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16. The second and third rows of transition elements resemble each other much more than they resemble the first row. Explain Why?

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17. E° of Cu is +0.34V while that of Zn is $-0.76V$. Explain

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18. The halides of transition elements become more covalent with increasing oxidation state of the metal. Why?

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19. While filling up of electrons in the atomic orbitals, the 4s orbital is filled before the 3d orbitals but reverse happens during the ionisation of the atom. Explain why?

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20. Reactivity of transition elements decreases almost regularly from Sc to Cu. Explain.

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Section D Matching The Columns

1. Match the catalysis given in Column-I with the processes given in Column-II

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2. Match the compounds/elements given in Column-I with uses given in Column-II

View Text Solution

3. Match the properties given in Column-I with the metals given in Column-II

View Text Solution

4. Match the statement given in Column-I with the oxidation states given in Column-II

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5. Match the solution given in Column-I and the colours given in Column-II

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6. Match the propertiy given in Column-I with the element given in Column-II

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7. Match the properties given in Column-I with the metals given in Column -II

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Section D Assertion And Reason Type

1. Assertion (A) : Cu^{2+} iodide is not known

Reason (R): Cu^{2+} oxidizes I^{-} to iodine

A. Both assertion and reason are true and reason is the correct explanation of the assertion

B. Both assertion and reason are true, but reason is not correct explanation of the assertion

C. Assertion is not true reason is true

D. Both assertion and reason are false

Answer: A

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2. Assertion (A): Separation of Zr and Hf is difficult.

Reason (R): Because Zr and Hf lie in the same group of the periodic table.

A. Both assertion and reason are true and reason is the correct explanation of the assertion

B. Both assertion and reason are true, but reason is not correct explanation of the assertion

C. Assertion is not true reason is true

D. Both assertion and reason are false

Answer: B

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3. Assertion (A): Actinoids form relatively less stable complexes as compared to lanthanoids.

Reason (R): Actinoids can utilize their 5f orbitals along with 6d orbitals in bonding but lanthanoids do not use their 4f orbital for bonding.

A. Both assertion and reason are true and reason is the correct explanation of the assertion

B. Both assertion and reason are true, but reason is not correct explanation of the assertion

C. Assertion is not true reason is true

D. Both assertion and reason are false

Answer: C

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4. Assertion (A): Cu cannot liberate hydrogen from acids.

Reason (R): Because it has positive electrode potential.

A. Both assertion and reason are true and reason is the correct explanation of the assertion

B. Both assertion and reason are true, but reason is not correct explanation of the assertion

C. Assertion is not true reason is true

D. Both assertion and reason are false

Answer: A

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5. Assertion (A): The highest oxidation state of osmium is (+8).

Reason (R): Osmium is a 5d-block elements

A. Both assertion and reason are true and reason is the correct explanation of the assertion

B. Both assertion and reason are true, but reason is not correct explanation of the assertion

C. Assertion is not true reason is true

D. Both assertion and reason are false

Answer: B

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Section D Long Answer Type Questions

1. Identify (A) to (E) and also explain the reaction involved

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2. When a chromite ore (A) is fused with sodium carbonate in free excess of air and the product is dissolved in water, a yellow solution of compound (B) is obtained. After treatment of this yellow solution with sulphuric acid, Compound (C) can be crystallised from the solution. When compound (C) is treated with KCl, orange crystals of compound (D) crystallise out. Identify A to D and also explain the reactions.

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3. When an oxide of manganese (A) is fused with KOH in the presence of an oxidising agent and dissolved in water, it gives a dark green solution of compound (B). Compound (B) disproportionates in neutral or acidic solution to give purple compound (C) oxidises potassium iodide solution

to a compound (D) and compound (A) is also formed. Identify compounds A to D and also explain the reactions involved.

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4. On the basis of Lanthanoid contraction, explain the following:

(i) Nature of bonding in La_2O_3 and Cu_2O_3

(ii) Trends in the stability of oxo salts of lanthanoids from La to Lu

(iii) Stability of the complexes of lanthanoids.

(iv) Radii of 4d and 5d-block elements.

(v) Trends in acidic character of lanthanoid oxides.

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5. (a) Answer the following question:

(i) Which element of the first transition series has highest second ionisation enthalpy?

(ii) Which element of the first transition series has highest third ionisation enthalpy?

(iii) Which elements of the first transition series has lowest enthalpy of atomisation?

(b) Identify the metal and justify your answer:

(i) Carbonyl $M(CO)_5$ (ii) MO_3F

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6. Mention the type of compounds formed when small atoms like H, C and N get trapped inside the crystal lattice of transition metals. Also give physical and chemical characteristics of these compounds.

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7. (a) Transition metals can act as catalysts because these can change their oxidation state. How does Fe(III) catalyse the reaction between iodide and persulphate ions?

(b) Mention any three processes where transition metals act as catalysts.

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8. A violet compound of manganese (A) decomposes on heating to liberate oxygen compounds (B) and (C) of manganese are formed. Compound (C) reacts with KOH in the presence of potassium nitrate to give compound (B). On heating compound (C) with conc. H_2SO_4 and NaCl, chlorine gas is liberated and a compound (D) of manganese along with other products is formed. Identify compounds A to D and also explain the reactions involved.

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Section E Multiple Choice Question Mcqs

1. Elements of which groups are called d-block elements?

A. 1 to 2

B. 3 to 12

C. 13 to 18

D. 13 to 17

Answer: B

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2. Which among the following has the vacant s-orbital?

A. Rh

B. Pd

C. Ag

D. Cd

Answer: B

View Text Solution

3. Which of following is not considered transition element?

A. Zn

B. Ag

C. Au

D. All of these

Answer: A

View Text Solution

4. Identify the correct order of ionic radii

A. $Ti^{2+} > V^{2+} > Cu^{2+} > Zn^{2+}$

B. $V^{2+} > Ti^{2+} > Cu^{2+} > Zn^{2+}$

C. $V^{2+} > Ti^{2+} > Zn^{2+} > Cu^{2+}$

D. $Ti^{2+} > V^{2+} > Zn^{2+} > Cu^{2+}$

Answer: D

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5. Which elements in 3d series has minimum enthalpy of atmoisation ?

A. Sc

B. Mn

C. Co

D. Zn

Answer: D

View Text Solution

6. What is the correct order of melting points of elements of first transition series?

A. $Mn > Cr > V > Ti$

B. $Ti > V > Cr > Mn$

C. $Cr > Mn > V > Ti$

D. $Cr > V > Ti > Mn$

Answer: D

View Text Solution

7. Which elements in first transition series has maximum third ionization enthalpy?

A. Zn

B. Cu

C. Mn

D. Cr

Answer: A

View Text Solution

8. Which element in first transition series has maximum second ionization enthalpy?

A. Cu

B. Zn

C. Mn

D. Fe

Answer: A

View Text Solution

9. Which element in 3d series does not exhibit variable oxidation states?

A. Zn

B. Sc

C. Fe

D. Ni

Answer: B

View Text Solution

10. Which of the following is not known?

A. Cu^{2+}

B. Sc^{2+}

C. Fe^{2+}

D. Cr^{2+}

Answer: B

View Text Solution

11. The highest oxidation state is shown by....

A. Mn

B. Os

C. Rh

D. Pt

Answer: B

View Text Solution

12. The most abundant transition element is present in .....

A. 3d series

B. 4d series

C. 5d series

D. 6d series

Answer: A

View Text Solution

13. Which of the following is not known?

A. CuI_2

B. Cu_2I_2

C. $FeCl_3$

D. $TiCl_4$

Answer: A

View Text Solution

14. Which element in 3d series show (+1) oxidation state?

A. Zn

B. Cu

C. Ni

D. Sc

Answer: B

View Text Solution

15. The only element with positive $E^{\circ}\left(M^{2+} \mid M\right)$ potential in 3d series is.....

A. Zn

B. Cu

C. Mn

D. Cr

Answer: B

View Text Solution

16. Which of the following is a reducing agent?

A. Mn^{3+}

B. Cr^{2+}

C. Co^{3+}

D. Ti^{4+}

Answer: B

View Text Solution

17. What is the correct order of hydration enthalpies of M^{2+} ions of first series?

A. $Cr^{2+} > Mn^{2+} > Co^{2+} > Ni^{2+}$

B. $Ni^{2+} > Co^{2+} > Mn^{2+} > Cr^{2+}$

C. $Ni^{2+} > Co^{2+} > Cr^{2+} > Mn^{2+}$

D. $Cr^{2+} > Mn^{2+} > Ni^{2+} > Co^{2+}$

Answer: C

View Text Solution

18. Which is not an oxidizing agent in acidic medium?

A. CrO_3

B. $Cr_2O_7^{2-}$

C. WO_3

D. MnO_4^-

Answer: C

View Text Solution

19. The pair of amphoteric oxides is.....

A. VO, Cr_2O_3

B. V_2O_5, CrO_3

C. V_2O_3, Cr_2O_3

D. VO_2, Cr_2O_3

Answer: D

View Text Solution

20. The most probable oxidation states of Cr and Mo are.....

A. $+2, +3, +4$

B. $+2, +3, +6$

C. $+3, +4, +5$

D. $+2, +3, +5$

Answer: B

View Text Solution

21. Which of the following is not known?

A. MnF_4

B. Mn_2O_7

C. MnF_7

D. MnO_3F

Answer: C

View Text Solution

22. Which of the following will not liberate $H_{2(g)}$ from acid?

A. Ti^{2+}

B. V^{2+}

C. Cr^{2+}

D. Mn^{2+}

Answer: D

View Text Solution

23. Identify the correct order of oxidizing strength:

A. $VO_2^+ > Cr_2O_7^{2-} > MnO_4^-$

B. $MnO_4^- > VO_2^+ > Cr_2O_7^{2-}$

C. $Cr_2O_7^{2-} > MnO_4^- > VO_2^+$

D. $MnO_4^- > Cr_2O_7^{2-} > VO_2^+$

Answer: D

View Text Solution

24. When $NaHCO_3$ is added to aqueous solution of $FeCl_3$, the gas liberated is....

A. O_2

B. CO_2

C. Cl_2

D. H_2

Answer: B

View Text Solution

25. Which of the following is example of mixed oxides?

A. Mn_2O_7

B. MnO

C. Mn_2O_3

D. Mn_3O_4

Answer: D

View Text Solution

26. Which of the following ion is most stable in aqueous solution?

A. Mn^{3+}

B. Ti^{3+}

C. V^{3+}

D. Cr^{3+}

Answer: D

View Text Solution

27. The basic character of the transition metal oxides follows the order...

A. $CrO > VO > FeO > TiO$

B. $VO > CrO > TiO > FeO$

C. $TiO > FeO > VO > CrO$

D. `TiO gt VO gt CrO gt FeO

Answer: D

View Text Solution

28. Which of the following is diamagnetic ?

A. Cu^{2+}

B. Zn^{2+}

C. Co^{2+}

D. Ni^{2+}

Answer: B

View Text Solution

29. Which of the following has highest magnetic moment?

A. Cr^{3+}

B. Fe^{3+}

C. Co^{3+}

D. V^{3+}

Answer: B

View Text Solution

30. The orange colour of $K_2Cr_2O_7$ is due to....

A. $\sigma \rightarrow \sigma^*$ transition

B. $d - d$ transition

C. Ligand to metal charge transfer

D. Metal to ligand charge transfer

Answer: C

View Text Solution

31. $\left[Ni(H_2O_6\right]^{2+}$ absorbs....

A. Green light

B. Red light

C. Yellow light

D. Orange light

Answer: B

View Text Solution

32. Which of the following is colourless?

A. $TiCl_4$

B. $CuSO_4$

C. $FeCl_3$

D. $MnCl_3$

Answer: A

View Text Solution

33. Transition elements are coloured because:

A. Our eye catches the colour of the light emitted by the compounds

B. The d-orbitals get split in different energy sets

C. There are incompletely filled d-orbitlas

D. The d-electrons absorb light of suitable wavelength

Answer: C

View Text Solution

34. The colour of $\left[Cr(H_2O)_6\right]^{3+}$ is....

A. Violet

B. Green

C. Blue

D. Colourless

Answer: A

View Text Solution

35. Transition elements form stable complexes because....

A. They are low electronegative elements

B. They are low ionization enthalpies

C. The charge/radius ratio is high and have vacant d-orbitals

D. They show variable valencies

Answer: C

View Text Solution

36. When H_2S is added to acidic dichromate solution, the colour of the solution changes to .....

A. Yellow

B. Blue

C. Green

D. Milky

Answer: D

View Text Solution

37. What si obtained when CrO_3 is dissolved in NaOH?

A. CrO_4^{2-}

B. $Cr(OH)_2$

C. $Cr_2O_7^{2-}$

D. $Cr(OH)_3$

Answer: A

View Text Solution

38. Which of the following undergoes disproportionation reaction?

A. MnO_4^-

B. MnO_4^{2-}

C. Mn_2O_3

D. MnO_2

Answer: B

View Text Solution

39. $KMnO_4$ is oxo salt of....

A. MnO_2

B. MnO_3

C. Mn_2O_7

D. Mn_2O_3

Answer: C

View Text Solution

40. The oxidation state of chromium in the final product obtained when H_2O_2 is treated with acidified $K_2Cr_2O_7$ is .....

A. $+2$

B. $+3$

C. $+5$

D. $+6$

Answer: D

View Text Solution

41. The reaction: $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$ is catalysed by.....

A. $NiSO_4$

B. $ZnSO_4$

C. Mn^{2+}

D. Fe^{3+}

Answer: B

View Text Solution

42. Zr and Hf have almost equal atomic size because....

A. Of characteristic configuration

B. Of lanthanoid contraction

C. Lattice enthalpy is high

D. Of actinoid contraction

Answer: B

View Text Solution

43. Which among the following elements have half-filled f-orbitals?

A. La

B. Pm

C. Gd

D. Lu

Answer: C

View Text Solution

44. Which of the following statements is incorrect?

A. In lanthanoids, only promethium is radio active

B. Highest oxidation state in actinoids is (+6)

C. $Ce(OH)_3$ is most basic in lanthanoid series

D. Actinoids have lower ionisation enthalpies than the lanthanoids

Answer: B

View Text Solution

45. The action of boiling water on actinoids gives

A. oxides and hydroxides

B. oxides and hydrides

C. hydroxides and hydrides

D. only oxides

Answer: B

View Text Solution

46. Which of the following is most basic?

A. $Ce(OH)_3$

B. $Lu(OH)_3$

C. Al_2O_3

D. $Ca(OH)_2$

Answer: D

View Text Solution

47. Which of the following is a good reducing agent?

A. Potassium dichromate

B. Ceric (IV) compounds

C. Eu(II) compounds

D. Acidic permanganate

Answer: C

View Text Solution

48. Lanthanoids and actinoids resembles in....

A. oxidation states

B. electronic configuration

C. formation of complexes

D. ionisation state

Answer: B

View Text Solution

49. For which lanthanoids, (+2) and(+3) oxidation states are common ?

A. Na

B. La

C. Ce

D. Eu

Answer: D

View Text Solution

50. Which of the trivalent ions is colourless?

A. Gd^{3+}

B. Pm^{3+}

C. Tm^{3+}

D. Er^{3+}

Answer: A

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51. Calculate magnetic moment of Fe^{+3} ions. (Fe= 26)

A. 5.9BM

B. 0.59BM

C. 59 BM

D. 590BM

Answer: A

View Text Solution

52. Calculate spin magnetic momentum of $M^{+2}_{(aq)}$ ions. (Z=26)

A. 4.89 BM

B. 0.489BM

C. 48.9BM

D. 489BM

Answer: A

View Text Solution

53. Calculate spin magnetic momentum of $M_{(aq)}^{+2}$ ions. (Z=27)

A. 3.80BM

B. 3.87BM

C. 0.387BM

D. 38.7BM

Answer: B

View Text Solution

54. Which of the following is lanthenoid element?

A. Ta

B. Tn

C. Lu

D. Rh

Answer: C

View Text Solution

55. Which of the following does not show different oxidation state?

A. Iron

B. Copper

C. Zinc

D. Manganize

Answer: C

View Text Solution

56. When KOH solution is added to the potassum dicromate solution, then solution become yellow in colour. Due to....

A. Conversion of chromate ion to the dichromate ions

B. Conversion of dichromate ion to the chromate ions

C. Oxidation state of cromium become +4 from +6

D. Oxidation state of cromium becomes +6 from +4

Answer: B

View Text Solution

57. State of oxidation number of Mn in $KMnO_4$

A. $+2$

B. $+4$

C. $+6$

D. $+7$

Answer: D

View Text Solution

58. Which of the following is not chemical twin?

A. Mo-W

B. Nb-Mo

C. Nb-Ta

D. Zr-Hf

Answer: B

View Text Solution

59. Which of the following ion has maximum unpaired electron?

A. Fe^{+2}

B. Cr^{+3}

C. Fe^{+3}

D. Co^{+2}

Answer: C

View Text Solution

60. Which of the following lanthanoid has smallest atomic radius?

A. Gadollinium

B. Scandium

C. Lutesium

D. Cerium

Answer: C

View Text Solution

61. If certain atom has atomic number of 22. Then what is the maximum oxidation state of It?

A. 1

B. 2

C. 3

D. 4

Answer: D

View Text Solution

62. Which of the following transitional element is found abudently?

A. Zn

B. Fe

C. Hg

D. Au

Answer: B

View Text Solution

63. Certain element has electronic configuration of $[Xe]4f^{14}5d^{1}6s^{2}$, then this element is....

A. Trans urenic element

B. Transitional element

C. Lanthanoid

D. Actinoids

Answer: C

View Text Solution

64. If in a certain element contain one electron in sub shell of 5d-orbital, then the element is..

A. La, Ga and Lu

B. Tb, Nd and Ho

C. Ce, Pr and Sm

D. Tm, Yb and Dy

Answer: A

View Text Solution

65. What is the structure of chromate ion?

A. Tetrahedral

B. Octahedral

C. Triagonal planar

D. Linear

Answer: A

View Text Solution

66. Which of the following ion has highest ionic radius?

A. Cr^{+3}

B. Mn^{+3}

C. Fe^{+3}

D. Co^{+3}

Answer: A

View Text Solution

67. Which of the following is strongest base?

A. $La(OH)_3$

B. $Ly(OH)_3$

C. $Ce(OH)_3$ is most basic in lanthanoid series

D. $Yb(OH)_3$

Answer: A

View Text Solution

68. State the chemical formula of pyrolusite

A. Mn_2O_3

B. MnO_3

C. MnO_2

D. Mn_2O_7

Answer: C

View Text Solution

69. Which oxidation state of manganize is unstable ?

A. $+2$

B. $+4$

C. $+5$

D. $+7$

Answer: C

View Text Solution

Section E Mcqs Asked In Comprtitive Exam

1. State the element X by the following electronic configuration. $X = [Ar]3d^{10}4s^1$

A. Ni

B. Cu

C. Zn

D. Co

Answer: B

View Text Solution

2. State unpaired electrons in $_{28}Ni$

A. 2

B. 3

C. 4

D. 1

Answer: A

View Text Solution

3. What is the general characteristic property of transition elements?

A. Paramagnetism

B. Diamagnetism

C. Salt resistant

D. None of the above

Answer: A

View Text Solution

4. Which element forms amalgum ?

A. Fe

B. Mg

C. Zn

D. Pb

Answer: C

View Text Solution

5. Transition elements containing higher oxidation number possess.... Property

A. Reducing agent

B. Oxidizing agent

C. Acidic

D. None of the above

Answer: B

View Text Solution

6. In the preparation of $KMnO_4$ Potassium permanganate is (K_2MnO_4) is prepared from pyrolucite (MnO_2). What is the change in oxidation

number?

A. $+1 \text{ to } +3$

B. $+2 \text{ to } +4$

C. $+3 \text{ to } +5$

D. $+4 \text{ to } +6$

Answer: D

View Text Solution

7. What is the oxidation number of Ti, whose magnetic moment is 1.73BM?

A. $+3$

B. $+2$

C. $+1$

D. $+4$

Answer: A

View Text Solution

8. Which metal does not contain more than one oxidation state?

A. Co

B. Zn

C. Ti

D. Mn

Answer: B

View Text Solution

9. Transition metals and their compounds contain catalystic property, because....

A. they possess magnetic property

B. they are chemically reactive

C. their d-orbitals are incompeletly filled

D. they possess the property to have more than one oxidation state

Answer: D

View Text Solution

10. State perfect order of ionic radii.

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

B. $La^{3+} < Eu^{3+} < Yb^{3+} < Lu^{3+}$

C. $La^{3+} < Eu^{3+} < Lu^{3+} < Yb^{3+}$

D. $Lu^{3+} < Eu^{3+} < La^{3+} < Yb^{3+}$

Answer: A

View Text Solution

11. In which lathanide contraction is seen?

A. Gd

B. Au

C. Np

D. At

Answer: A

View Text Solution

12. State product and its colour when MnO_2 reacts with KOH in presence of air?

A. $KMnO_4$- Purple

B. K_2MnO_4- Green

C. MnO-Colourless

D. MnO_3-Black

Answer: B

View Text Solution

13. What is obtained by the oxidation I^- with MnO_4^- in alkaline solution?

A. IO_4^-

B. IO_3^-

C. I_2

D. IO_2^-

Answer: B

View Text Solution

14. Why $KMnO_4$ is of purple colour?

A. Charge Transfer spectra

B. d-d Transition

C. f-f Transition

D. d-f Transition

Answer: A

View Text Solution

15. By which of the following blue colour is obtained while adding hydrogen paroxide (H_2O_2) in acidic potassium dichromate?

A. CrO_3

B. Cr_2O_3

C. CrO_5

D. CrO_4^{2-}

Answer: C

View Text Solution

16. Which ion has 5.93 BM magnetic moment?

A. Mn^{2+}

B. Fe^{2+}

C. Cr^{2+}

D. V^{3+}

Answer: A

View Text Solution

17. Which of the following is colourless?

A. CuCl

B. $K_3[Cu(CN)_4]$

C. CuF_2

D. $\left[Cu\left(CH_3(N)_4\right)\right]BF_4$

Answer: A::B

View Text Solution

18. Mercury is in liquid form because...

A. as d-orbital is completely filled up so d-d overlapping is not possible

B. as d-orbital is completely filled up so d-d overlapping is possible

C. its s-orbital is completey filled up

D. its volume is very small

Answer: A

View Text Solution

19. Which oxidation number is possessed by compound of Mn?

A. $+4$

B. $+5$

C. $+6$

D. $+7$

Answer: D

View Text Solution

20. Which of the following statement is incorrect for electrons of 3d and 4f series?

A. Electrons of 3d-orbital contains more oxidation state than 4f series

B. The energy between 3d and 4s orbital is very less

C. Europium (II) is more stable than cerium (II)

D. While going from scandium to copper diamagnetism in 3d-orbital increases

Answer: D

View Text Solution

21. What is the % of iron in pyrophoric alloy?

A. 0.2

B. 0.5

C. 0.95

D. 0.05

Answer: D

View Text Solution

22. Which statement is correct of the following ?

(1) Mangenese possesses +7 oxidation state

(2) Zinc possesses coloured ions

(3) $[CoF_6]^{3-}$ is diamagnetic

(4) Sc can possess +4 oxidation state

(5) Zn possesses +2 oxidation state.

A. 1 &2

B. 1&5

C. 2&4

D. 3&1

Answer: B

View Text Solution

23. Which complex ion of the following possess 2.82 BM magnetic moment?

A. $Ni(CO)_4$

B. $[NiCl_4]^{2-}$

C. $Ni(\mathrm{PPh_3})_4$

D. $\left[Ni(CN)_4\right]^{2-}$

Answer: B

View Text Solution

24. Which statement is incorrect for transition metallic element?

A. They possess different oxidation state

B. Their all ions are coloured

C. They possess both paramagnetism and diamagnetism properties

D. They possess catalitic property

Answer: B

View Text Solution

25. Which maximum oxidation state possessed by actinide?

A. $+5$

B. $+4$

C. $+7$

D. $+8$

Answer: C

View Text Solution

26. Find basic oxides from the following:

(1) MnO_2O_7 (2) V_2O_3 (3) V_2O_5 (4) CrO (5) Cr_2O_3

A. 1 and 2

B. 2 and 3

C. 3 and 4

D. 2 and 4

Answer: D

View Text Solution

27. Which element of the following possesses $[Xe]4f^7 5d^1 6s^2$ electronic structure?

A. Lutetium

B. Terbium

C. Ytterbium

D. Gadolinium

Answer: D

View Text Solution

28. What is the atomic number of iron and chromium in chromite ore?

A. $+3,\ +2$

B. $+3,\ +6$

C. $+2, +6$

D. $+2, +3$

Answer: D

View Text Solution

29. Which is paramagnetic from the following? $Fe^{2+}, Zn^{0}, Hg^{2+}, Ti^{+4}$

A. only Fe^{2+}

B. Zn^{0} and Ti^{+4}

C. Fe_2^{2+} and Hg^{2+}

D. Zn^{0} and Hg^{2+}

Answer: A

View Text Solution

30. Which compound is not possible of Titanium (Z=22)?

A. TiO_2

B. K_2TiF_6

C. $TiCl_3$

D. K_2TiO_4

Answer: D

View Text Solution

31. With which of the following ions, ammonia does not make complex?

A. Ag^+

B. Pb^{2+}

C. Cu^{2+}

D. Cd^{2+}

Answer: B

View Text Solution

32. Which is not stable under ambient condition?

A. Fe^{3+}

B. Cu^{+}

C. Ti^{4+}

D. Mn^{2+}

Answer: B

View Text Solution

33. MnO_3 in an acidic medium dissociates into

A. MnO_2 and MnO_4^-

B. MnO and MnO_4^-

C. MnO_2 and MnO

D. MnO_2 and MnO_3

Answer: A

View Text Solution

34. Magnetic moment of Cr^{2+} is nearest to .....

A. Fe^{2+}

B. Ni^{2+}

C. Mn^{2+}

D. Co^{2+}

Answer: A

View Text Solution

35. Which of the following elements has lowest melting points?

A. Cr

B. Cu

C. Ni

D. Fe

Answer: B

View Text Solution

36. Maximum number of unpaired electrons are present in....

A. Gd^{3+}

B. Yb^{2+}

C. Tb^{2+}

D. Pm^{3+}

Answer: A

View Text Solution

37. When calomel is treated with ammonium hydroxide, a black substance is formed. The black substance is.....

A. $Hg(NH_2)_2 + HgO$

B. $HgO.\ HgCl_2$

C. $Hg + HgO$

D. $H_2N - Hg - Cl + Hg$

Answer: D

View Text Solution

38. Which of the following is most basic?

A. $Al(OH)_3$

B. $Cr(OH)_3$

C. $La(OH)_3$

D. $Fe(OH)_3$

Answer: C

View Text Solution

39. Which of the following does not exist?

A. WO_4^{2-}

B. CrO_4^{2-}

C. VO_4^{3-}

D. $[CuI_4]^{2-}$

Answer: D

View Text Solution

40. $KMnO_4$ in alkaline medium changes to ....

A. Mn^{3+}

B. MnO_2

C. MnO_4^{2-}

D. $Mn(OH)_4^-$

Answer: B

View Text Solution

41. Choose the correctly paired gaseous cation and its magnetic (spin only) moment (in BM)

A. $Cr^{2+}, 4.90BM$

B. $Mn^{2+}, 4.90BM$

C. $Ti^{2+}, 3.87BM$

D. $Co^{3+}, 4.87BM$

Answer: A

View Text Solution

42. In presence of acidic medium, $KMnO_4$ converts H_2S into ....

A. Mn only

B. S only

C. MnS +S

D. Mn only

Answer: B

View Text Solution

43. Copper sulphate is dissolved in water containing.... For making bordeaux mixture.

A. NaOH

B. KCN

C. $Ca(OH)_2$

D. All of these

Answer: C

View Text Solution

44. Colour imparted by Co(II) compounds to glass is.....

A. Green

B. Brown

C. Violet

D. Blue

Answer: D

View Text Solution

45. The colourless species is.....

A. VCl_3

B. $VOSO_4$

C. Na_3VO_4

D. $\left[V(H_2O)_6\right]SO_4H_2O$

Answer: C

View Text Solution

46. Among the following the compound that is both paramagnetic and colourless is....

A. $K_3\left[Cu(CN)_4\right]$

B. $VOSO_4$

C. $K_2Cr_2O_7$

D. $(NH_4)_2[TiCl_6]$

Answer: B

View Text Solution

47. $KMnO_4$ on reaction with KOH does not give...

A. H_2O

B. MnO_2

C. K_2MnO_4

D. $[O]$

Answer: B

View Text Solution

48. Which is least stable in aqueous medium ?

A. Mn^{2+}

B. Fe^{2+}

C. Co^{2+}

D. Ni^{2+}

Answer: B

View Text Solution

49. In which of the following elements number of d-electrons is zero in 6d-obitlas?

A. Th

B. Am

C. Lr

D. Cm

Answer: B

View Text Solution

50. In acidic medium, which of the following becomes colourless ?

A. FeO_4^{2-}

B. CrO_4^{2-}

C. MnO_4^-

D. MnO_4^{2-}

Answer: C

View Text Solution

51. Which of the following exhibits minium number of oxidation states?

A. Th

B. Np

C. Mn

D. Cr

Answer: A

View Text Solution

Section E Mcqa Asked In Jee Neet Aieee

1. Electronic structure of... is $3d^3 4s^0$

A. Cr^{2+}

B. Mn^{4+}

C. Mn^{3+}

D. Fe^{3+}

Answer: B

View Text Solution

2. What valency of all lanthanide series elements?

A. 2

B. 3

C. 4

D. 5

Answer: B

View Text Solution

3. State the oxidation state of Cerium [Ce]

A. $+3,\ +4$

B. $+2, +5$

C. $+2, +4$

D. $+3, +5$

Answer: A

View Text Solution

4. Mention the number of d-electrons in Fe^{+} (Z=26)

A. 4

B. 5

C. 6

D. 3

Answer: C

View Text Solution

5. What is the magnetic momentum of aqueous solution of Ni^{2+} ?

A. 4.90BM

B. 0.0BM

C. 1.73BM

D. 2.84BM

Answer: D

View Text Solution

6. Which ionic pair from the following is coloured in aqueous solution?

A. Sc^{3+}, Ti

B. Sc^{3+}, Co^{2+}

C. Ni^{2+}, Cu^{+}

D. Ni^{2+}, Ti^{3+}

Answer: D

View Text Solution

7. Which of the following descending order of second ionization enthalpy ? Ti(22), V(23), Cr(24) and Mn(25)

A. $V > Mn > Cr > Ti$

B. $Mn > Cr > Ti > V$

C. $Ti > V > Cr > Mn$

D. $Cr > Mn > V > Ti$

Answer: D

View Text Solution

8. Lanthenoid (Ln) is known for its +3 oxidation state. Which of the following statement is not applicable?

A. Ionic volume (radii) decreases as atomic number increases

B. The compounds of Ln(III) are most of coloured

C. Hydroxides of Ln(III) are most of basic

D. As volume of Ln(III) is more their compounds possess ionic nature

Answer: B

View Text Solution

9. Which of the following ions is coloured in aqueous solution ?

A. $Lu^{3+}(Z=71)$

B. $Sc^{3+}(Z=21)$

C. $La^{3+}(Z=57)$

D. $Ti^{3+}(Z=22)$

Answer: D

View Text Solution

10. Which of the following pair possess same volume?

A. Zr^{4+}, Hf^{4+}

B. Zn^{2+}, Hf^{4+}

C. Fe^{2+}, Ni^{2+}

D. Zr^{4+}, Ti^{4+}

Answer: A

View Text Solution

11. The outer electronic configuration of Gd (Atomic no. 64) is.....

A. $4f^{3}5d^{5}6s^{2}$

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

C. $4f^{4}5d^{4}6s^{2}$

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

Answer: D

View Text Solution

12. Iron exhibits (+2) and (+3) oxidation states. Which of the following statements about iron is incorrect?

A. Ferrous compounds are relatively more ionic than the corresponding ferric compounds

B. Ferrous compounds are less volatile than the corresponding ferric compounds

C. Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds

D. Ferrous oxide is more basic in nature than the ferric oxide

Answer: C

View Text Solution

13. The colour of light absorbed by an aqueous solution of $CuSO_4$ is....

A. Orange-red

B. Blue-green

C. Yellow

D. Violet

Answer: A

View Text Solution

14. Four successive members of the first row transition elements are listed ahead with atomic numbers. Which one of them is expected to have the highest $E^{\circ}_{(M^{3+}|M^{2+})}$ value?

A. Co(Z=27)

B. Cr(Z=24)

C. Mn(Z=25)

D. Fe (Z=26)

Answer: A

View Text Solution

15. Consider the following reaction:

$$zMnO_4^- + yC_2O_4^{2-} + zH^+ \rightarrow xMn^{2+} + 2yCO_2 + \frac{Z}{2}H_2O$$

The value of x,y and z are:

A. 5,2 and 8

B. 5,2 and 16

C. 2,5 and 8

D. 2,5 and 16

Answer: C

View Text Solution

16. Which of the following arrangements doesnot represent the correct order of the property stated against it?

A. $Sc < Ti < Cr < Mn$: Number of oxidation states

B. $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$: Paramagnetic behaviour

C. $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: Ionic size

D. $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: Stability in aqueous solution

Answer: B

View Text Solution

17. Sc (Z=21) is a transition elements but Zn(Z=30) is not because....

A. Both Sc^{3+} and Zn^{2+} ions are colourless and form with compounds

B. In case of Sc, 3d orbitals are partially filled but in Zn these are completely filled

C. Last electron is assumed to be added to 4s level in case of zinc

D. Both Sc and Zn donot exhibit variable oxidation states

Answer: B

View Text Solution

18. Identify the correct order of solubility in aqueous medium.....

A. $Na_2S > CuS > ZnS$

B. $Na_2S > ZnS > CuS$

C. $CuS > ZnS > Na_2S$

D. $ZnS > Na_2S > CuS$

Answer: B

View Text Solution

19. Which of the following lanthanoid ions is diamagnetic ? (Atomic No,: Ce=58, Sm= 62, Eu= 63, Yb= 70)

A. Eu^{2+}

B. Yb^{2+}

C. Ce^{2+}

D. Sm^{2+}

Answer: B

View Text Solution

20. Which of the following statements about the interstitial compounds is incorrect?

A. They are much harder than the pure metal

B. They have higher melting points then the pure metal

C. They retain metallic conductivity

D. They are chemically very reactive

Answer: D

View Text Solution

21. The equation which is balanced and represents the correct product is....

A. $CuSO_4 + 4KCN \rightarrow K_2\left[Cu(CN)_4\right] + K_2SO_4$

B. $Li_2O + 2KCl \rightarrow 2LiCl + K_2O$

C. $\left[CoCl(NH_3)_5\right]^+ + 5H^+ \rightarrow Co^{2+} + 5NH_4^+ + Cl^-$

D. $\left[Mg(H_2O)_6\right]^{2+} + (\mathrm{EDTA})^{4-} \xrightarrow[NaOH]{\text{Excess}} [Mg(\mathrm{EDTA})]^{2+} + 6H_2O$

Answer: C

View Text Solution

22. Reason of lanthanoid contraction is.....

A. Negligible screening effect of f-orbitals

B. Increasing nuclear charge

C. Descreasing nuclear charge

D. Decreasing screening effect

Answer: A

View Text Solution

23. Magnetic moment 2.84BM is given by: (Atoms No: Ni= 28, Ti= 22,Cr= 24, Co= 27)

A. Ni^{2+}

B. Ti^{3+}

C. Cr^{2+}

D. Co^{2+}

Answer: A

View Text Solution

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

A. Rusting of iron sheets

B. Decolourization of blue $CuSO_4$ solution by iron

C. Formation of $Fe(CO)_5$ from Fe

D. Liberation of H_2 from steam by iron at high temperature

Answer: C

View Text Solution

25. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii? (Number 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

View Text Solution

26. Gadolinium belongs to 4f series. It's atomic number is 64. Which of the following is the correct electronic configuration of gadollinium?

A. $[Xe]4f^7 5d^1 6s^2$

B. $[Xe]4f^6 5d^2 6s^2$

C. $[Xe]4f^8 6d^2$

D. $[Xe]4f^9 5s^1$

Answer: A

View Text Solution

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

A. FeC_2O_4

B. $Fe(NO_2)_2$

C. $FeSO_4$

D. $FeSO_3$

Answer: C

View Text Solution

28. Which is the correct order of increasing energy of the listed orbitlas in the atom of titanium? (Atomic No. Z=22)

A. 3s 3p 3d 4s

B. 3s 3p 4s 3d

C. 3s 4s 3p 3d

D. 4s 3s 3p 3d

Answer: B

View Text Solution

29. The colour of $KMnO_4$ is due to.....

A. $L \rightarrow M$ charge transfer transition

B. $\sigma \rightarrow \sigma^*$ Transition

C. $M \rightarrow L$ charge transfer transition

D. d-d transition

Answer: A

View Text Solution

30. A pink coloured salt turns blue on heating. The presence of which cation is most likely?

A. Cu^{2+}

B. Fe^{2+}

C. Zn^{2+}

D. Co^{2+}

Answer: D

View Text Solution

31. Which of the following statements is false?

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

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

C. $Na_2Cr_2O_7$ is a primary standard in volumetry

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

Answer: C

View Text Solution

32. Which of the following compounds is metallic and ferromagentic ?

A. MnO_2

B. TiO_2

C. CrO_2

D. VO_2

Answer: C

View Text Solution

33. The electronic configurations of Eu (Atomic No. 63) Gd (Atomic No. 64) and Tb(Atomic No. 65), are:

A. $[Xe]4f^7 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

B. $[Xe]4f^6 5d^1 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^8 5d^1 6s^2$

C. $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

D. $[Xe]4f^7 6s^2$, $[Xe]4f^7 5d^1 6s^2$ and $[Xe]4f^9 6s^2$

Answer: C

View Text Solution

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

A. The solution is decolourized

B. SO_2 is reduced

C. Green $Cr_2(SO_4)_3$ is formed

D. The solution turns blue

Answer: C

View Text Solution

35. Which one of the following statements related to lanthanons is correct ?

A. All the lanthanons are much more reactive than aluminium

B. Ce^{+4} solution are widely used as oxidizing agent in volumetric analysis

C. Europium shows +2 oxidation state

D. The basicity decreases as the ionic radius decreases from Pr to Lu

Answer: A

View Text Solution

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

A. Cr^{2+}

B. MnO_4^{2-}

C. MnO_4^{3-}

D. Cu^{+}

Answer: B

View Text Solution

37. For the tetrahedral complex $[MnBr_4]^{2-}$ the spin only magnetic moment value is.... (Atomic No. Of Mn=25)

A. 1.7

B. 5.9

C. 4.8

D. 2.4

Answer: B

View Text Solution

38. Which of the following lanthanoids shows +4 oxidation state to acquire noble gas configuration? {Atomic no: La= 57, Ce= 58, Eu = 63 and Yb= 70)

A. Ce

B. Yb

C. La

D. Eu

Answer: A

View Text Solution

39. In the following reactions, ZnO is respectively acting as/an....

(i) $ZnO + Na_2O \rightarrow Na_2ZnO_2$

(ii) $ZnO + CO_2 \rightarrow ZnCO_3$

A. acid and acid

B. acid and base

C. base and acid

D. base and base

Answer: B

View Text Solution

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

A. Mn^{2+}

B. Ti^{2+}

C. V^{2+}

D. Cr^{2+}

Answer: A

View Text Solution

41. The reason for greater range of oxidation states in actinoids is attributed to ....

A. actionoid contraction

B. the radioactive nature of actinoids

C. 5f, 6d and 7s levels of comparable energies

D. 4f and 5d levels being close in energies

Answer: C

View Text Solution

42. $HgCl_2$ and l_2 both when dissolved in water containing I^- ions, the pair of species formed is....

A. HgI_2, I_3^-

B. Hg_2, I_2, I^-

C. HgI_4^{2-}, I_3^-

D. HgI_2, I^-

Answer: C

View Text Solution

43. The gas that can readily decolourise acidified $KMnO_4$ solution is....

A. NO_2

B. SO_2

C. CO_2

D. P_2O_5

Answer: B

View Text Solution

44. Match the metal ions given in Column-I with the spin megnetic moments of the ions given in Column-II and assign the correct code:

A. $\begin{matrix} a & b & c & d \\ (\text{iv}) & (v) & (ii) & (i) \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ (\text{iii}) & (v) & (i) & (ii) \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ (\text{i}) & (ii) & (iii) & (iv) \end{matrix}$

D. $\begin{matrix} a & b & c & d \\ (\text{iv}) & (i) & (ii) & (iii) \end{matrix}$

Answer: A

View Text Solution

45. Which one of the following ions exhibits d-d transition and paramagnetism as well?

A. MnO_4^{2-}

B. CrO_4^{2-}

C. MnO_4^{2-}

D. $Cr_2O_7^{2-}$

Answer: A

View Text Solution

46. 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. V

B. Mn

C. Cr

D. Ti

Answer: B

View Text Solution

47. The Lanthanide ion that would show colour is

A. Sm^{3+}

B. La^{3+}

C. Lu^{3+}

D. Gd^{3+}

Answer: A

View Text Solution

48. The elements that usually does not show variable oxidation state is....

A. V

B. Ti

C. Cu

D. Sc

Answer: D

View Text Solution

49. (A) $\xrightarrow[O_2]{4KOH} \underset{(\text{Green})}{2B} + 2H_2O$

(B) $\xrightarrow{4HCl} 2B + 2H_2O$

(C) $\xrightarrow[KI]{H_2O} 2(A) + 2KOH + (D)$

In the above sequence of reactions (A) and (D) respectively are:

A. KI and $KMnO_4$

B. KI and K_2MnO_4

C. KIO_3 and MnO_2

D. MnO_2 and KIO_3

Answer: D

View Text Solution

50. Thermal decomposition of a Mn compound (X) at 513 K temperature results in compound (Y), MnO_2 and a gaseous product. MnO_2 reacts with NaCl and concentrated H_2SO_4 to give a pungent gas Z.X, Y and X are respectively.

A. $K_2MnO_4, KMnO_4$ and SO_2

B. $K_2MnO_4, KMnO_4$ and Cl_2

C. K_3MnO_4, K_2MnO_4 and Cl_2

D. $KMnO_4, K_2MnO_4$ and Cl_2

Answer: D

View Text Solution

51. Which of the following reactions are disproportionation reaction?

(a) $2Cu^{+} \rightarrow Cu^{2+} + Cu^{0}$

(b) $3MnO_4^{2-} + 4H^{+} \rightarrow 2MnO_4^{-} + MnO_2 + 2H_2O$

(c) $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + MnO_2 + O_2$

(d) $2MnO_4^{-} + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^{\oplus}$

Select the correct option from the following

A. a and d only

B. a and b only

C. a, b and c

D. a, c and d

Answer: B

View Text Solution

52. The atomic radius of Ag is closest to:

A. Ni

B. Cu

C. Au

D. Hg

Answer: C

View Text Solution

Section E Mcqs Asked In Gujcet Board Exams

1. Why $_{21}Sc$ is not considered as transition element?

A. In the compound d-orbitals are empty

B. Ionic volume of Sc is very small

C. Sc does not possess more than one oxidation numer

D. Sc possesses acidic-basic both properties.

Answer: A

View Text Solution

2. In which of the following atom possesses highest oxidation state?

A. $(n-1)d^3ns^2$

B. $(n-1)d^5ns^2$

C. $(n-1)d^8ns^2$

D. $(n-1)d^5ns^2$

Answer: D

View Text Solution

3. In which of the following ion d-d transition is not possible?

A. Mn^{2+}

B. Cu^{2+}

C. Ti^{4+}

D. Cr^{3+}

Answer: C

View Text Solution

4. State the use of Potassiumdichromat $[K_2Cr_2O_7]$

A. As an oxidizing agent to convert ferric ion from ferrous ion in acidic medium

B. As an insecticide

C. In electroplating

D. As reducing agent

Answer: A

View Text Solution

5. Stabilization of oxidation state in Lanthanoid elements depends on which of the following?

A. Hydration enthalpy and Ionization energy

B. electronic configuration

C. Enthalpy

D. Internal energy

Answer: A

View Text Solution

6. Which compounds of Lanthanides are used in pigments?

A. $Lu(OH)_3$

B. CeO_2

C. $Tb(OH)_3$

D. $Ce(OH)_3$

Answer: B

View Text Solution

7. What is the atomic number of an element of Mn^{2+} ion. Whose electronic structure is $[Ar]3d^8$?

A. 27

B. 25

C. 26

D. 28

Answer: D

View Text Solution

8. Which of the following option is the correct order for the basic strength of metallic hydroxides?

A. $Al(OH)_3 < Lu(OH)_3 < Ce(OH)_3 < Ca(OH)_2$

B. $Ca(OH)_2 < Al(OH)_3 < Lu(OH)_3 < Ce(OH)_3$

C. $Lu(OH)_3 < Ce(OH)_3 < Al(OH)_3 < Ca(OH)_2$

D. $Lu(OH)_3 < Ce(OH)_3 < Ca(OH)_2 < Al(OH)_3$

Answer: A

View Text Solution

9. Which of the following is a transition element as per the ground state electronic configuration?

A. Au

B. Hg

C. Cd

D. Zn

Answer: A

View Text Solution

10. Which of the following compound is used in gas lighter?

A. CeO_2

B. Pyrophoric misch metal

C. Nichrome

D. Nitinol

Answer: B

View Text Solution

11. Which of the following statement is incorrect for $KMnO_4$?

A. It is an oxidising agent

B. It is used as antiseptic

C. It is used as bleaching agent in textile industries

D. It is dark purple coloured amorphous substance

Answer: D

View Text Solution

12. Which of the following ion has the maximum theoretical magnetic moment?

A. Fe^{3+}

B. Cr^{3+}

C. Ti^{3+}

D. Co^{3+}

Answer: A

View Text Solution

13. Which of the following oxide has the maximum basicity?

A. La_2O_3

B. Pr_2O_3

C. Sm_2O_3

D. Gd_2O_3

Answer: A

View Text Solution

14. Which statements is not suitable for interstitial compounds?

A. They are hard due to localisation of free electrons

B. Chemical bond is formed between metal & non-metal atom

C. The proportion of components is not definite is such compounds

D. They are resistant to wear and corrosion

Answer: B

View Text Solution

15. Which alloy does not contain Ni meatal?

A. German silver

B. Bronze

C. Stainless steel

D. Nichrome

Answer: B

View Text Solution

16. Which of the following is the correct order for theoretical magnetic moment?

A. $Cr^{3+} = Mn^{2+} < Fe^{3+}$

B. $Cr^{3+} < Mn^{2+} < Fe^{3+}$

C. $Cr^{3+} < Mn^{2+} = Fe^{3+}$

D. $Cr^{3+} > Mn^{2+} = Fe^{3+}$

Answer: C

View Text Solution

17. Which statements is incorrect with reference to inner transition elements?

A. Pm is radioactive element among actinoids

B. Only in the electronic configuration of lanthanoids lke Ce, Gd and Lu the electrons are filled in 5d orbitals

C. The values of ionisation enthalpy of actinoids are less than the values of ionisation enthalpy of lanthanoids

D. The oxides of lanthanoids are basic

Answer: A

View Text Solution

18. What is responsible from the following for innertransition elemtns having +3 stable oxidation state?

A. Ionisation energy

B. Hydration enthalpy

C. (A) and (B) both

D. Electronic structure

Answer: C

View Text Solution

19. Which is not innertransition compound?

A. TiC

B. VC

C. WC

D. SiC

Answer: D

View Text Solution

20. Aqueous solution of which elements is coloured?

A. $TiCl_2$

B. $ZnCl_2$

C. $CdCl_2$

D. Hg_2Cl_2

Answer: A

View Text Solution

21. Which of the following is electronic configuration of Palladium (Pd), an element of second transition series?

A. $[Kr]4d^9 5s^1$

B. $[Kr]4d^{10} 5s^0$

C. $[Kr]4d^8 5s^2$

D. $[Xe]3d^{10} 5s^0$

Answer: B

View Text Solution

22. What is the experimental value of magnetic moment of metal ion in $\left[Fe(CN)_6\right]^{4-}$?

A. 4.90BM

B. 5.00BM

C. 0.00BM

D. 5.92BM

Answer: C

View Text Solution

23. Which of the following alloy does not contain Copper?

A. Nichrome

B. Bronze

C. Brass

D. German Silver

Answer: A

View Text Solution

24. Which of the following substance is used in measurement of Chemical Oxygen Demand (COD) in polluted water?

A. H_2SO_4

B. $KMnO_4$

C. MnO_2

D. $K_2Cr_2O_7$

Answer: D

View Text Solution

25. An alloy of which of the following metal is used in filling the cavity in the tooth?

A. Hg, Ag, Sn, Cu, Ni

B. Hg, Au, Sn, Cu, Ni

C. Hg, Al, Sn, Cu, Zn

D. Hg, Ag, Sn, Cu, Zn

Answer: D

View Text Solution

26. Which of the following ion has maximum Second ionisation enthalpy?

A. V^+

B. Sc^+

C. Cr^+

D. Mn^+

Answer: C

View Text Solution

27. Which of the following mixture of metals can not form alloy?

A. $Ni + Mg + Cr$

B. $Au + Cu + Cr$

C. $Fe + Cr + Cu$

D. $Ni + Cu + Cr$

Answer: A

View Text Solution

28. What is the colour of K_2MnO_4?

A. Red

B. Violet

C. Green

D. Blue

Answer: C

View Text Solution

29. Which of the following alloy is not used to make resistance wire?

A. Nitinol

B. German silver

C. Nichrome

D. Cupronickel

Answer: A

View Text Solution

30. Choose correct option for the statements given below

(Correct statement- T, incorrect statement- F)

(i) Electronic configuration of transition metal ion is suitable for

formation of complexes

(ii) A chemical bond is formed between non-metal and metal atoms in interstitial compounds

(iii) Crystal structures of Cu and Au are different

A. TFF

B. FTT

C. TFT

D. TTF

Answer: D

View Text Solution

31. Which colour well be observed when Manganese dioxide is fused with KOH in presence of O_2?

A. Purple

B. Green

C. Orange

D. Red

Answer: B

View Text Solution

32. The theoretical magnetic moment of $_{27}Co$ is 3.87BM. Which one of the correct compound from the following?

A. $Co(NO_3)_2$

B. $CoCl_3$

C. $[CoF_6]^{2-}$

D. $\left[Co(NH_3)_6\right]^{3+}$

Answer: A

View Text Solution

33. Which of the following alloys does not contain zinc?

A. The mixture used in filling cavity in the tooth

B. Bronze

C. Brass

D. German Silver

Answer: B

View Text Solution

34. The magnetic moment of a compound of cobalt is 3.87BM, the compound is....

A. $\left[Co(H_2O)_6\right]^{+3}$

B. $\left[Co(CN)_6\right]^{3-}$

C. $Co(NO_3)_3$

D. $\left[Co(H_2O)_6\right]^{+2}$

Answer: D

View Text Solution

35. Which of the following ion is colourless?

A. Sc^{3+}

B. Ti^{3+}

C. Mn^{3+}

D. Cu^{2+}

Answer: A

View Text Solution

36. Which of the following is the least basic?

A. $Yb(OH)_3$

B. $Ce(OH)_3$

C. $Nd(OH)_3$

D. $Gd(OH)_3$

Answer: A

View Text Solution

37. What is the colour of $\left[Ti(H_2O)_6\right]^{3+}$ complex ion?

A. Blue

B. Violet

C. Pink

D. Green

Answer: B

View Text Solution

38. Which of the following is general electronic configuration of Actinide series?

A. $[Rn]5f^{0-14}6d^{0-2}7s^2$

B. $[Xe]4f^{0-14}5d^{0-10}6s^2$

C. $[Rn]5f^{0-14}5d^{0-2}6s^2$

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

Answer: A

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39. Which compound of lanthanoid is used to produce very low temperature by magnetic effect?

A. Cerium dioxide

B. Oxides of Lanthanoids

C. Gradlinium sulphate

D. Cerium sulphate

Answer: C

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40. Which ion has magnetic moment 5.90BM?

A. Mn^{4+}

B. Fe^{3+}

C. Co^{2+}

D. Fe^{2+}

Answer: D

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41. Which of the following ion will not form coloured aqueous solution?

A. Cu^{2+}

B. Fe^{3+}

C. Ti^{4+}

D. Ni^{2+}

Answer: C

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42. The correct order of catalytic activity of Cr, V, Fe and Mn metals in increasing order is ....

A. $Fe < Mn < V < Cr$

B. $V < Fe < Cr < Mn$

C. $Cr < V < Fe < Mn$

D. $V < Cr < Mn < Fe$

Answer: D

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43. Which of the following ion has the maximum theoretical magnetic moment?

A. Ti^{3+}

B. V^{3+}

C. Cr^{3+}

D. Co^{3+}

Answer: D

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44. Which among the following elements is radioactive?

A. Pm

B. La

C. Tm

D. Pr

Answer: A

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45. Which of the following metals are present in German Silver?

A. Nickel, Silver and Copper

B. Zinc, Silver and Copper

C. Germanium, Silver and Copper

D. Zinc, Nickel and Copper

Answer: D

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46. Which of the following statements is incorrect?

A. The ionic size decreases as we move from Ce^{3+} to Lu^{3+}

B. The atomic radius decreases as we move from Ce to Lu

C. $Ce(OH)_3$ is the least basic among the hydroxides of Lanthanoids

D. The stable oxidation state of all Lanthanoids is (+3)

Answer: C

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47. What is the magnetic momentum of cuprous chloride on the basis of the axial rotation?

A. 1.73BM

B. 4.90BM

C. 0.0 BM

D. 2.83BM

Answer: C

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48. Assertion (A): Atomic radii from Cr to Cu is almost similar

Reason (R): Sheilding effect of entering electron in 3d-orbital decrease repulsion forces of 4s-orbital electrons towards nucleus

A. (A) and (R) both are true (R) is correct explanation of (A)

B. (A) is true, (R) is wrong

C. (A) and (R) both are true

D. (A) is wrong (R) is true

Answer: B

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49. Which alloy is used by dentist to fill the cavity in the tooth?

A. $Hg + Ag + Cu$

B. $Hg + Ag + Cu + Sn$

C. $Hg + Ag + Sn + Cu + Zn$

D. $Ag + Sn + Cu + Zn$

Answer: C

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50. Which are the correct uses of potassium dichromate from the following?

(i) As an indicator in redox titration

(ii) As a reagent in COD measurements

(iii) As reducing agent in synthesis of organic compounds

(iv) In leather industry

A. (i)

B. (ii) and (iv)

C. (i) and (iii)

D. (i), (ii) and (iii)

Answer: B

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