CHEMISTRY

BOOKS - R SHARMA CHEMISTRY (HINGLISH)

THE D AND F BLOCK ELEMENTS

Follow Up Test 1

1. In the d-block elements the less or differenting electron enters the d-subshell of the

A. last shell

B. third last shell

C. second last shell

D. fourth last shell

Answer: C

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2. Which of the d-block elements are not referred to as the transition elements ?

A. Group 9

B. Group 12

C. Group 10

D. Group 13

Answer: B

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3. The ground state electronic configuration of platinum is

A. $[Xe]4f^{14}5d^{9}6s^{1}$

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

C. $[Xe]4f^{14}5d^{8}6s^{2}$

D. $[Kr]4d^{4}5s^{1}$

Answer: A

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4. Which of the following series of d-block elements exhibits the minimum deviation in electronic configuration ?

A. 3d series

B. 4d series

C. 5d series

D. 6d series

Answer: D

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5. In the f-block elements the last or differentiating electron enters the f-subshell of the

A. third last shell

B. second last shell

C. fourth last shell

D. outermost shell

Answer: A

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Follow Up Test 2

1. Unlike s-block metals, have very high melting and boiling points they

A. are more meltallic

B. are more dense

C. utilize (n-1) d as well as ns electrons for boiling

D. have higher ionization enthaplies

Answer: C

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2. Which of the following has the highest melting point in the first row transition elements ?

A. V

B. Mo

C. W

D. Cr

Answer: D

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3. Which of the following has the lowest enthalpy of atomisation ?

A. V

B. Ti

C. Ni

D. Zn

Answer: D

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4. Which of the following d-block metals has the highest boiling point ?

A. Re

B. Ta

C. W

D. Hg

Answer: A

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5. Which of the folling d-block metals has the highest density ?

A. Os

B. Ir

C. Pt

D. Sc

Answer: B

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6. Atoms of d-block elements in a given period are smaller than those of s-block elements but bigger than those of p-block elements. However, the variation within a given series is quite small because

A. the energy of the (n-1) d electron is greater than that of the ns electrons

B. the electrons are added to the (n-1) d and ns subshells simultaneously

C. the energy of the (n-1) d electron is similar to that of the ns electrons

D. the electrons are added to the d subshell of the penultimate shell rather than to the outermost

shell.

Answer: D

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7. Which of the following statement is correct ?

A. Because of lanthanide contraction, the separation of second-row d-block elements form one another is easier

B. Because of lanthanide contraction, the radii of the third-row d-block elements are almost the same as those of the second-row elements

C. Because of lanthanide contraction, the radii of the third-row elements are almost the same as those of the first-row elements.

D. The second-row elements have smaller radii than the corresponding third-row elements.

Answer: B

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8. Which of the following d-block elements has the bigger covalent radius ?

A. Co

B. Ni

C. Cu

D. Zn

Answer: B

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9. Which of the following statement is correct regarding 3d-series of elements ?

(1) Sc has the lowest while Zn has the highest first ionization enthlpy.

(2) Cu has the highest while Sc has the lowest second ionization enthalpy

(3) Zn has the highest third ionization enthalpy

(4) Fe has lower third ionization enthalpy relative to Mn

A. (i), (ii), (iii)

B. (ii), (iii)

C. (i), (ii), (iii), (iv)

D. (i), (iv)

Answer: C

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10. Which of the d-block elements has the lowest electronegativity ?

A. Co

B. Ni

C. Cu

D. Zn

Answer: D

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11. The noble charactoer of platinum and gold is favoured by

A. high entalpies of sublimation, high ionization enthalpies and high enthapies of solvation

B. high enthalpies of sublimation, high ionization enthalpies and low enthalpies of solvation

C. high enthalp[ies of sublimation, low ionization enthalpies and low enthalpies of solvation

D. low enthalpies of sublimation, high ionization enthalpies and low enthalpies of solvation

Answer: B

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12. Which of the following is correct for d-block metals ?

A. They form exclusively covalent compounds

B. They exclusively form coordination compounds but no simple compounds

C. They may form either ionic or covalent compounds depending on the condition.

D. They form only ionic compounds.

Answer: C

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13. The d-block elements exhibit variable oxidation states. The serveral different oxidation states shown by the d-block elements is related to their

A. electronic configurations

B. electropositive characters

C. atomic masses

D. atomic sizes

Answer: A

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

A. Zn

B. Ni

C. Ti

D. Sc

Answer: D

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15. Which of the 3d-seres of the transition metals exhibits the leagest number of oxidation states ?

A. Cr

B. Mn

C. Fe

D. Co

Answer: B

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16. Which of the following has d^1 configuration and is stable ?

A. Cr $(+5)$

B. Mn $(+6)$

C. both (1) and (2)

D. V $(+4)$

Answer: D

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17. Which of the following has d^3 configuration and is quite stable ?

A. Fe $(+3)$

B. Mn $(+3)$

C. V $(+3)$

D. Cr $(+3)$

Answer: D

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18. Which of the following species with d^6 configuration is stable in the presence of strong complexing reagents ?

A. Fe $(+2)$

B. Co $(+3)$

C. Cu $(+1)$

D. Ni $(+2)$

Answer: B

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19. Which of the following is the strongest oxidizing agent ?

A. VO_2^+

B. $Cr_2O_7^{2-}$

C. CoO_4^{2-}

D. FeO_4^{2-}

Answer:

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20. Which of the following couples has the most positive E^{Θ} value ?

A. V^{3+}/V^2

B. $Cr^{3=}/Cr^{2+}$

C. Fe^{3+}/Fe^{2+}

D. Mn^{3+}/Mn^{2+}

Answer: D

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21. Which of the following statements is correct ?

(1) The highst oxidation state of a metal is either xhibited in its oxide or its fluoride

(2) Cr^{2+} is a stronger reducing agent than Fe^{2+}

(3) The stability of the +6 state for Group 6 elements $W^{6+} < Mo^{6+} < Cr^{6+}$

(4) Cu^{+} ion is not stable in aqueous solutions

A. (i), (iii), (iv)

B. (i), (ii), (iii), (iv)

C. (i), (ii), (iv)

D. (ii), (iii), (iv)

Answer: C

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Follow Up Test 3

1. Which of the following statements is context of paramagnetic materils ?

A. It is difficult for magnetic lines of force to travel through a paramagnetic material than through a vacuum.

B. Paramagnetism arises as a result of unpaired electron spins in the atom/ion.

C. A paramagnetic material moves from a weaker to a stronger part of the magnetic field

D. A parmagnetic material placed in a magntic field attracts magnetic lines of force towards it.

Answer: A

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2. Which of the following is not ferromagnetic ?

A. Mn^{4+}

B. Ti^{4+}

C. Co

D. both (1) and (2)

Answer: D

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3. Which of the following statements is incorrect ?

A. Magnetic susceptibility of transition metal compounds is experimentally measured by Gouy method.

B. The unit of magnetic moment is Bohr magneton, μ_B

.

C. The value of Bohr magneton is given by the formula,

$$\mu_B = eh / 4\pi m_e$$

D. One Bohr magneton is equal to $9.27 \times 10^{-23} jT^{-1}$

Answer: D

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

A. $5.92\mu_B$

B. $3.87\mu_B$

C. $4.90\mu_B$

D. $2.84\mu_B$

Answer: A

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5. The 'spin only' magnetic moment of Ti in a given compound is 1.73 BM. The oxidation state and configuration of Ti in the compound are -------- respectively.

A. $+1, 4s^2 3d^1$

B. $+3, 3d^1$

C. $+2, 4s^1$

D. $+4, 3d^1$

Answer: B

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6. Which of the following metal ions is colored in aqueous solution ?

A. Sc^{3+}

B. Ti^{4+}

C. Zn^{2+}

D. V^{4+}

Answer: D

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7. Which of the following is coloured ?

A. V_2O_5

B. NbF_5

C. TaF_5

D. $TaCI_5$

Answer: A

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8. The transition metals have a strong tendency to form complaexes because of

(i) smaller sizes of the metal ions

(ii) variable oxidation states

(iii) high ionic charges of metal ions

(iv) availability of vacant d-orbitals for bond formation.

A. (i), (ii), (iii), (iv)

B. (i), (iii), (iv)

C. (iv) only

D. (i), (iii)

Answer: B

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9. Which of the following is arranged in order of increasing stability of the metal complexes ? (Oxidation states are given in parentheses).

A. $Pt(+2) > Co(+3) < Ag(+1) < Cr(+3)$

B. $Cr(+3) < Pt(+2) < Ag(+1) < Co(+3)$

C. $Co(+3) < Cr(+3) < Pt(+2) < Ag(+1)$

D. $Ag(+1) < Pt(+2) < Cr(+3) < Co(+3)$

Answer: D

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10. The interstitial compounds of transition metals are than the metal itself.

A. softer

B. more malleable

C. harder

D. more metallic

Answer: C

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11. Which of the following is used in large amount to make ferrous and non-ferrous alloys ?

A. Cu

B. Ni

C. Cr

D. Mn

Answer: B

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Follow Up Test 4

1. Which of the following oxides is amphoteric in nature ?

A. Mn_2O_7

B. MnO_2

C. Cr_2O_3

D. both (2) and (3)

Answer: D

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2. Sodium chromate is prepared by fusing

A. sodium dichromate with carbon

B. $(NH_4)_2Cr_2O_7$ with sodium hydrogen sulphate in introgen

C. chromite $(Fecr_2O_4)$ with sodium hydroxide in air.

D. chromite $(FeCr_2O_4)$ with sodium chloride in air.

Answer: C

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3. The equilibrium $Cr_2O_7^{2-} \Leftrightarrow 2CrO_4^{2-}$

A. an acidic medium

B. an alkaline medium

C. a netural medium

D. It does not shift.

Answer: A

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4. The number of moles of $K_2Cr_2O_7$ reduced by $1mol$ of Sn^{2+} ions is

A. 3

B. $1/6$

C. 6

D. $1/3$

Answer: D

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5. How many equivalents of oxygen atoms can be available from 1 mole of $K_2Cr_2O_7$?

A. 6

B. 3

C. 5

D. 2

Answer: B

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6. CrO_3 on treatment with NaOH solution produces

A. Cr_2O_3

B. $Na_2Cr_2O_7$

C. Na_2CrO_4

D. $Cr(OH)_3$

Answer: C

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7. Which of the following is incorrect regarding $K_2Cr_2O_7$?

A. It oxidezes iodide to iodine

B. It oxidizes H_2S to SO_2

C. It oxidizes SO_2 to H_2SO_4

D. It oxidizes ethyl alcohol to acetic acid

Answer: B

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8. Chromyl choride, CrO_2CI_2, is prep[ared by heating a mixture of

A. CrO_3 and NaCI

B. NaCI, $K_2Cr_2O_7$ and MnO_2

C. NaCI, $K_2Cr_2O_7$ and NaOH

D. NaCI, $K_2Cr_2O_7$ and concentrated H_2SO_4

Answer: D

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9. Ammonium dichromate on heating gives

A. CrO_3

B. Cr_2O_3

C. CrO

D. CrO_2

Answer: B

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10. When hydrogen peroxide is added to acidified potassium dichromate, a blue colour is produced due to formation of :

A. $(NH_3)CrO_4$

B. K_3CrO_8

C. CrO_5

D. $k[CrO(O_2)(CH)]$

Answer: C

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11. Sodium chromate on trement with lead acetate gives a precipiate. This precipitate is dried and the solid is used

as a pigment for road sign and markings. The solid is knnwn as

A. chrome yellow

B. white lead

C. red lead

D. chrome green

Answer: A

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12. Assertion (A): Potassium dichromate is preferred to $Na_2Cr_2O_7$ for use in volumetric analysis (titrations)

Reason (R): $Na_2Cr_2O_7$ is hygroscopic whilst the

$K_2Cr_2O_7$ is not

Which of the following is correct ?

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. Both A and R are false

Answer: A

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13. Postassium permanganate is manufactured a large scale by fusing - with KOH and KNO_3 to form K_2MnO_4, which is than electrolytically oxidized in an alkaline medium.

A. manganite, $Mn_2O_3 \cdot H_2O$

B. hausmannite, Mn_3O_4

C. pyrolusite, MnO_2

D. braunite, Mn_2O_3

Answer: C

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14. In strongly alkaline medium, the equivalent mass of $KMnO_4$ is --------, where formula mass.

A. M/6

B. M

C. M/3

D. M/5

Answer: B

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15. Acidified potassium permangate can't oxidize

A. $C_2O_4^{2-}$

B. N_2H_4

C. SO_4^{2-}

D. $S_2O_3^{2-}$

Answer: C

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16. Baeyer's reagent is dilute and

A. netual $KMnO_4$

B. slightly acidic $KMnO_4$

C. strongly alkaline $KMnO_4$

D. slightly alkaline $KMnO_4$

Answer: D

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17. How many of oxygen atoms become available form one mole of $KMnO_4$ as an oxidizing agent in the acidic medium ?

A. 2.5

B. 5

C. 3.0

D. 6

Answer: A

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18. Which of the following is used in medicine as a powerful laxative ?

A. Hg_2CI_2

B. $HgCI_2$

C. $ZnCI_2$

D. $CdCI_2$

Answer: A

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Follow Up Test 5

1. The general valence shell electronic configuration of lanthanoides is represented by

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

B. $(n-2)f^{1-14}(n-1)d^{10}ns^2$

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

D. $(n-2)f^{1-14}(n-2)d^{0-5}ns^2$

Answer: A

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2. Which of the following lanthanoids is rediocative ?

A. Lutetium

B. Cerium

C. Promethium

D. Thulium

Answer: C

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3. The most common and stable oxidation state of a lanthanide is

A. $+2$

B. $+3$

C. $+4$

D. $+1$

Answer: B

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4. Which of the following properties form Ce so Lu ?

A. Hardness of elements

B. Melting points of elements

C. Boiling points element

D. Basic strength of Ln $(OH)_3$

Answer: D

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5. Which of the following statements is incorrect ?

A. Lanthanide do not exhibit magnetic properties and also color and spectral properties.

B. Because of same charge, almost identical radii and similar chemical properties, lanthanide ions $\left(\ln^{3+}\right)$ can't be separated easily form one another.

C. The second and third rows of transition elements (Y $\rightarrow$ Ag and La $\rightarrow$ Lu) resemble each other more

closely than do the elements of the first and second rows (Sc $\rightarrow$ Cu and Y $\rightarrow$ Ag)

D. The vertical pair of elements of second and third transition serious, such as Zn/Hf, Nb/Ta and Mo/W, are almost identical in size.

Answer: A

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6. The most common oxidation states of cerium are

A. $+2$ and $+3$

B. $+3$ and $+4$

C. $+2$ and $+4$

D. $+3$ and $+5$

Answer: B

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7. Lanthanum nitrids on hydrolysis produces

A. HN_3

B. N_2H_4

C. N_2

D. NH_3

Answer: D

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8. Many lanthanides are used to prepare

A. water softeners

B. ceramic materials

C. superconducting materials

D. enzyme catalyst.

Answer: C

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9. Which of the following is not correct regrading lanthanoids ?

A. Neodymium oxide is used as a most poweful liquid lasers lanthanide it in selenium oxychloride

B. If the lanthanide with nf electrons has a pink color, then the lanthanide with (14 - n) f electrons will be colorless.

C. Pr and Nd lanthanoids are used inglass blower's goggles

D. The best single use of lanthanoids is for the production of alloy steels for plates and pipes

Answer: B

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Follow Up Test 6

1. The general valence shell electronic configuration of actinoids is represented by

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

B. $(n-2)f^{1-14}(n-1)d^{1-10}ns^2$

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

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

Answer: D

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2. How many actinoids are radioactive ?

A. Only one

B. 7

C. 14

D. 12

Answer: C

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3. Naturally occurring uranium contains ------- isotopes

A. three

B. four

C. two

D. five

Answer: A

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4. Which of the following is corred ?

A. All the actinides resemble the lanthanoids quite closely

B. Actinides do not exhibit similarity with lanthanides

C. The second half of the actinides resembles the lanthanides quite closely

D. The first half of the actinides resembles the lanthanides

Answer: C

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5. Which of the following actinoids is well known to exhibit $+2$ oxidation state ?

A. Ce

B. No

C. Lr

D. both (2) and (3)

Answer: B

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6. Which of the following is incorrect ?

A. Ionisation enthalpies of the early actionoids are higher than for the early lanthanoids

B. Unlike lanthanoids, actinoids form oxocations

C. Oxides and hydroxides of actinoids are more basis than those of lanthanoids

D. Ion exchange behaviour is exhibited by both actinides and lamnthanides.

Answer: A

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Question Bank Building The Knowledge

1. Oxidation state of in Fe_3O_4 is

A. $3/2$

B. $4/5$

C. $5/4$

D. $8/3$

Answer:

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2. The most durable metal plating on iron to protect it againt corrosion is

A. zinc plating

B. copper plating

C. tin plating

D. nickel plating

Answer: A

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3. The most common and most stable oxidation state for all the elements of titanium family is

A. $+2$

B. $+3$

C. $+4$

D. $+1$

Answer: C

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4. The oxidation number of $+6$ thermodynamically preferred for

A. Cr

B. Mo

C. W

D. both (2) and (3)

Answer: D

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5. Which of the following readily forms compounds over a range of oxidation states that is wider than that of any other common metal ?

A. Bh

B. Mn

C. Re

D. Tc

Answer: B

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6. Which of d-block elements can exhibit the highest possible oxidation state ?

A. Fe

B. Rh

C. Os

D. both (2) and (3)

Answer: D

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7. Which of the following elements is an essential element ?

A. Mt

B. Co

C. Rh

D. Ir

Answer: B

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8. Which of the following is incorrect ?

A. The transition metals react with halogens at elevated temperatures to form halids

B. The reactivity of halogens decreases in the order :

$$I_2 > Br_2 > CI_2 > F_2$$

C. Metals are usually oxidized to their highest oxidation states to form fluorides

D. The lower oxidation states are stabilised in iodides.

Answer: B

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9. Silver halides darken in light owing to ------- , a property which is primarily responsible for their use in photography.

A. oxidation

B. photochemical decomposition

C. reaction with N_2

D. photoelectric effect

Answer: B

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10. The precipitate of AgCI dissolves in an excess of NH_3, KCN and $Na_2S_2O_3$ solution respectively, producing complex ions represented by the following chemical formulae

A. $\left[Ag(NH_3)_2\right]^+$, $\left[Ag(CN)_2\right]^-$ and $\left[Ag(S_2O_3)_2\right]^{3-}$

B. $Ag.\ 2NH_3$, Ag . KCN and AgCI . S_2O_3

C. $\left[Ag(NH_3)_2\right]^{2+}$, $\left[Ag(CN)_2\right]^{2-}$ and $\left[Ag(S_2O_3)_2\right]^{3-}$

D. $\left[Ag(NH_3)_2\right]^{+}$, $\left[Ag(CN)_2\right]^{2-}$ and $\left[Ag(S_2O_3)_2\right]^{3-}$

Answer: A

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11. When a solution of mercuric chloride treated with an excess of stannic chloride it produces, eventually

A. Hg_2CI_2

B. Hg_2SnCI_6

C. Hg

D. $HgCI_4$

Answer: C

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12. Which of the following is not correctly matched ?

A. $Hg_2CI_2 \rightarrow$ calomel

B. $HgCI_2 \rightarrow$ corrosive sublimate

C. $HgS \rightarrow$ Clinnabar

D. $K_2HgI_4 + NH_3 \rightarrow$ Nessler's reagent

Answer: D

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13. The most common oxosalt of copper (II) is blue virtiol.

It has the composition

A. $CuSO_4.4H_2O$

B. $CuSO_4.5H_2O$

C. $CuSO_4.3H_2O$

D. $CuSO_4.H_2O$

Answer: B

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14. How many water molecules in blue vitriol are coordinated to the metal ?

A. Five

B. Four

C. Three

D. Two

Answer: B

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15. If a aqueous solution of copper (II) sulphate is saturated with ammoina, the blue compound -----

crystallises on evaporation.

A. $\left[Cu(NH_3)_4\right]SO_4.\ H_2O$

B. $\left[Cu(NH_3)_6\right]SO_4$

C. $\left[Cu(NH_3)_5H_2O\right]SO_4$

D. $\left[Cu(H_2O)_2(NH_3)_4\right]SO_4$

Answer: A

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16. Which of the following has more number of unpaired d-electrons ?

A. Zn^+

B. Fe^{2+}

C. Ni^{2+}

D. Cu^{+}

Answer: B

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17. $K_2Cr_2O_7$ on heating with aqueous NaOH gives

A. $Cr(OH)_2$

B. $Cr(OH)_3$

C. CrO_4^{2-}

D. Cr^{3+}

Answer: C

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18. Cuprous compounds such as CuCI, CuCN and CuSCN are the only salts stable in water due to

A. high hydration energy of Cu^+ ions

B. their inherent tendency not to disproportionate

C. diamagnetic nature

D. insolubility in water

Answer: D

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19. Stainaless steel contains iron and

A. $Cr + Ni$

B. $Cr + Zn$

C. $Zn + Pb$

D. $Fe + Cr + Ni$

Answer: A

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20. Actinides

A. are synthetic elements

B. include element 104

C. have short lived isotopes

D. exhibit variable valencies

Answer: D

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21. When $(NH_4)_2Cr_2O_7$ is heated, the gas evolved is

A. NO_2

B. N_2

C. O_2

D. N_2O

Answer: B

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22. The common oxidation states of Ti are

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

B. $+2,\ +3$

C. $+3,\ +4$

D. $+3,\ -4$

Answer: C

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23. When $CuSO_4$ is electrolysed, using Pt electrodes

A. copper is deposited at cathode, sulpher is liberates at anode

B. copper is deposited at cathode, oxygen gas is liberated at andoe

C. oxygen gas is liberated at cathode, copper is deposited at anode

D. sulphur is deposited at cathode, oxygen gas is liberated at anode

Answer: B

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24. The general valence shell electronic configuration of transition elements is

A. $(n-1)d^{1-10}ns^{1-2}$

B. $(n-1)d^{0-10}ns^{1-2}$

C. $(n-1)d^{1-10}ns^{0-2}$

D. $(n-1)d^{1-10}ns^{2}$

Answer: C

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25. While extracting an element from its ore, the ore is grind and leached with dil KCN solution to form the

soluble product potassium argentocyanide. The element is

A. Mn

B. Cr

C. Fe

D. Ag

Answer: D

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26. Within each transition series, the oxidation states

A. first increase till the middle of the period and then decrease

B. decrease regularly in moving form left to right

C. first increase till the middle of period and then increase

D. increase regularly in moving from left to right

Answer: A

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27. In which of the following compounds transition metal has zero oxidation stae ?

A. $\left[Fe(CO)_5\right]$

B. $NH_2.NH_2$

C. $NOClO_4$

D. CrO_5

Answer: A

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28. Which of the following d-block elements has the lowest melting point ?

A. Cu

B. Ag

C. Au

D. Pd

Answer: B

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29. In which of the following pairs do the elements have nearly the same densities ?

A. Cr and Fe

B. Zn and Mn

C. Co and Ni

D. Ag and Au

Answer: C

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30. The $(+5)$ oxidation state is by far the most stable and best known for

A. V

B. Nb

C. Ta

D. Ag Nb and Ta

Answer: D

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31. Which of the following elements is sometimes used to protect iron ?

A. Cu

B. Pt

C. Ni

D. Pd

Answer: C

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32. Cigarette smokers absorb significant levels of ----- from tobacco smoke.

A. Cd

B. Zn

C. Hg

D. Cu

Answer: A

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33. Which of the following statement are correct about Cr^{2+} (Z = 24) and Mn^{3+} (Z = 25) ?

(i) Cr^{2+} is a reducing agent

(ii) Mn^{3+} is an oxidizing agent

(iii) Both Cr^{2+} and Mn^{3+} exhibit d^4 configuration

(iv) When Cr^{2+} is used as a reducing agent, the chromium ion attains d^5 electronic configuration

A. (i), (ii), (iii), (iv)

B. (ii), (iii), (iv)

C. (i), (ii), (iii)

D. (ii), (iii)

Answer: C

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34. The color of $KMnO_4$ is due to

A. d-d transition

B. L $\rightarrow$ M charge transfer transition

C. $\sigma - \sigma^*$ transition

D. M $\rightarrow$ L charge transfer transition

Answer: B

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35. Which of the following compounds of silver is soluble in water ?

A. AgF

B. AgCl

C. AgBr

D. AgI

Answer: A

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36. Which of the following silver halides is insoluble in liquor ammonia ?

A. AgF

B. AgCI

C. AgBr

D. AgI

Answer: D

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37. Which of the following silver halides is used in photography chiefly for the production of colloidal emulsion plates ?

A. AgI

B. AgBr

C. AgCl

D. AgF

Answer: A

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38. Which of the following compounds of mercury is commonly known as calomel ?

A. Hg_2F_2

B. Hg_2CI_2

C. Hg_2Br_2

D. Hg_2I_2

Answer: B

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39. Which of the following compounds is known as corrosive sublimate ?

A. $ZnCI_2$

B. $CdCI_2$

C. $HgCI_2$

D. $CuCI_2$

Answer: C

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40. Potassium iodide forms a scarlet precipitate of mercuric iodide when added to mercuric chloride solution. The precipitate of mercuric iodide dissolves in excess of potassium iodide forming a complex

A. K_2HgI_4

B. K_4HgI_6

C. K_3HgI_3

D. $KHgI_2$

Answer: A

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41. On heating at $750^\circ C$, blue virtiol yields

A. $Cu + SO_2 + SO_3$

B. $Cu_2O + SO_3$

C. $CuO + SO_3$

D. $Cu + S + H_2O$

Answer: C

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42. Bordeaux mixture is a mixture of copper sulphate and

A. Pyridine

B. Rochelle salt

C. Lime

D. Sodium oxide

Answer: C

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43. On strong heating, $AgNO_3$ produces the gases

A. NO_2 and NO

B. NO and O_2

C. N_2O and NO

D. NO_2 and O_2

Answer: D

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44. Bell metal is an alloy of

A. $Cu + Ni$

B. $Cu + Zn$

C. $Cu + Sn$

D. $Cu + Pb$

Answer: C

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

A. Am

B. Gd

C. La

D. Eu

Answer: A

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46. Which one of the following may be regarded as an organometallic compound ?

(1) Nickel tetracarbonly (0)

(2) Chlorophyll

(3) $K_3\left[Fe(C_2O_4)_3\right]$

(4) $\left[Co(en)_3\right]CI_3$

A. (i) and (iii)

B. (i), (ii), (iii) and (iv)

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

D. (i) and (ii)

Answer: D

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47. Among the lanthanides the one obtained by synthetic method is

A. Lu

B. Pm

C. Pr

D. Gd

Answer: B

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48. Cinnabar is an ore of

A. Zn

B. Cu

C. Hg

D. Cr

Answer: C

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49. Nitriding is a process of hardening steel by treating it inan atmosphere of

A. NH_3

B. H_2S

C. N_2

D. O_3

Answer: A

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50. Which one of following statements is incorrect ?

A. Metal iron is corroded readily in noist air

B. Argentite is an ore of silver

C. oxidation state of Cr in $K_2Cr_2O_7$ is $+12$

D. Photographic plates and films have an essential ingredient of silver bromide.

Answer: C

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51. Which series of reactions correctly represents chemical rections related to iron and its compounds ?

A. $Fe \xrightarrow[heat]{CI_2} FeCI_3 \xrightarrow[air]{heat} FeCI_2 \xrightarrow{Zn} Fe$

B. $Fe \xrightarrow[heat]{O_2} Fe_3O_4 \xrightarrow[600^\circ C]{CO} FeO \xrightarrow[700^\circ C]{CO} Fe$

C. $Fe \xrightarrow[H_2SO_4]{dil} FeSO_4 \xrightarrow[O_2]{H_2SO_4} Fe_2(SO_4)_3 \xrightarrow{heat} Fe$

D. $Fe \xrightarrow[heat]{O_2} FeO \xrightarrow[H_2SO_4]{dil} FeSO_4 \xrightarrow{heat} Fe$

Answer: B

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52. Consider the following reaction

$$xMnO_4^- + C_2O_4^{2-} + zH^+ \rightarrow xMn^{2+} + 2yCO_2 + \frac{z}{2}H_2O$$

The value of x, y and z in the reaction are respectively

A. 2, 5 and 8

B. 2, 5 and 16

C. 5,2 and 8

D. 5,2 and 16

Answer:

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53. Four successive members of first row transition element are listed belw. Which one of them is expected to have highest $E_{\frac{M^{3+}}{\left(M^{2+}\right)^{\ominus}}}$ value?

A. $Mn(Z=25)$

B. $Fe(Z=26)$

C. $Co(Z=27)$

D. $Cr(Z = 24)$

Answer: C

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54. Which one of the following statements is not correct ?

A. Mercury (II) iodide dissolve in excuess of poptassium iodide solutiuon

B. Tin (IV) chloride is made by dissolving tin solution in concentrated hydrochloric acid

C. Zinc dissolves in sodium hydroxide solution

D. Carbon monoxide reduces iron (III) oxide to iron

Answer: B

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55. Which of the following has been caled the 'wonder metal' ?

A. Ti

B. Zr

C. Hf

D. Rf

Answer: A

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56. Which of the following is a common white pigment ?

A. Cr_2O_3

B. $PbCrO_4$

C. TiO_2

D. CrO_3

Answer: C

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57. Whichj of the following is the third most bioligically important d-block metal after iron and zinc ?

A. Au

B. Ag

C. Cu

D. Co

Answer: C

58. Both chromate and dichromate ions are in dynamic equilibrium st pH

A. 6

B. 8

C. 4

D. 10

Answer: C

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59. Mercuric chloride reacts with aqueous ammonia to form a white precipitate of

A. $Hg(NH_3)_2CI_2$

B. $Hg(NH_2)_2CI_2$

C. $Hg(NH_3)_2CI$

D. $HG(NH_2)CI$

Answer: D

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60. Which of the following elements is responsible for oxidation of water to O_2 in biological processes ?

A. Fe

B. Cu

C. Mn

D. Mo

Answer: C

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61. An aqueous solution of a mixture of two inorganic salts, when treated with dilute HCI, gave a precipitate (P) and a filtrate (Q). The precipitate (P) was found to dissolved in hot water. The filtrate (Q) remained unchanged, when treated with H_2S in a dilute mineral acid medium. However, it gave a precipitatew (R) with H_2S in an ammoniacal medium. The precipitate (R) gave a coloured solution (S), when treated with H_2O_2 in an aqueous NaOH medium. The precipitate (P) contains ------ while the colored solution (S) contains

A. Pb^{2+} , Na_2CrO_4

B. Hg_2^{2+} , $CuSO_4$

C. Hg^{2+} , $ZnSO_4$

D. Ag^{+} , $Fe_2(SO_4)_3$

Answer: A

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62. Which of the following arrangements does not represent the correct order of the property stated against it ?

(i) $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: ionic size

(ii) $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in aqueious solution

(iii) $Sc < Ti < Cr < Mn$: number of oxidation states

(iv) $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$: paramagnetic behaviour

A. (i), (ii), (iii), (iv)

B. (i), (ii), (iii)

C. (ii) and (iv)

D. (ii) and (iii)

Answer: B

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Archives

1. Which one of the following statements related to lanthanons is incorrect ?

A. Europium shows $+2$ oxidation state

B. The basicity decreases as the ionic radius decreases form Pr to Lu.

C. All the lanthanons are much more reactive than aluminium

D. $Ce(+4)$ solution are widely used as oxidizing agent in volumetric analysis.

Answer: B

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

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

B. The solution turn blue

C. The solution is decolourized

D. SO_2 is reduced

Answer: A

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

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

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

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

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

Answer: A

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4. Gadolinium belongsd to 4f series. It's atomic number is 64. which of the following is the correct electronic configuration of gadolinium ?

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

A. $(Fe)C_2O_4$

B. $Fe(NO_2)_2$

C. $FeSO_4$

D. $FeSO_3$

Answer: C

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6. Which is the correct order of increasing energy of the listed orbitals in the atom of titanium ? (At. No. Z = 22)

A. $3s3p3d4s$

B. $3s3p4s3d$

C. $3s4s3p3d$

D. $4s3s3p3d$

Answer: B

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7. Magnetic moments $2.84B.\ M$ is given by :

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

A. Co^{2+}

B. Ni^{2+}

C. Ti^{3+}

D. Cr^{2+}

Answer:

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

A. Liberation of H_2 form steam by iron at high temperature

B. Rusting of iron sheets

C. Decolourization of blue $CuSO_4$ solution by iron

D. Formation of $Fe(CO)_5$ form Fe

Answer: D

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9. Because of lanthnoid contractoin, which of the following pairs of elements have nearly same atomic radii ? (Number in the parentrhesis are atomic numbers)

A. $Zr(40)$ and $Ta(73)$

B. $Ti(22)$ and $Zr(40)$

C. $Zr(40$ and $Nb(41)$

D. $Zr(40)$ and $Hf(72)$

Answer: D

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10. The number of d electrons in Fe^{2+} (atomic number of $Fe = 26$) is not equal to that of the.

A. p- electrons in Ne (Z = 10)

B. s- electrons Mg (Z = 12)

C. p- electrons in CI (Z = 17)

D. d- electrtons in Fe (Z = 26)

Answer: C

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

A. $FeCI_3$, $SnCI_2$

B. $HgCI_2$, $SnCI_2$

C. $FeCI_2$, $SnCI_2$

D. $FeCI_3$, KI

Answer: C

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12. In acidec 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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13. The reaction of aqueus $KMnO_4$ 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

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14. Lanthanoid contraction is caused due to:

A. Negligible screening effect of 'f' orbitals

B. Incresing nuclear charge

C. Decreasing nuclear charge

D. Decreasing screening effect

Answer: A

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15. Which of the following lanthanoid ions is diamagnetic? (Atomic number of $Ce = 58, Sm = 62, Eu = 63, Yb = 70$]

A. Sm^{2+}

B. Eu^{2+}

C. Yb^{2+}

D. Ce^{2+}

Answer: C

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16. $KMnO_4$ 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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17. Which of the following statements about the interstitial compounds is incorrect?

A. They are chemically reactive

B. They much harder than the pure metal

C. They have higher melting points than the pure metal

D. They retain metallic conductivity

Answer: A

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18. Which of the following does not give oxygen on heating ?

A. $Zn(CIO_3)_2$

B. $K_2Cr_2O_7$

C. $(NH_4)_2Cr_2O_7$

D. $KCIO_3$

Answer: C

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19. Identify the alloy containing a non metal as a constitunt in it

A. Invar

B. Steel

C. Bell metal

D. Bronze

Answer: A

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20. Which of the following statements is not true ?

A. On passing H_2S through acidified acidified $K_2Cr_2O_7$ solution, a milky colour is observed

B. $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric anlysis

C. $K_2Cr_2O_7$ solution in acidic medum is orange

D. $K_2Cr_2O_7$ solution because yellow on increasing the pH beyond 7

Answer: B

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

A. $Fe(Z = 26)$

B. $Co(Z = 27)$

C. $Ni(Z = 28)$

D. $Cu(Z = 29)$

Answer: D

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22. Which of the following exhibits only +3 oxidation state?

A. Pa

B. U

C. Th

D. Ac

Answer: D

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

A. their chemical reactivity

B. their magnetic behaviour

C. their unfilled d-orbitals

D. their ability to adopt variable oxidation states

Answer: D

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

A. $TI < V < Mn < Cr$: increasing 2 nd ionization enthlpy

B. $Ti < V < cr < Mn$: increasing number of oxidation states

C. $Ti^{3+} < V^{3+} < Cr^{3+} < Mn^{3+}$: increasing magnetic moment

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

Answer: D

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25. If $n = 6$, the correct sequence for filling of electrons will be.

A. $ns \rightarrow np \rightarrow (n-1)d \rightarrow (n-2)f$

B. $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$

C. $ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$

D. $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$

Answer: D

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26. Acidified $K_2Cr_2O_7$ solution turns green when sodium sulphite is added to it. Explain.

A. $CrSO_4$

B. $Cr_2(SO_4)_3$

C. CrO_4^{2-}

D. $Cr_2(SO_3)_3$

Answer: B

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27. 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. $Cr > Mn > Co > Fe$

B. $Mn > Fe > Cr > Co$

C. $Fe > Mn > Co > Cr$

D. $Co > Mn > Fe > Cr$

Answer: B

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28. which of the following electronts is present as the impurity to the maximum extent in the pig iron?

A. Phosphorus

B. Manganese

C. Carbon

D. Silicon

Answer: C

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

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

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

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

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

Answer: D

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30. Which one of the following ions has electronic configuration $[Ar]3d^6$?

$(At.\ Nos.\ Mn = 25, Fe = 26, Co = 27, Ni = 28)$

A. Co^{3+}

B. Ni^{3+}

C. Mn^{3+}

D. Fe^{3+}

Answer: A

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

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

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

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

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

Answer: C

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32. Which of the following oxidation states is the most common among the lanthanoids ?

A. 4

B. 2

C. 5

D. 3

Answer: D

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33. Which one of the elements with the following outer orbital configuration may exhibit the larger number of oxidation states ?

A. $3d^5 4s^1$

B. $3d^5 4s^2$

C. $3d^2 4s^2$

D. $3d^3 4s^2$

Answer: B

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34. Among TiF_6^{2-}, CoF_6^{3-}, Cu_2C1_2 and $NiC1_4^{2-}$ (At. No. $Ti = 22, Co = 27, Cu = 29, Ni = 28$), the colourless species are -

A. Cu_2CI_2 and $NiCI_4^{2-}$

B. TiF_6^{2-} and Cu_2CI_2

C. CoF_6^{3-} and $NiCI_4^{2-}$

D. TiF_6^{2-} and CoF_6^{3-}

Answer: B

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35. The correct of decreasing second ionisation enthalpy of $Ti(22), V(23), Cr(24)$ and $Mn(25)$ is

A. $Ti > V > Cr > Mn$

B. $Cr > Mn > V > Ti$

C. $V > Mn > Cr > Ti$

D. $Mn > Cr > TI > V$

Answer: B

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36. Which of the following ions is the most stable in aqueous solution ?

$(At.\ No.\ Ti = 22, V = 23, Cr = 24, Mn = 25)$

A. Ti^{3+}

B. Mn^{3+}

C. Cr^{3+}

D. V^{3+}

Answer: C

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37. Identify the incorrect statement among the following:

A. As a result of lanthanoid contraction, the properties of 4d series of the transition elements have no

similarities with the 5d series of elements.

B. Shielding power of 4d electrons is quite weak

C. There is a decrease in the radii of the atoms or ions as one proceeds from La to Lu.

D. Lanthanoid contraction is the accumulation of successive shrinkages

Answer: A

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38. In which of the following paris both the ions are coloured in aqueous solution? (Atomic number, $Sc-21, Ti=22, Ni=28, Cu=29, Co=27$)

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

B. Sc^{3+}, Ti^{3+}

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

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

Answer: A

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39. Copper sulphate solution reacts with KCN to give

(a) $Cu(CN)_2$

(b) $CuCN$

(c) $K_2\left[Cu(CN)_4\right]$

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

A. $Cu(CN)_2$

B. CuCN

C. $\left[Cu(CN)_4\right]^{3-}$

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

Answer: C

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40. More number of oxidation states are exhibited by the actinoids than by the lanthanoids. The main reason for this is

A. more active nature of the actinoids

B. more energy difference between 5d and 6d orbitals than that between 4f and 5d orbitals

C. lesser energy difference between 5d and 6d orbitals than that between 4f and 5d orbitals

D. greater metallic character of the lanthanoids than that of the corresponding actioids

Answer: C

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

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

A. Sc^{3+}

B. Fe^{2+}

C. Ti^{3+}

D. Mn^{2+}

Answer: A

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42. 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. Manganese $(Z = 25)$

C. Chromium $(Z = 24)$

D. Iron $(Z = 26)$

Answer: B

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43. The number of moles of $KMnO_4$ reduced by $1\text{mol of}KI$ in alkaline medium is

A. one

B. two

C. five

D. one fifth

Answer: B

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44. Among K, Ca, Fe and Zn the element which can form more than one binary compound with chlorine is

A. Fe

B. Zn

C. K

D. Ca

Answer: A

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45. Among the following series of transition metal ions the one where all meal ions have $3d^2$ electronic configuration is

A. $Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+}$

B. $Ti^{+}, V^{4+}, Cr^{6+}, Mn^{7+}$

C. $Ti^{+}, V^{4+}, Cr^{6+}, Mn^{7+}$

D. $Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+}$

Answer: D

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46. Lanthanoids are

A. 14 elements in the sixth period (atomic no = 90 to 103) that are filling 4f sublevel

B. 14 elements in the seventh period (atomic no = 90 to 103) that are filling 5f sublevel

C. 14 elements in the 6th period (atomic no = 58 to 71) that are filling the 4f sublevel

D. 14 elements in the 7th period (atomic no = 50 to 71) that are filling the 4f sublevel

Answer: C

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47. The basic character of the transition metal monoxide follows the order

A. $VO > CrO > TiO > FeO$

B. $CrO > VO > FeO > TiO$

C. $TiO > FeO > VO > CrO$

D. $TiO > VO > CrO > FeO$

Answer: D

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48. Which one of the following characteristics of transition metals is associated with their catalytic

activity?

A. High enthalpy of atomization

B. Paramagnetic behaviour

C. Colour of hydrated ions

D. Variable oxidation states

Answer: D

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49. The correct order of ionic radii Y^{3+} , La^{3+} , Eu^{3+} and Lu^{3+} is

$(AT.\ No: Y = 39, La = 57, Eu = 63, Lu = 71)$

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

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

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

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

Answer: D

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50. In the silver plating of copper, $K\left[Ag(CN)_2\right]$ is used instead of $AgNO_3$. The reason is

A. a thin layer of Ag is formed on Cu

B. more voltaga is reqired

C. Ag^+ ions are completely removed form solution

D. less availability of Ag^+ ions, as Cu cannot displace Ag form $\left[Ag(CN)_2\right]^-$ ion.

Answer: D

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51. An atom has electronic configuration $1s^2 2s^2 2p^6 3s^2 3P^6 3d^3 4s^2$. In which group wouold it be placed ?

A. Fifth

B. Fifteen

C. Second

D. Third

Answer: A

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52. General electronic configuration of lanthanides is

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

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

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

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

Answer: A

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53. Which of the following statements is not correct ?

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

B. In lanthanide series ionic of $\ln^{2+}$ ion decreases

C. La is actully an element of transition series rather lanthanide series.

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

Answer: A

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54. Which one of the following forms a colourless solution in aqueous medium ?

(Atomic number : $Sc = 21, Ti = 22, V = 23,$ and $Cr = 24$)

A. V^{3+}

B. Cr^{3+}

C. Ti^{3+}

D. Sc^{3+}

Answer: D

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