CHEMISTRY

BOOKS - DISHA CHEMISTRY (HINGLISH)

THE d-AND f-BLOCK ELEMENTS

Mcq

1. Which one of the elements with the following outer orbital configurations may exhibit the largest 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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2. The addition of excess of aqueous HNO_3 to a solution containing $\left[Cu(NH_3)_4\right]^{2+}$ produces

A. Cu^+

B. $\left[Cu(H_2O_4)\right]^{2+}$

C. $Cu(OH)_2$

D. $Cu(NO_3)_2$

Answer: B

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3. The "spin-only" magnetic moment [in units of Bohr magneton, (μ_B)] of Ni^{2+} in aqueous solution would be (At. NO. Ni=28)

A. 6

B. 1.73

C. 2.84

D. 4.9

Answer: C

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

(i) Cr (VI) is more stable than Mo(VI) and W (VI). (ii) Mo (Yl) and W(VT) are more stable ll1an Cr(Vl). (ili) Higher oxidation states of heavier members of group-6 of transition series are more stable. (iv) Lower

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

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

Answer: B

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5. Of the following outer electronic configurations of atoms, the highest oxidation state is achieved by

which one of them?

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

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

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

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

Answer: D

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6. $(n-1)d^{10}ns^2$ is the general electric configuration of

A. Fe,Co,Ni

B. Cu,Ag,Au

C. Zn,Cd,Hg

D. Se,Y,La

Answer: C

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7. In the following salts the highest value of magnetic moment is observed in

A. $MnSO_4.4H_2O$

B. $CuSO_4.5H_2O$

C. $FeSO_4.6H_2O$

D. $ZnSO_4.7H_2O$

Answer: A

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8. Which one of the following transition metal ions shows magnetic moment of 5.92 BM?

A. Mn^{2+}

B. Ti^{3+}

C. Cr^{3+}

D. Cu^{2+}

Answer: A

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9. Which of the following statements is incorrect?

A. Zn,Cd and Hg due to presence of completely filled d-orbitals $\left[(n-1)d^{10}ns^2\right]$ are not strudied along with other transition metals.

B. Zn, Cd and Hg have low m.p and are comparitively softer than other transition metals

C. Metallic bond made by elements with d^5 configuration is stronger as compared to metallic bond made by elements with d^3 configuration.

D. Metals of 5d series forms strong metallic bonds as compared with metals of3d series.

Answer: A

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10. Super conductors are derived fTom compounds of

A. p-Block elements

B. lanthanides

C. actinides

D. transition elements

Answer: D

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11. Which of the following compounds has colour but no unpaired electrons?

A. $KMnO_4$

B. K_2MnO_4

C. $MnSO_4$

D. $MnCl_2$

Answer: A

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12. What is the percentageoflanthanoid metal in mischmetall?

A. 0.9

B. 0.2

C. 0.05

D. 0.95

Answer: D

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13. Which of the following in its oxidation state shows the paramagnetism?

A. Tb(VI)

B. Lu(III)

C. Co(IV)

D. La(III)

Answer: A

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14. In neutral or faintly alkaline medium, thiosulphate is quantitatively oxidized by $KMnO_4$ is

A. SO_3^{2-}

B. SO_4^{2-}

C. SO_2

D. SO_5^{2-}

Answer: B

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15. Wrought iron, pig iron and steel differ in properties due to

A. carbon content

B. malleability

C. conductivity

D. softness

Answer: A

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16. The lanthanide contraction is responsible for the fact that

A. Zr and Zn have the same oxidation state

B. Zr and Hfhave about the same radius

C. Zr and Nb have similar oxidation state

D. Zr andY have about the same radius

Answer: B

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17. $KMnO_4$ can be prepared from K_2MnO_4 as per the reaction,

$3MnO_4^{2-} + 2H_2O \Leftrightarrow 2MnO_4^{2-} + MnO_2 + 4OH^-$

The reaction can go to completion by removing OH^- ions by adding.

A. KOH

B. CO_2

C. SO_2

D. KCl

Answer: B

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18. On the basis of data given below,

$E^{\circ}_{Sc^{3+}/Sc^{2+}} = -0.37V, E^{\circ}_{Mn^{3+}/Mn^{2+}} = +1.57V$

$E^{\circ}_{Cr^{2+}/Cr} = -0.90V, E^{\circ}_{Cu^{2+}/Cu} = 0.34V$

which of the following statements is incorrect?

A. Sc^{3+} has good stability due to $[Ar]3d^0 4s^0$ configuration

B. Mn^{3+} is more stable than Mn^{2+}

C. Cr^{2+} is reducing in nature.

D. Copper does not give H_2 on reaction wwith dil H_2SO_4

Answer: B

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19. Green vitriol is

A. $FeSO_4.7H_2O$

B. $ZnSO_4.7H_2O$

C. $CaSO_4.2H_2O$

D. $CuSO_4.5H_2O$

Answer: A

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20. Number of moles of $K_2Cr_2O_7$ reduced by one mole of Sn^{2+} ions is

A. $\frac{1}{3}$

B. 3

C. $\frac{1}{6}$

D. 6

Answer: A

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

A. $Co(Z = 27)$

B. Ni(Z=28)

C. Cu(Z=29)

D. Fe(Z=26)

Answer: C

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22. Which of the following factors may be regarded as the main cause of lanthanoide contraction?

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

B. Poorer shielding of5d electrons by 4felectrons

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

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

Answer: B

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23. AgCl is soluble in NHpH solution. The solubility is due to the formation of

A. $AgOH$

B. Ag_2O

C. $\left[Ag(NH_3)_2\right]^+$

D. NH_4Cl

Answer: C

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24. Oxidation states of the metal in the minerals haematite and magnetite, respectively, are

A. II, III in haematite and III in magnetite

B. II, III in haematite and II in magnetite

C. II in haematite and II, III in magnetite

D. III in haematite and II, III in magnetite

Answer: D

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25. In acidic medium $KMnO_4$ oxidises $FeSO_4$ solution. Which of the following statements is correct?

A. 10 mL of 1 N $KMnO_4$ solution oxidises 10 mL of 5 N $FeSO_4$ solution

B. 10 mL of 1M $KMnO_4$ solution oxidises 10 mL of 5 N $FeSO_4$ solution

C. 10 mL of 1 M $KMnO_4$ solution oxidises 10 mL of 1 M $FeSO_4$ solution

D. 10 mL of 1 N $KMnO_4$ solution oxidises 10 mL of 0.1 M $FeSO_4$ solution

Answer: B

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26. In which of the following lanthanides oxidation state +2 is most stable?

A. Ce

B. Eu

C. Tb

D. Dy

Answer: B

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27. Acidified solution of chromic acid on treatment with H_2O_2 gives blue colour which is due to

A. $CrO_3 + H_2O + O_2$

B. $CrO_5 + H_2O$

C. $H_2Cr_2O_7 + H_2O + O_2$

D. none of these

Answer: B

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

A. Only MnO_2

B. Only $KMnO_4$

C. Both MnO_2 and $KMnO_4$

D. Either MnO_2 or $KMnO_4$

Answer: C

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29. An explosion take place when conc. H_2SO_4 is added to $KMnO_4$. Which of the following is formed?

A. Mn_2O_7

B. MnO_2

C. $MnSO_4$

D. M_2O_3

Answer: A

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30. Which of the following statements are correct? (i) Chromium has the highest melting point among the series 1 metals. (ii) Nwnber of unpaired electrons is greater in Cr than other elements of series 1. (iii) In

any row the melting point of transition metal increases as the atomic nwnber increases.

A. (i) and (iii)

B. (i) and (ii)

C. (ii) and (iii)

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

Answer: B

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31. In the laboratory, manganese (II) salt is oxidised to permanganate ion in aqueous solution by

A. hydrogen peroxide

B. cone. nitric acid

C. peroxodisulphate

D. dichromate

Answer: C

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

A. They are chemically reactive.

B. They are much harder then the pure metal.

C. They have higher melting points than the pure metal

D. They retain metallic conductivity

Answer: A

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

A. Eu

B. Ld

C. Gd

D. Am

Answer: D

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34. Identify the product and its colour when MnO_2 is fused with solid KOH in the presence of O_2.

A. $KMnO_4$, purple

B. K_2MnO_4, dark green

C. MnO, colourless

D. Mn_2O_3, brown

Answer: B

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35. In the extraction ofsilverfrom argentite ore. The ore is treated with dil. solution of NaCN in water in the presence of Y, whereby the following reaction takes place :

$Ag_2X + 4NaCN + 2Y \rightarrow 2Na\left[Ag(CN)_2\right] + Na_2XO_4$

. X and Y in this reaction are respectively:

A. Sb ans S

B. S and O_2

C. O and O_2

D. O and S

Answer: B

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36. Which of the following compound is called Turnbull's blue?

A. Ferricyanide

B. Ferrous ferricyanide

C. Ferrous cyanide

D. Ferri-ferrocyanide

Answer: B

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37. Which of the following element is responsible for oxidation of water to O_2 in biological process?

A. Fe

B. Mn

C. Cu

D. Mo

Answer: B

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38. Consider the following statement

(i) $La(OH)_3$ is the least basic among hydroxides of lanthanides.

(ii) Zr^{4+} and Hf^{4+} posses almost the same ionic radii.

(iii) Ce^{4+} can act as an oxidizing agent.

Which of the above is/are true?

A. (i) and (iii)

B. (ii) and (iii)

C. (ii) only

D. (i) and (ii)

Answer: B

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39. For making Ag and $AgNO_3$, which of the following is used

A. pH_3

B. phosphonium iodide

C. Na_2CO_3

D. NH_3

Answer: A

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40. Which of the following conversions can be carried out by both acidified $K_2Cr_2O_4$ and acidified $KMnO_4$?

(i) $Fe^2 \rightarrow Fe^{3+} + e^-$

(ii) $I^- \rightarrow IO_3^-$

(iii) $I^- \rightarrow I_2$

(iv) $H_2S \rightarrow S$

A. (i) and (iii)

B. (ii) and (iv)

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

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

Answer: C

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

A. their magnetic behaviour

B. their unfilled dorbitals

C. their ability to adopt variable oxidation state

D. their chemical reactivity

Answer: C

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42. The basic character of the transition metal monoxides follows the order (AtomicNos.,Ti = 22, V=23, Cr= 24, Fe=26)

A. TiOgt VOgtCrOgt Fe

B. YOgtCrOgtTiOgt FeO

C. CrOgtYOgtFeOgtTiO

D. TiOgtFeOgtYOgtCrO

Answer: A

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43. Excited state configuration of Mn^{2+} is

A. t_{2g}^4

B. $t_{2g}^3 c_g^2$

C. $t_{2g}^4 c_g^2$

D. $t_{2g}^5 c_g^0$

Answer: B

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

A. $Cr_2O_7^{2-}$ and H_2O are formed

B. CrO_4^{2-} is reduced to +3 state of Cr

C. CrO_4^{2-} is oxidized to +7 state of Cr

D. Cr^{3+} and $Cr_2O_7^{2-}$ are formed

Answer: A

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