CHEMISTRY

JEE MAIN AND ADVANCED

Mock test 27

Example

1. The coordination number of a metal in coordination compound is

A. Same as primary valency

B. Sum of primary and secondary valencies

C. Same as secondary valency

D. Twice the primary valency

Answer: C

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2. Which of the following complexes has six coordination number?

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

B. $\left[Co(en)_2Cl_2\right]^{+}$

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

D. $\left[Ni(NH_3)_4\right]^{2+}$

Answer: B

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3. Which of the following ligands forms chelate with metal ion?

A. Acetate

B. Oxalate

C. Cyanide

D. Ammonia

Answer: B

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4. An example of ambidentate ligand is

A. H_2O

B. NO_2^-

C. $NH_2CH_2CH_2NH_2$

D. NH_3

Answer: B

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5. When two moles of $\left[Co(NH_3)_5Cl\right]Cl_2$ is treated with excess silver nitrate solution, the number of moles of

silver chloride formed is

A. 3

B. 6

C. 4

D. 2

Answer: C

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6. In solution, the complex, $\left[Pt(NH_3)_6\right]Cl_4$ gives

A. 4 ions

B. 3 ions

C. 2 ions

D. 5 ions

Answer: D

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7. As per IUPAC nomenclature, the name of the complex, $\left[Co(H_2O)_4(NH_3)_2\right]Cl_3$ is

A. Tetraaquadiaminecobalt (III) chloride

B. Tetraaquadiamminecobalt (III) chloride

C. Diaminetetraaquacobalt (III) chloride

D. Diamminetetraaquacobalt (III) chloride

Answer: D

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8. The IUPAC name of $\left[Ni(NH_3)_4\right]\left[NiCl_4\right]$ is

A. Tetrachloridonickel (II) tetraamminenickel (II)

B. tetraamminenickel (II) Tetrachloridonickel (II)

C. tetraamminenickel (II) Tetrachloridonickelate (II)

D. tetraamminenickel (Iv) Tetrachloridonickelate (Iv)

Answer: C

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9. The ionization isomer of $\left[Cr(H_2O)_4Cl(NO_2)\right]Cl$ is

A. $\left[Cr(H_2O)_4(NO_2)\right]Cl_2$

B. $\left[Cr(H_2O)_4Cl_2\right]NO_2$

C. $\left[Cr(H_2O)_4Cl(ONO)\right]Cl$

D. $\left[Cr(H_2O)_3Cl_2(NO_2)\right]H_2O$

Answer: B

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10. The primary valence of the metal ion in the coordination compound $K_2\left[Ni(CN)_4\right]$ is

A. Four

B. Zero

C. Two

D. Six

Answer: C

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11. Which among the following is a polydentate ligand?

A. Oxalate

B. Ethane-1, 2-diamine

C. $EDTA^{4-}$

D. SCN^{-}

Answer: C

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12. Which one of the following will give a white precipitate with $AgNO_3$ in aqueous medium

A. $\left[Co(NH_3)_5Cl\right](NO_2)_2$

B. $\left[Pt(NH_3)_2Cl_2\right]$

C. $[Pt(en)Cl_2]$

D. $\left[Pt(NH_3)_4\right]Cl_2$

Answer: D

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13. Which kind of isomerism is exhibited by octahedral $[Co(NH_3)_4Br_2]CI$? .

A. Geometrical and inoization

B. Geometrical and optical

C. Optical and ionization

D. Only geometrical

Answer: A

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14. The optically active co-ordination complex ion among the following is

A. $Trans - \left[Co(en)_2Cl_2\right]^+$

B. $Cis - \left[Co(en)(NH_3)_2Cl_2\right]^+$

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

D. $\left[Co(NH_3)_4Cl_2\right]^+$

Answer: B

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15. The number of possible isomers of a square planar complex, [mabcd] is/are

A. 4

B. 3

C. 2

D. 1

Answer: B

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16. The complex ion having minimum magnitude of $\triangle_o$ (CFSE) in octahedral field is

A. $[CoCl_6]^{3-}$

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

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

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

Answer: A

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17. The number of unpaired electrons in central metal of cobalt ferrocyanide, $Co_2\left[Fe(CN)_6\right]$ is

A. 0

B. 2

C. 1

D. 3

Answer: A

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18. Geometrical shapes of the complexes formed by the reaction of Ni^{2+} with Cl^{-} , and CN^{-} , respectively are

A. Octahedral, tetrahegral and square planar

B. Tetrahegral, Octahedral and square planar

C. Square planar, tetrahegral and octahedral

D. Octahedral, square planar and tetrahegral

Answer: B

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19. The compound which does not show paramagnetism is

A. $\left[Cu(NH_3)_4\right]Cl_2$

B. $\left[Ag(NH_3)_2\right]Cl$

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

D. $[CoF_6]^{3-}$

Answer: B

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20. The shape of $\left[Cu(NH_3)_4\right]^{2+} is \square planar$, Cu^(2+)` in this complex is

A. sp^3 hybridised

B. dsp^2 hybridised

C. sp^3d hybridised

D. sp^3d^2 hybridised

Answer: B

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21. What is the geometrical shape of complex and hybridisation of central metal in $\left[Fe(CO)_5\right]$?

A. Tetrahedral, sp^3

B. Square planar, dsp^2

C. Trigonal bipyramidal, dsp^3

D. Trigonal bipyramidal, sp^3d

Answer: C

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22. Out of the following, choose a correct statement.

A. [Cu(NH_3)_6]^(2+)` is a colourless ion

B. [Zn(H_2O)_6]^(2+) ` ion is blue coloured

C. [Ni(CO)_4] ` ion has a square planar shape

D. If $\left[CoCl(NH_3)_5\right]^{2+}$ absorbs yellow colour of light, then the colour of this coordination entity is violet.

Answer: D

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23. The magnetic moment of a transition metal of 3d series is $\sqrt{48}$ B.M. It`s electronic configuration is

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

B. $3d^6 4s^1$

C. $3d^6 4s^2$

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

Answer: B

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24. Crystal field stabilization energy for high spin d^4 octahedral complex is

A. $-0.6\ \triangle_o$

B. $-1.8\ \triangle_o$

C. -1.6 triangle_circ + p`

D. $-1.2\ \triangle_o$

Answer: A

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25. High spin complex of d^6 configuration in an octahedral field will have the CFSE equal to

A. $\frac{-12}{5}\ \triangle_o$

B. $\frac{-14}{5}\ \triangle_o$

C. $\frac{-41}{5}\ \triangle_o$

D. $\frac{-2}{5}\ \triangle_o$

Answer: D

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26. The hybridized state of Al^{3+} in the complex ion formed when $AlCl_3$ is treated with aqueous acid is

A. sp^3

B. dsp^2

C. sp^3d^2

D. sp^2d

Answer: C

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27. Which of the following complexes is an inner orbtial complex ?

A. $[FeF_6]^{3-}$

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

C. $[Ni(H_2O)_6]^{2+}$

D. $[Mn(CN)_6]^{3-}$

Answer: D

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28. Which of the following pairs does not exhibit colour in solution ?

A. $ZnCl_2, HgCl_2$

B. $CuCl_2, VOCl_2$

C. $VOCl_2, FeCl_2$

D. $MnCl_2, FeCl_3$

Answer: A

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29. Which of the following complexes will show jahn-Teller distortion?

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

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

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

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

Answer: A

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30. Out of the following, choose a correct expression for finding out the cystal field stabilization energy in tetrahedral coordination entities.

A. (## AAK_MCP_27_NEET_CHE_E27_030_A001 .png" width="30%">

B. (## AAK_MCP_27_NEET_CHE_E27_030_A002 .png" width="30%">

C. (## AAK_MCP_27_NEET_CHE_E27_030_A003 .png" width="30%">

D. (## AAK_MCP_27_NEET_CHE_E27_030_A004 .png"

width="30%">

Answer: C

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31. The homoleptic complex is

A. $\left[Co(NH_3)_4Cl_2\right]^+$

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

C. $\left[Ni(NH_3)_4Cl_2\right]$

D. $\left[Fe(NH_3)_4Cl_2\right]^+$

Answer: B

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32. Which of the following is not a metal carbonyl?

A. $Ni(CO)_4$

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

C. $Mn_2(CO)_{10}$

D. $Fe(CO)_5$

Answer: B

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33. In which of the following carbonyls, the bond length of CO is the highest ?

A. $\left[V(CO)_6\right]^-$

B. $\left[Cr(CO)_6\right]$

C. $\left[Mn(CO)_6\right]^+$

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

Answer: D

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34. The number of bridging CO groups in $\left[Co_2(CO)_8\right]$ and $\left[Fe(CO)_5\right]$ are respectively

A. 2, 0

B. 1, 1

C. 1, 0

D. 2, 1

Answer: A

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35. The addition of four amine groups to a metal ion $\left(X^{2+}\right)$ shows a stability constants of $2 \cdot 10^4$, $1.5 \cdot 10^3$, $1.2 \cdot 10^2$ and $1.4 \cdot 10^1$ respectively. Then, the overall complex dissociation equlolibrium constant for $\left[X(NH_3)_4\right]^{2+}$ ion is

A. 5.04 * 10^(-10)`

B. 19.8 * 10^(-10)`

C. 1.98 * 10^(-11)`

D. 50.4 * 10^(-9)`

Answer: C

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36. Excess of copper and iron are removed mainly by which of the following chelating ligands via formation of coordination compounds?

A. Desferrioxime-B and EDTA respectively

B. EDTA and D-penicillamine respectively

C. Desferrioxime-B and D-penicillamine respectively

D. D-penicillamine and Desferrioxime B-respectively

Answer: D

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37. Ethylidene chloride is a/an

A. Gem-dihalide

B. Allylic halide

C. Vinylic halide

D. Vic-dihalide

Answer: A

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38. Which of the following will not lead to the formation of an alkyl halide?

A. 

B. 

C. 

D. 

Answer: D

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39. F_3C-CH=CH_2 overset(HBr)(rarr) (A) overset(NaI) underset(dry acetone)(rarr) (B) `

A. F_3C-CH(Br)-CH_3 and F_3C-CH(I)-CH_3`

B. F_3C-CH_2-CH_2Br and F_3C-CH_2-CH_2 I`

C. $BrF_2C - CH = CH_2$ and $IF_2C - CH = CH_2$

D.

$BrF_2C - CH_2 - CH_2Br$ and $IF_2C - CH_2 - CH_2I$

Answer: B

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40. In the reaction $C_2H_5OH + HX \xrightarrow{Zncl_2} C_2H_5X + H_2O$. The order of reactivity of HX is

A. Hl gt HBr gt HCl

B. HCl gt HBr gt Hl

C. HCl gt Hl gt HBr

D. HBr gt Hl gt HCl

Answer: A

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41. CH_3-C-= CH + Br_2 overset (Ccl_4)(rarr)(A)` The product (A) is

A. (## AAK_MCP_27_NEET_CHE_E27_043_A001 .png" width="30%">

B. (## AAK_MCP_27_NEET_CHE_E27_043_A002 .png" width="30%">

C. (## AAK_MCP_27_NEET_CHE_E27_043_A003 .png" width="30%">

D. $CH_3 - CH_2 - CHBr_2$

Answer: B

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42. Among the following halide ions $\left(X^{-}\right)$ reaction, which is feasible is?

A.

$$x^{-} + CH_3 - CH_2 - H \rightarrow CH_3 - CH_2 - X + H^{-}$$

B. (## AAK_MCP_27_NEET_CHE_E27_044_A002 .png" width="30%">

C. $x^{-} + CH_3 - CH_3 \rightarrow CH_3 - X + \overline{C}H_3$

D. $x^{-} + CH_3 - OH \rightarrow CH_3 - X + \overline{O}H$

Answer: B

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43. The numberof all possible products excluding stereoisomers obtained on monochlorination of n-butane and iso-butane are respectively

A. 2 and 3

B. 3 and 2

C. 2 and 1

D. 2 and 2

Answer: D

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