# UNIT TEST-05

## Subject : Chemistry

## Class : XII

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Q.1** (1) | **Q.2** (4) | **Q.3** (2) | **Q.4** (1) | **Q.5** (3) | **Q.6** (4) | **Q.7** (3) | **Q.8** (4) | **Q.9** (1) | **Q.10** (3) |
| **Q.11** (1) | **Q.12** (2) | **Q.13** (4) | **Q.14** (3) | **Q.15** (2) | **Q.16** (4) | **Q.17** (2) | **Q.18** (3) | **Q.19** (4) | **Q.20** (2) |
| **Q.21** (3) | **Q.22** (2) | **Q.23** (3) | **Q.24** (2) | **Q.25** (4) | **Q.26** (2) | **Q.27** (3) | **Q.28** (4) | **Q.29** (3) | **Q.30** (3) |
| **Q.31** (2) | **Q.32** (1) | **Q.33** (4) | **Q.34** (3) | **Q.35** (3) | **Q.36** (1) | **Q.37** (1) | **Q.38** (4) | **Q.39** (1) | **Q.40** (4) |
| **Q.41** (1) | **Q.42** (3) | **Q.43** (1) | **Q.44** (4) | **Q.45** (4) | **Q.46** (2) | **Q.47** (4) | **Q.48** (4) | **Q.49** (1) | **Q.50** (2) |

**Q.1** (1)

Assertion and Reason true and R is the correct explanation of A.

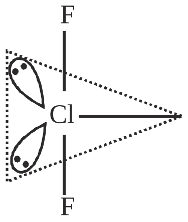
**Q.2** (4)

**Q.3** (2)

All halogens are coloured due to the absorption of different quanta of radiation in visible region. This results in excitation of outer electrons to higher energy level which gives colour of the halogen. $Cl_2$ is a greenish yellow gas.

**Q.4** (1)

$ClF_3$ has $sp^3d$ hybridization



**Q.5** (3)

$$XeF_6 \xrightarrow{3H_2O} XeO_3 + 6HF$$

**Q.6** (4)

Hg does not have abnormal electronic configuration.

**Q.7** (3)

Order of melting point Mn < Ti < V < Cr

**Q.8** (4)

Only those transition metal ions which contain unpaired electrons, are coloured. Since colour appears when the unpaired *d*-electron absorb energy and gets excited to the higher energy *d*-orbital. Hence, the reason of appearance of colour is *d*-*d* transition.

**Q.9** (1)

The aqueous solution of $CuSO_4$ consist of the complex $[Cu(H_2O)_4]^{2+}$ ion which absorbed in orange -red and impart deep blue colouration to solution.

**Q.10** (3)

Spin only magnetic moments depend upon the number of unpaired electrons, more the number of unpaired electron, greater will be the spin only magnetic moment.

${}_{25}Mn = 1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^5 4s^2$

$Mn^{2+} = 1s^2, 2s^2\ 2p^6, 3s^2 3p^6\ 3d^5, 4s^0$

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |

Number of unpaired electrons=5

${}_{24}Cr = 1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^5, 4s^1$

$Cr^{2+} = 1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^4, 4s^0$

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |

Number of unpaired electron=4

$23V = 1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^3, 4s^2$

$V^{2+} = 1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^3, 4s^0$

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | | |

Number of unpaired electrons =3

So, the correct order of spin only magnetic moment is $Mn^{2+} > Cr^{2+} > V^{2+}$

**Q.11** (1)

$\mu = \sqrt{n(n+2)}$ ; $3d^5$ has maximum, 5 unpaired electrons so it will have highest magnetic moment.

**Q.12** (2)

Magnetic moment depends upon number of unpaired electrons. In $Sc^{3+}$, there is no unpaired electron. So, its effective magnetic moment is zero.

**Q.13** (4)

**Q.14** (3)

Acidified potassium dichromate is oxidized to unstable blue chromium peroxide, which is soluble in ether and produces blue coloured solution

$$K_2Cr_2O_7 + H_2SO_4 + 4H_2O_2 \rightarrow \underset{\text{blue colour}}{2CrO_5} + K_2SO_4 + 5H_2O$$

**Q.15** (2)

$$4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8CO_2$$

(yellow)

**Q.16** (4)

Cobalt (60) isotope is used in the treatment of cencer.

**Q.17** (2)

$$Fe^{+3} + (SCN^-) \rightleftharpoons [Fe(SCN)]^{2+}$$

$$K_c = \frac{[Fe(SCN)]^{2+}}{[Fe^{+3}][SCN^-]}$$

The Red colour will increased in the reaction by formation of $[Fe(SCN)]^{2+}$ So By adding KSCN red colour increased

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**Q.18** (3)

As the atomic number increases in lanthanides due to very weak sheilding effect, Zeff increases and radius decreases.

**Q.19** (4)

$^{175}_{71}Lu$

Z - no. of proton = 71

(atomic no.)

no. of electron = 71 ( neutral atom)

no. of neutron = 175 - 71 = 104

**Q.20** (2)

$Ni(CO)_4$ has a O.N. zero for Ni

**Q.21** (3)

$BF_3$ is an electron deficient compound and acts as Lewis acid hence it cannot donate a pair of electrons and does not act of ligand.

**Q.22** (2)

**Q.23** (3)

IUPAC Name of $[Ni(en)Br_2(PPh_3)_2]$ is ⇒ Dibromido ethylenediamine bis (triphenyl - phosphine) nickel (II)

**Q.24** (2)

Primary and secondary

**Q.25** (4)

central metal/ion in coordination entities are generdly referred as lewis acid because it has vacant orbital to accept lone pair from the ligand.

**Q.26** (2)

Effective atomic number (EAN) =Atomic no. of metal -Oxidation no.+ Coordination no.×2

For$[CoF_6]^{2-}$ , the oxidation state of cobalt is 4.

EAN = (27 – 4) + 6 × 2

=23 + 12 = 35

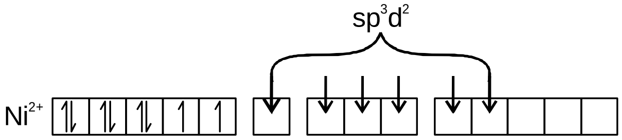
**Q.27** (3)

**Q.28** (4)

From VBT we can predict the hybridisation of central metal ion under the influence of ligand

**Q.29** (3)

$[Ni(NH_3)_6]^{+2}$



$Ni^{+2}$, $sp^3d^2$

paramagnetic (2.8 B M)

**Q.30** (3)

excess KCN is added to an aqueous solution of copper sulphate a complex of copper $[Cu(CN)_4]^{2-}$ is obtained which is paramagnetic. chelating complex generally more stable. the stability of co-ordination compounds can be related to gibbs energy, ehthalpy and entropy. CFT does not include covalent character into account of coordination compounds while it include ionic character.

**Q.31** (2)

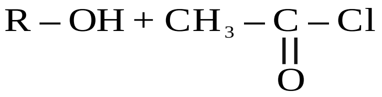
**Q.32** (1)

As positive charge on the central metal atom increases, the less readily the metal can donate electron density into the $\pi^*$ orbials of CO ligand (donation of electron density into $\pi^*$ orbitals of CO result in weakening of C – O bond). Hence, the C – O bond would be strongest in $[Mn(CO)_6]^+$.

**Q.33** (4)

Schiff 's Test, fehling's test and Tollen's Test are only given by aldehyde not only ketone.

**Q.34** (3)



$$R-OH + CH_3-\underset{\underset{O}{\|}}{C}-Cl$$

Acetyl chloride

Here $e^{\oplus}$ is $No_2^{\oplus}$ (Nitroniumion)

**Q.35** (3)

**Q.36** (1)

Lesser the electronegativity difference between the two bonded atom, higher is the covalent character. Since the electronegativity difference between N & Cl is minimum, $NCl_3$ has maximum covalent character, N is more electronegative then P, As and Sb.

**Q.37** (1)

Ti $^{+4}$ is not coloured Because d –d Transition is not possible .

**Q.38** (4)

Magnetic moment (u) = $\sqrt{n(n+2)}$

n →no. of unpaired electron

$5.92 = \sqrt{n(n+2)}$

$= \sqrt{n(n+2)} = \sqrt{35}$

n = 5

**Q.39** (1)

Oxide of Mn in its intermediate oxidation state i.e., +4 is $MnO_2$. This is amphoteric in character.

**Q.40** (4)

In 7th period, coinage metal is Rontegen (Rg)

**Q.41** (1)

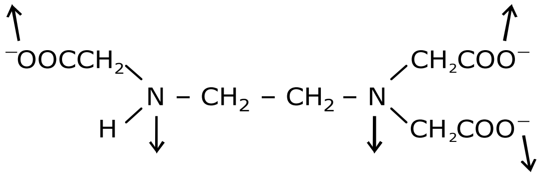
3 moles white ppt. ⇒ 3moles of AgCl

⇒ $3Cl^-$ are outside the coordination sphere

⇒ Primary valency = 3

⇒ 6 $NH_3$ are co-ordinated with Co, in the coordination sphere = Secondary valency = 6.

**Q.42** (3)



Ethylene diamine triacetate ion

**Q.43** (1)

$Fe(CN)_2 + 4KCN \longrightarrow Fe(CN)_2.4\,KCN \rightleftharpoons 4K^+ + [Fe(CN)_6]^{4-}$

It gives test of $K^+$ but does not give test of $Fe^{2+}$. These type of salts which do not lose their identity when dissolved in water are called complexes.

**Q.44** (4)

**Q.45** (4)

$[Ni(NH_3)_2Cl_2]$

$Ni^{2+} \rightarrow d^8$ $sp^3$ hybridisation

Tetrahedral complex

$[Ni(NH_3)_2Cl_2] \rightarrow$ cannot show isomerism.

$[Pt(NH_3)_2Cl_2] \rightarrow dsp^2 \rightarrow$ shows geometrical isomerism

$[Ni(NH_3)_4(H_2O)_2]^{2+} \rightarrow$ Octahedral → show geometrical isomerism

(3) $[Ni(en)_3]^{2+} \rightarrow$ Octahedral → shows optical isomerism

**Q.46** (2)

**Q.47** (4)

CO is called π-acid ligand. In metal carbonyl complexes, there is donation of an electron pair from carbon to the empty orbital of metal and then simultaneously a back π-bonding is formed by sideways overlap of a filled orbital on the metal with empty antibonding $\pi^*_{2py}$ orbital of CO.]

**Q.48** (4)

**Q.49** (1)

$K_2[HgI_4] \longrightarrow$ Nessler's Reagent

**Q.50** (2)

$CH_3COONa + FeCl_3 \rightarrow [Fe(OH)_2(CH_3COO)]$

Iron (III) dihydroxy actate

(Blood Red colour)