

TEST INFORMATION

DATE : 15.04.2015

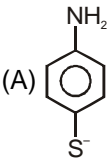
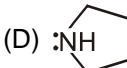
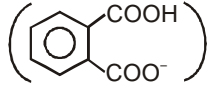
PART TEST-01 (PT-01)

Syllabus : Mole concept, Equivalent Concept, Ionic equilibrium, Electrochemistry, Inorganic Nomenclature, Periodic table, Chemical bonding and Coordination compounds.

DPP No. # 02 (JEE-ADVANCED)
Total Marks : 169
Max. Time : 118 min.

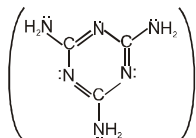
Single correct Objective ('-1' negative marking) Q.1 to Q.15	(3 marks, 2 min.)	[45, 30]
One or more correct objective (no negative marking) Q.16 to Q.20	(4 marks, 2 min.)	[20, 10]
Single digit integer type ('-1' negative marking) Q.21 to Q.29	(4 marks, 3 min.)	[36, 27]
Assertion and Reason ('-1' negative marking) Q.30 to Q.32	(3 marks, 3 min.)	[09, 09]
Comprehension ('-1' negative marking) Q.33 to Q.41	(3 marks, 2 min.)	[27, 18]
Match the Listing (no negative marking) Q.42	(8 marks, 6 min.)	[08, 06]
Match the Following (no negative marking) Q.43 to Q.45	(8 marks, 6 min.)	[24, 18]

- During the complete combustion of ethene C_2H_4 , what change in hybridisation does the carbon atom undergo ?
 (A) sp^3 to sp (B) sp^3 to sp^2 (C) sp^2 to sp (D) sp^2 to sp^3
- Which of the following substances does not exhibit H-bonding with water ?
 (A) CH_3CH_2OH (B) $CH_3-C(=O)-OH$ (C) $CH_3-CH_2-CH_3$ (D) $N(CH_3)_3$
- In which of the following pairs, the number of lone pair(s) and molecular geometry is same ?
 (A) $TeCl_4$, PCl_4^+ (B) ClF_3 , PCl_3 (C) $SiCl_4$, BF_4^- (D) BrF_5 , XeF_5^-
- In which of the following, the π -bonds can lie necessarily in same plane ?
 (A) $Cl-C \equiv C-Cl$ (B) $O=C=O$ (C) $H-C \equiv C-C \equiv C-H$ (D) N_2
- What is the maximum number of electrons which can be accommodated in an atom in which the highest principal quantum number is 4 ?
 (A) 10 (B) 18 (C) 36 (D) 54
- The ligand $N(CH_2CH_2NH_2)_3$ is :
 (A) tridentate (B) tetradentate (C) didentate (D) pentadentate
- The correct name for the complex $[Pt(NH_3)_2Cl_4]$, which has maximum planes of symmetry is :
 (A) cis-platinum tetrachlorodiammine (B) trans-platinum tetrachlorodiammine
 (C) trans-Diamminetetrachloroplatinum(IV) (D) cis-Diammine tetrachloroplatinum (IV)
- Which of the following pairs of coordination compound shows same type of isomerism ?
 (A) $[Co(NH_3)_5Br]SO_4$ and $[Ni(dmg)_2]$ (B) $[Pt(NH_3)_2Cl_2]$ and $[Co(en)_2BrCl]Cl$
 (C) $[Co(NH_3)_6][Cr(CN)_6]$ and $K[PtCl_3(C_2H_4)]$ (D) $[Ni(en)_3]^{2+}$ and $[Pt(en)_2]^{2+}$
- The correct electronic configuration for $[CrF_6]^{4-}$ will be :
 (A) $t_{2g}^4 e_g^0$ (B) $e^2 t^2$ (C) $t_{2g}^3 e_g^1$ (D) $e_4 t^0$
- 4-nitrophenyl hydrazine is an example of :
 (A) a tridentate ligand (B) a bidentate ligand
 (C) a monodentate ligand (D) a tetradentate ligand

11. What is the coordination number of La in the compound $[\text{La}(\text{EDTA})(\text{H}_2\text{O})_4] \cdot 3\text{H}_2\text{O}$
 (A) 6 (B) 8 (C) 10 (D) 12
12. Which among the following will be named as dibromobis(ethylenediamine)chromium (III) bromide ?
 (A) $[\text{Cr}(\text{en})_2\text{Br}_2] \text{Br}_2$ (B) $[\text{Cr}(\text{en})_2\text{Br}_2]\text{Br}_3$ (C) $[\text{Cr}(\text{en})_2\text{Br}_2] \text{Br}$ (D) $[\text{Cr}(\text{en})_2\text{Br}_3]$
13. $\text{C}_6\text{H}_5-\overset{\text{O}}{\parallel}\text{C}-\overset{\ominus}{\text{CH}}-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$ is called benzoylacetato. Bis(Benzoylacetato)beryllium will show :
 (A) structural isomerism (B) geometrical isomerism
 (C) optical isomerism (D) None of these
14. In which of the following pairs of elements the electronegativity of the first element is less than that of second element ?
 (A) Al, Ga (B) Li, K (C) Cl, S (D) F, Cl
15. Which of the following can not show linkage isomerism ?
 (A)  (B) NO_2^- (C) OCN^- (D) N_3^-
16. Which among the following is stronger lewis bases than $\text{HN}(\text{SiH}_3)_2$?
 (A) NH_3 (B) $\text{H}_2\text{N}(\text{CH}_3)$ (C) $\text{H}_2\text{N}(\text{SiH}_3)$ (D) 
17. In which of following silicate, the number of corner shared per tetrahedron is ≥ 2 ?
 (A) Four membered cyclic silicate (B) Pyrosilicate
 (C) Chain silicate (D) 2-D silicate
18. Which of the following is/are correct ?
 (A) vander Waal's radius of iodine is more than its covalent radius
 (B) All isoelectronic ions belong to the same period of periodic table
 (C) First ionisation energy of Be is more than that of C
 (D) Electron affinity of N as well as noble gases is negative.
19. How many nodal surface can be present in the molecular orbital formed by the overlap of s and p_x (x axis is the molecular axis)?
 (A) 2 (B) 1 (C) 3 (D) None of these
20. Which of the following show intramolecular hydrogen bonding ?
 (A) salicylaldehyde (B) O-nitrotoluene
 (C) p-nitrophenol (D) hydrogenphthalate ion 
21. How many types of C–O bond length are present in $\text{CH}_3-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_2-\underset{\text{OH}}{\underset{|}{\text{CH}}}-\overset{\text{O}}{\parallel}\text{C}-\text{O}^\ominus$?
22. How many of the following compound can be optically active ?
 (a) $[\text{Co}(\text{en})_2\text{ClBr}]$ (b) $[\text{Co}(\text{en})(\text{NH}_3)_2\text{Cl}_2]^+$ (c) $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]^+$ (d) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$
 (e) $[\text{Co}(\text{en})_3]^{3+}$ (f) $[\text{Ni}(\text{dmg})_2]$ (g) $[\text{Pb}(\text{EDTA})]^{2-}$ (h) $[\text{Cr}(\text{ox})_2(\text{dmg})]^{2-}$
 (i) $[\text{Cr}(\text{dmg})_3]$
23. The sum of oxidation state of Co and Cr in the following complex is : $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{NH}_3)_2\text{Cl}_4]_3$
24. How many of the following species use d_{z^2} orbital in their hybridization ?
 (a) $[\text{Ni}(\text{CN})_4]^{2-}$ (b) $[\text{CoBr}_4]^{2-}$ (c) NH_4Cl (d) XeF_4
 (e) $[\text{Cr}(\text{NH}_3)_6]^{2+}$ (f) $[\text{Cu}(\text{NH}_3)_4]^{2+}$ (g) $[\text{FeF}_6]^{3-}$ (h) I_3^-
25. Find total number of N–Cr–O bond angles in tris(glycinato)chromium (III).
26. Find the value of x + y where x and y indicate number of H atoms in $\text{H}_x\text{Fe}(\text{CO})_4$ and $\text{H}_y\text{Re}(\text{CO})_5$ respectively. (EAN rule is followed).

27. How many of the following relations is/are correct ?
- (a) $\text{Mg} > \text{Al}$ (electropositive character) (b) $\text{Al} > \text{Ga}$ (electronegativity)
 (c) $\text{N}^+ > \text{N}$ (ionization energy) (d) $\text{Se} > \text{S}$ (magnitude of $\Delta_{\text{eg}} H$)
 (e) $\text{He}^+ > \text{H}$ (Atomic size) (f) $\text{O}_2^{2-} < \text{O}_2$ (paramagnetic nature)
 (g) $\text{C}_2 > \text{N}_2$ (Number of π bonds) (h) $\text{F}_2 > \text{B}_2$ (bond order)
 (i) $\text{B}_2 > \text{F}_2$ (bond length) (f) $\text{NO}_2^- > \text{NO}_3^-$ (bond angle)

28. How many N atoms in cyanuric amide (melamine) are sp^2 hybridized ?

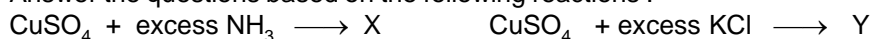


29. $a (\text{Si}(\text{Me})_x \text{Cl}_y) + \text{water} \xrightarrow[\text{condition}]{\text{controlled}}$ What is the value of $a + x + y$?

30. **Statement-1:** $\text{K}_3[\text{Fe}(\text{CN})_6]$ is an inner orbital complex where as $\text{K}_3[\text{FeF}_6]$ is an outer orbital complex.
Statement-2: CN^- being a strong ligand, pairs electrons of Fe^{3+} and we get $d^2\text{sp}^3$ hybridization. But F^- being weak ligand do not pair electrons in Fe^{3+} .
 (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.
31. **Statement-1 :** H_2S is less acidic than H_2Te
Statement-2 : As the size of Te is more than S, the bond $\text{Te}-\text{H}$ is weaker than $\text{S}-\text{H}$
 (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.
32. **Statement-1 :** Atomic size in Na is larger than Al.
Statement-2 : Number of shells in Na are more than in Al.
 (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True.

Comprehension # 1

Answer the questions based on the following reactions :



33. The color of species X and hybridization of Cu^{2+} in it are respectively.
 (A) Deep blue and sp^3 (B) Blue and sp^3 (C) Deep blue and dsp^2 (D) Black and dsp^2
34. The name of Y is :+
 (A) Potassium (tetrachloride) disulphate copper (II) (B) Potassium tetrachloridocuprate (II)
 (C) Potassium tetrachloridocopper (II) (D) Dipotassiumcuprate(II) chloride
35. To Y, excess KCN is added due to which a highly stable complex results. This complex is :
 (A) $[\text{Cu}(\text{CN})_4]^{2-}$ diamagnetic (B) $[\text{Cu}(\text{CN})_6]^{4-}$ diamagnetic
 (C) $[\text{Cu}(\text{CN})_4]^{3-}$ paramagnetic (D) $[\text{Cu}(\text{CN})_6]^{5-}$ paramagnetic

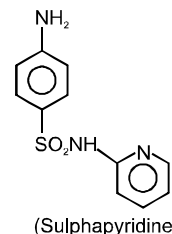
Comprehension # 2

Sulphur forms numerous compounds and show variety of oxidation states. It also exhibit a good tendency of catenation. It forms variety of oxoacids and oxoanions also. Sulphur also occur in several biomolecules and is also used in chemotherapy as sulphad rugs.

36. Sulphapyridine was shown to be effective against pneumonia

What is the hybridization of 'S' in this compound .

- (A) sp^2
 (B) sp^3d
 (C) sp^3
 (D) sp^3d^2



37. $\text{NH}_2 - \text{SO}_3\text{H}$ is called as sulphamic acid. $\text{NH}_2 - \text{CO}_2\text{H}$ is called as carbamic acid. Using this knowledge, find which formula is correctly matched with name ?
 (A) Calcium sulphamate $\Rightarrow \text{Ca}(\text{N}-\text{SO}_3\text{H})$ (B) Aluminum pyrophosphate $\Rightarrow \text{Al}_2(\text{P}_2\text{O}_7)_3$
 (C) Sodium carbamate $\Rightarrow \text{Na}(\text{NH}_2-\text{COO})$ (D) Ammonium thiosulphate $\Rightarrow (\text{NH}_4)_2\text{S}_2\text{O}_3$
38. Among the following compounds of sulphur, which contain no S-S bond ?
 (A) $\text{H}_2\text{S}_2\text{O}_5$ (B) $\text{H}_2\text{S}_2\text{O}_3$ (C) $\text{Na}_2\text{S}_4\text{O}_6$ (D) CaS_2O_7

Comprehension # 3

Electronegativity is a feature which is relative and depends on several factor like oxidation number, hybridizations etc.

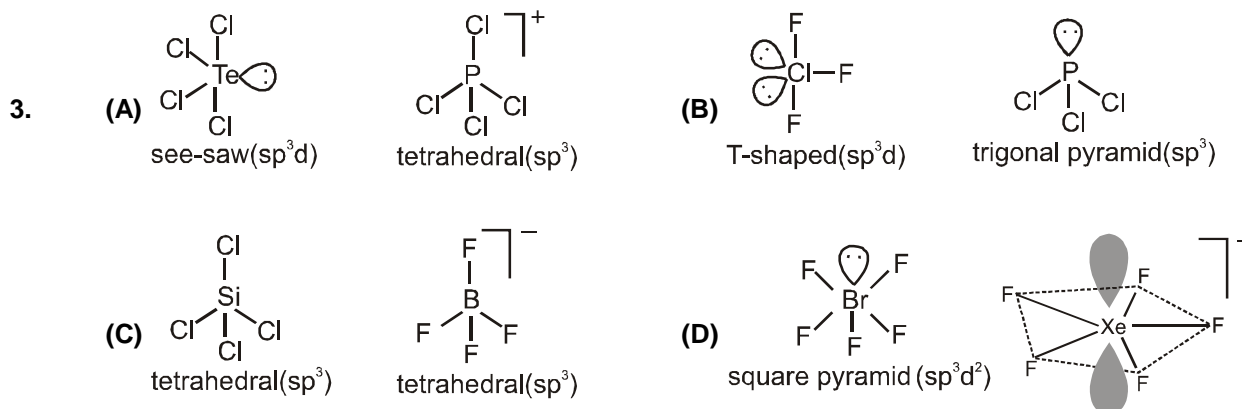
For instance, the electronegativity of differently hybridized carbon are :

sp	2.99
sp ²	2.66
sp ³	2.48

39. Which of the following contain all carbon of equal electronegativity ?
 (A) Propene (B) Propadiene (C) Cyclopropene (D) Cyclopropane
40. Which of the following is correct ?
 $\text{H}_3\text{C} - \text{CH}_3$, $\text{H}_2\text{C} = \text{CH}_2$, $\text{HC} \equiv \text{CH}$
 (a) (b) (c)
 (A) The C - C σ bond is of equal strength in (a) and (b)
 (B) The C - C σ bond is stronger in (a) than (c)
 (C) The C - C σ bond is stronger in (b) than (c)
 (D) The C - C σ bond is stronger in (c) than (a)
41. The direction of dipole of $\text{C} \equiv \text{O}$ is \leftarrow . This means there is slight positive charge on O. This can be explained by :
 (A) higher electronegativity of O (B) sp hybridization of C
 (C) positive formal charge on O (D) All of these
42. **Column I**
 (1) XeO_2F_4
 (2) SO_2Cl_2
 (3) COCl_2
 (4) HClO_3
- Column II**
 (p) Central atom is sp³ hybridized with no lone pair on it .
 (q) Central atom is sp² hybridized.
 (r) Central atom involves $d_{x^2-y^2}$ orbital in hybridization.
 (s) Contain central atom in oxidation state, two less than the highest.
- | | | | | |
|-----|-----|-----|-----|-----|
| | (1) | (2) | (3) | (4) |
| (A) | p | q | r | s |
| (C) | r | p | q | s |
43. **Column I**
 (A) $\text{Na}_3[\text{Co}(\text{ox})_3]$
 (B) $[\text{RhCl}(\text{CO})(\text{PPh}_3)(\text{NH}_3)]$
 (C) $[\text{Cr}(\text{NH}_3)_2(\text{CN})_4]$
 (D) $\text{Ba}[\text{CoBr}_2\text{Cl}_2]$
- Column II**
 (p) Show geometric isomerism.
 (q) Low spin complex.
 (r) Paramagnetic with more than two unpaired electrons.
 (s) Show colligative property corresponding of two particles per formula.
 (t) Electrically conducting.
44. **Column I**
 (A) MnO_4^-
 (B) MnO_4^{2-}
 (C) $[\text{Cu}(\text{CN})_4]^{3-}$
 (D) $\text{Ni}(\text{dmg})_2$
- Column II**
 (p) Paramagnetic and colored.
 (q) Diamagnetic and colored.
 (r) Diamagnetic and colorless
 (s) Tetrahedral complex.
 (t) Square planar complex.
45. **Column I**
 (1) $\text{B} > \text{Be} > \text{Li}$
 (2) $\text{Na} < \text{K} < \text{Rb}$
 (3) $\text{Zn} > \text{Ca}$
 (4) $\text{S} > \text{Se}$
- Column II**
 (p) Electronegativity
 (q) Ionization energy
 (r) Atomic radius
 (s) Metallic nature.
 (t) Acidic nature of oxide

CHEMISTRY

- $\text{C}_2\text{H}_4 + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$
 $\text{sp}^2 \qquad \qquad \text{sp}$
- Each of given species except $\text{CH}_3\text{CH}_2\text{CH}_3$ contain either H bonded to EN atom or lone pair containing EN atom.



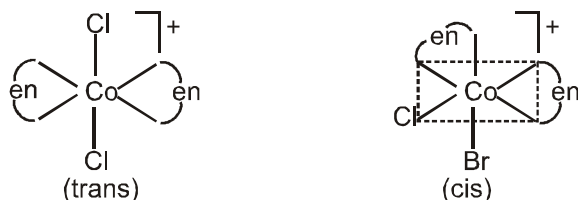
- In triple bond, π bond is formed by p_x-p_x and p_y-p_y . Hence perpendicular to each other. In consecutive double bond, if p_x-p_x overlap form one π bond, then p_y-p_y form other π bond. Hence perpendicular to each other. (Here Z axis is taken as internuclear axis).
- As it has 4 properly oriented N atoms.
- For Name, check rules from notes.



5 planes of symmetry

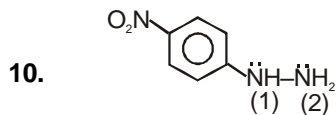
2-planes of symmetry

- (A) $[\text{Co}(\text{NH}_3)_5\text{Br}] \text{SO}_4$ can show ionization isomerism only But $[\text{Ni}(\text{dmg})_2]$ can't
 (B) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ is square planar and hence can show cis-trans isomerism.
 $[\text{Co}(\text{en})_2\text{ClBr}]\text{Cl}$ can show ionisation isomerism as well as cis-trans isomerism in octahedral complexes.



- (C) $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$ can show coordination isomerism where as $\text{K}[\text{PtCl}_3(\text{C}_2\text{H}_4)]$ can't show any isomerism.
 (D) $[\text{Ni}(\text{en})_3]^{2+}$ is optically active and $[\text{Pt}(\text{en})_2]^{2+}$ is square planar and hence optically inactive.

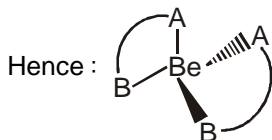
- As octahedral field is present so their will be octahedral splitting.
 Further, F^- is a weak field ligand. so pairing will not take place unless all orbital are half filled.



Either nitrogen (1) or nitrogen (2) can donate lone pair

12. Cr^{+3} and 2Br^- in the bracket, so one Br^- will remain outside the bracket to balance total positive charge.

13. Benzoylacetato is non-symmetrical didentate ligand and beryllium can only use sp^3 orbitals (as it has no d-orbital). So Be forms tetrahedral complex with it.



Where A — B is a representation of non-symmetrical didentate ligand.
This structure has no plane of symmetry. so it is optically active.

14. $\text{Al} = 1.61$ Due to d-contraction
 $\text{Ga} = 1.81$

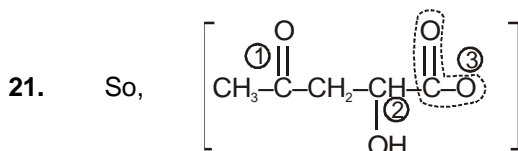
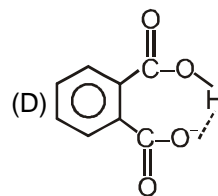
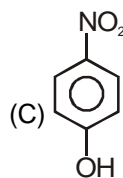
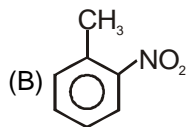
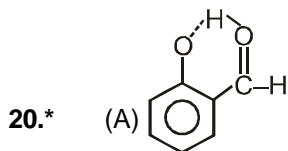
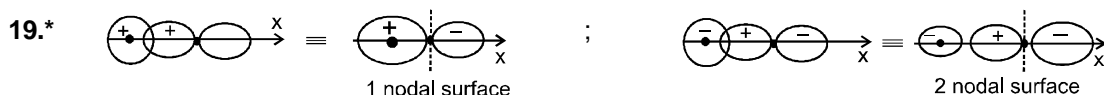
15. $\begin{array}{c} -1 \quad +1 \quad -1 \\ \vdots \quad \vdots \quad \vdots \\ \text{N}=\text{N}=\text{N} \end{array}$ The two nitrogen atoms are equivalent

16.* In $\text{HN}(\text{SiH}_3)_2$, lone pair of N is delocalized by back bonding in d-orbitals of 2 silicons. So it is very poor base.

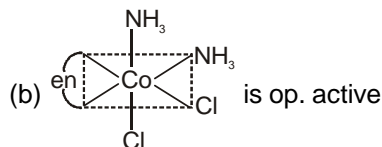
NH_3 , $\text{NH}_2(\text{CH}_3)$, :NH and $\text{H}_2\text{N}(\text{SiH}_3)_2$ are hence better bases than $\text{HN}(\text{SiH}_3)_2$.



18.* Refer notes



22. (a) cis-isomer is op. active.



(c) op. inactive

(e) always optically active.

(g) EDTA complexes are optically active

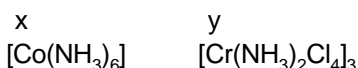
(i) same as (h)

(d) op. inactive

(f) square planar, optically inactive

(h) 3 didentate ligands are always optically active

23.



$$x + 3y - 4 \times 3 = 0 \Rightarrow x + 3y = 12$$

common oxidation states of Co are +2 and +3 & same for chromium.

only Co^{+3} , Cr^{+3} , satisfy the above equation

$$\text{Hence } x + y = 6$$

24.

(a) $d_{x^2-y^2}$ ($d\text{-}sp^2$) (b) sp^3

(c) $\text{NH}_4^+ = sp^3$

(d) sp^3d^2 (SN=6) d_{z^2} and $d_{x^2-y^2}$

(e) d^2sp^3 (d_{z^2} and $d_{x^2-y^2}$)

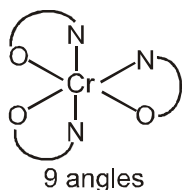
(f) dsp^2 ($d_{x^2-y^2}$)

(g) sp^3d^2 (d_{z^2} and $d_{x^2-y^2}$)

(h) I_3^- (d_{z^2})

Hence, ans is 4

25.



26.

For $\text{H}_x \text{Fe}(\text{CO})_4$, $18e^-$ rule for Fe = $8 - (-x) + 4 \times 2 = 18$

$$\Rightarrow x + 8 = 10 \Rightarrow x = 2$$

Similarly, Re belongs to 7th group

;

So, $18e^-$ rule for Re = $7 - (-y) + 10 = 18$

$$\Rightarrow 7 + y = 8$$

$$\Rightarrow y = 1$$

$$\Rightarrow x + y = 3$$

27.

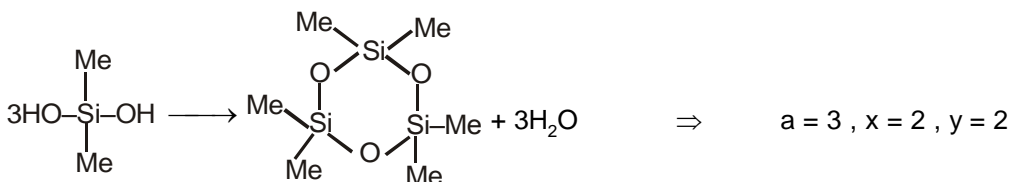
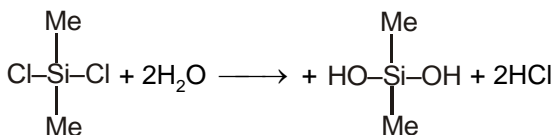
(a), (c), (f), (i) are correct

28.

The lone pair on nitrogen of NH_2 is in conjugation with the double bond of rings and hence is delocalized.

29.

The product is a silicone in which each Si is bonded to two O atom. This can be achieved by having two Cl atoms.



$$\text{So, } a + x + y = 7$$



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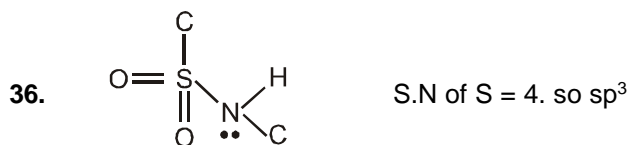
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PAGE NO.- 3

31. Self explanatory 32. The valence shell of sodium as well as aluminium is 3.

33. $X = [\text{Cu}(\text{NH}_3)_4]^{2+}$
 $\text{Cu}^{2+} = d^9$, one electron is excited so we get dsp^2 hyb.

34. Y is $\text{K}_2[\text{CuCl}_4]$ 35. $[\text{CuCl}_4]^{2-} + \text{CN}^- \rightarrow [\text{Cu}(\text{CN})_4]^{3-} + (\text{CN})_2 + \text{Cl}^-$



37. sulphamate $\Rightarrow \text{NH}_2 - \text{SO}_3^-$
Carbamate $\Rightarrow \text{NH}_2 - \text{CO}_2^-$
Pyrophosphate $\Rightarrow (\text{P}_2\text{O}_7)^{4-}$
Thiosulphate $\Rightarrow \text{S}_2\text{O}_3^{2-}$

38. Refer class notes.

39. All C are equivalent in Cyclopropane

40. more is s-character in the hybridized orbital involved, stronger is the bond.

41. $:\bar{\text{C}} \equiv \overset{+}{\text{O}}:$

Although Oxygen is highly electronegative in comparison of sp hybridized carbon, here the direction of dipole is decided by the above canonical structure which is stable due to complete octet of both atoms.

42. (A) $\text{XeO}_2\text{F}_4 \rightarrow \text{SN} = 6$, sp^3d^2 hybridization use d_{z^2} and $d_{x^2-y^2}$.

(B) $\text{SO}_2\text{Cl}_2 \rightarrow \text{SN} = 4$, sp^3 hybridized 'S' with no lone pair.

(C) $\text{COCl}_2 \rightarrow \text{SN} = 3$, sp^2 hybridized.

(D) $\text{HClO}_3 \rightarrow$ Oxidation no. of Cl = +5 & highest is +7. It contains one lone pair.

43. (A) Oxidation number of Co = +3. It is d^6 , and electrons are paired. It is diamagnetic. It is low spin complex. It produces four particles per formula.

(B) Oxidation number of Rh = +1. It is $4d^8$ and coordination number is 4. It is square planar and diamagnetic. It shows geometrical isomerism.

(C) $\text{K}[\text{Cr}(\text{NH}_3)_2(\text{CN})_4]$ has Cr in +3 oxidation state, It shows GI, Cr(+3) is d^3 hence paramagnetic with 3 unpaired electrons. It produces 2 particles per formula and is electrically conducting.

(D) It contains Co^{2+} which is d^7 and it is tetrahedral. It is paramagnetic with 3 unpaired electrons. It also has 2 particles per formula. It is electrically conducting.

44. (A) $\text{MnO}_4^- \rightarrow$ Oxidation no. of Mn = +7, It is d^0 . It is diamagnetic transfer spectrum. It is tetrahedral.

(B) $\text{MnO}_4^{2-} \rightarrow$ Oxidation no. of Mn = +6, It is d^1 . It is paramagnetic & also colored. It is tetrahedral.

(C) $[\text{Cu}(\text{CN})_4]^{3-} \rightarrow$ Oxidation no. of Cu = +1, It is d^{10} . It is diamagnetic & colorless. It is tetrahedral.

(D) $\text{Ni}(\text{dmg})_2 \rightarrow$ Oxidation no. of Ni = +2, It is d^8 . It is square planar and diamagnetic but is colored.

45. (A) Electronegativity increases in going from left to right in period. I.E. of Be > I.E. of B.

Atomic radius decreases in going from left to right in period.

Metallic nature decreases in going from left to right in period.

Acidic nature of oxides increases in going from left to right.

(B) Down the group, electronegativity decreases, ionization energy decreases, Atomic radius increases, metallic nature increases and acidic nature of oxide decreases.

(C) Calcium & Zn belong same period but Zn is more electronegative has higher I.E. smaller radius, lesser metallic nature and has amphoteric oxide.

(D) EN, I.E and acidic nature of oxide of S is more than those of Se.