

## 1. Central Metal: -

(D)

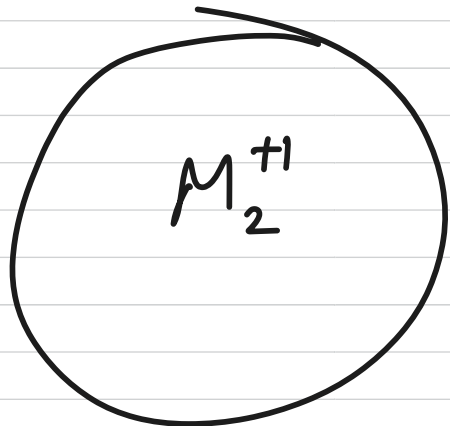
Q which of the following is not the essential req. for complex by central metal

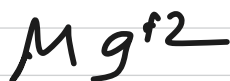
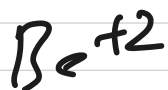
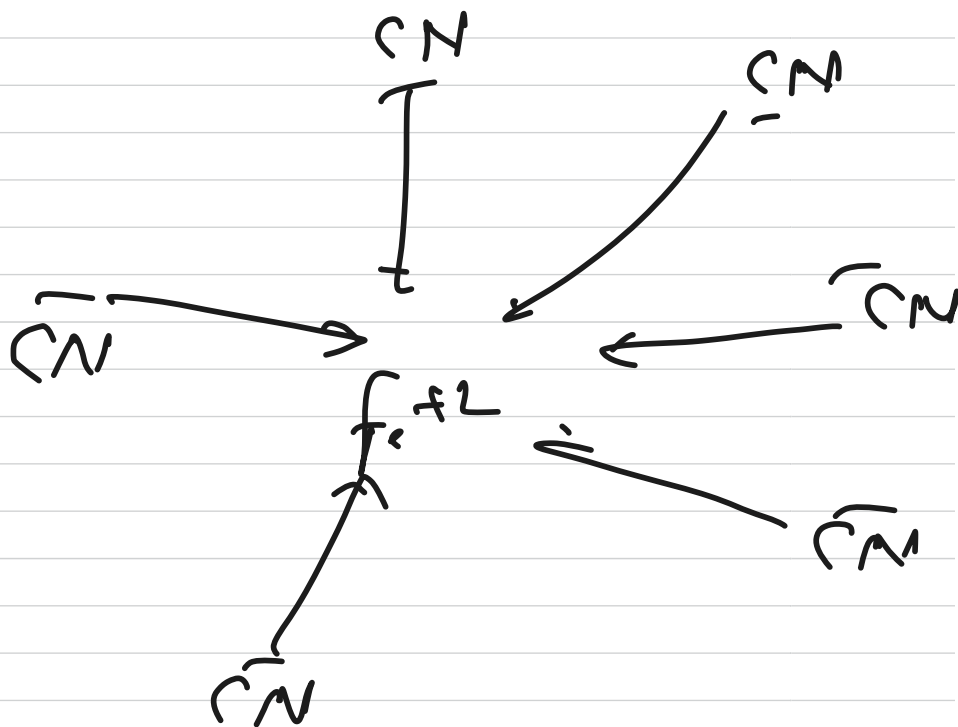
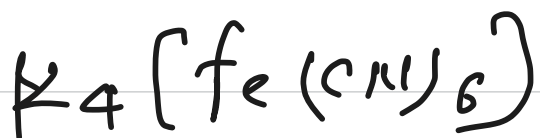
(A) Small size ✓

(B) High for chn chg ✓

(C) vacant orbital of low E ✓

~~(D)~~ variable o.N.







RACE # 11

INORGANIC CHEMISTRY

MM : 34

TIME : 10 Min.

*Only one correct*

- Select the **CORRECT** statement for  $H_2$  molecule [3]
  - Experimentally it has 100 % covalent character
  - On time average the molecule is polar but at the particular moment it does not act as a dipole.
  - On time average the molecule is non-polar and the particular moment it does not act as dipole.
  - On time average the molecule is non-polar but at the particular moment it may act as a dipole which is equally probable in all directions
- Which of the following order is **INCORRECT** for boiling point of given molecules— [3]
  - n-pentane > neo-pentane
  - $CH_4 < NH_3 < H_2O < HF$
  - $PH_3 < AsH_3 < NH_3 < SbH_3$
  - $H_3BO_3 > (CH_3)_3BO_3$
- Give initial T for true statement and F for false statement respectively [3]
  - Vanderwaal forces are responsible for the formation of dry ice
  - Dipole-induced dipole forces are present in clathrates compounds
  - London dispersion force is responsible for liquification of Noble gases
  - for dipole-dipole interactions  $\Rightarrow E \propto \frac{1}{r^3}$  (E = Energy & r = Inter molecular distance)
  - T F T F
  - T T T F
  - F T T F
  - T T T T
- Select the **CORRECT** order of boiling point ? [3]
  - $C_3H_8 < C_3F_8$
  - neo-pentane > iso-pentane
  - $T_2 < D_2$
  - $SbH_3 < NH_3$
- Statement-1** :  $CCl_4$  has lower boiling point than that of  $SiCl_4$  [3]
 

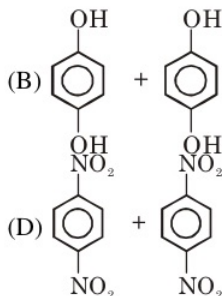
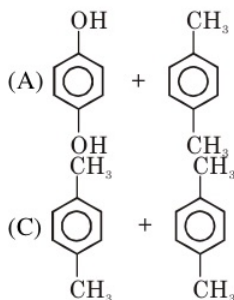
**Statement-2** : The magnitude of negative charge developed at chlorine atoms in  $SiCl_4$  is more in comparison to negative charge developed at chlorine atoms in  $CCl_4$

  - Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
  - Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
  - Statement-1 is true, statement-2 is false.
  - Statement-1 is false, statement-2 is true.

*More than one may be correct*

- London force works in [3]
  - $I_2$ (solid)
  - $ICl_\ell$  (liquid)
  - $BI_3$ (solid) &  $S_8$ (solid)
  - Graphite

7. In which of the following pair of compounds, the predominant inter molecular interaction energy is dependent on the  $r^{-6}$  ( $r$  is distance) between the species :- [3]



**Comprehension (Q.8 to Q.10)**

[9]

The existence of intermolecular forces is supported by the facts : non ideality of real gases, Joule-thomson effect, liquefaction of gases. The electrical field of a dipole can induce a dipole moment in adjacent molecule (which may be polar or non polar) then the induced dipole can interact electrostatically with the polarising dipole.

8. Which has the **least** probability of forming a clathrate with aqueous solution of quinol ? [3]  
(A)  $\text{CH}_4$  (B) He (C) Kr (D) Xe
9. Select the **CORRECT** statement : [3]  
(A) Boiling point of  $\text{NF}_3$  is greater than  $\text{NMe}_3$   
(B) Greater the dipole moment in molecule, greater will be the dipole-dipole interaction between the molecules.  
(C) London dispersion force increases with decreasing number of electrons  
(D) Boiling point of hydrides of carbon family decreases down the group.
10. The **STRONGEST** force among the following is [3]  
(A) London force  
(B) Ion-dipole interaction  
(C) Dipole- induced dipole interaction  
(D) Dipole-dipole interaction

**Matching list**

11. **Column-I** [4]  
(Given process)
- |   |                            |
|---|----------------------------|
| (P) Dissolution of alcohol in water             | (1) London force           |
| (Q) Interaction between $\text{CO}_2$ molecules | (2) Kessom force           |
| (R) Solubility of NaCl in water                 | (3) Debye force            |
| (S) Solubility of Noble gas in water            | (4) Ion-dipole interaction |
- Code**
- |       |     |     |     |
|-------|-----|-----|-----|
| (P)   | (Q) | (R) | (S) |
| (A) 1 | 3   | 2   | 4   |
| (B) 2 | 1   | 4   | 3   |
| (C) 2 | 3   | 1   | 4   |
| (D) 1 | 2   | 3   | 4   |

**FILL THE ANSWER HERE**

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**RACE # 11**

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**MM : 34**

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*Only one correct*

1. Ans.(D)
2. Ans.(B)
3. Ans.(D)
4. Ans. (A)
5. Ans.(D)

*More than one may be correct*

6. Ans.(A,B,C,D)
7. Ans. (A,C,D)

*Comprehension (Q.8 to Q.10)*

8. Ans. (B)
9. Ans.(B)

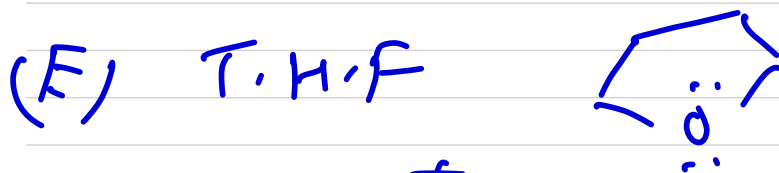
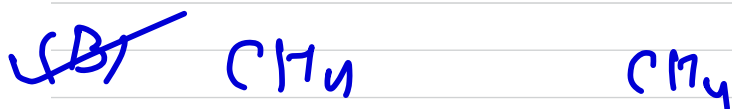
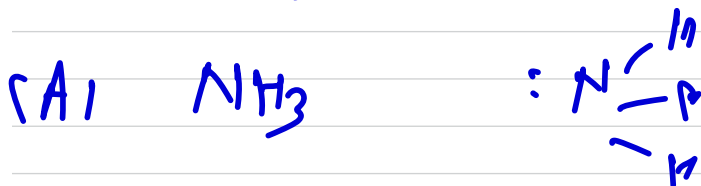
10. Ans. (B)

**Matching list**

11. Ans.(B)

# Ligand:-

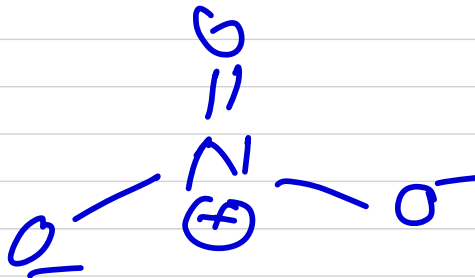
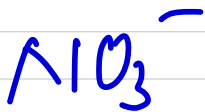
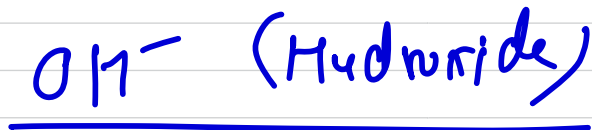
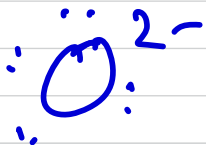
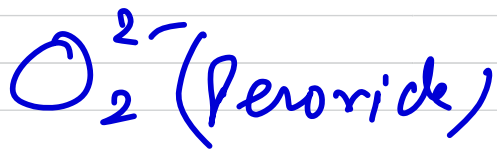
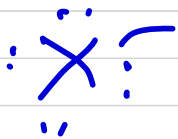
Q which is not act as ligand -

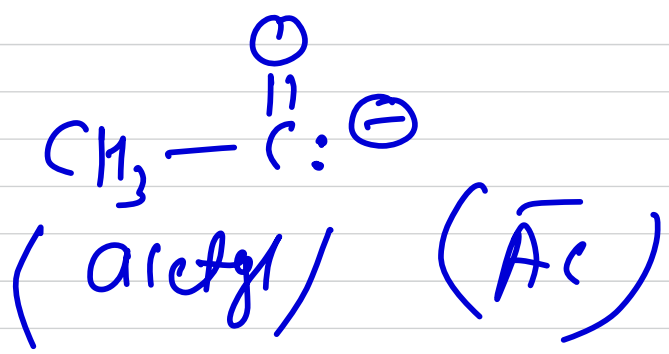
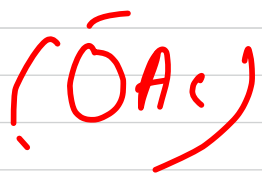
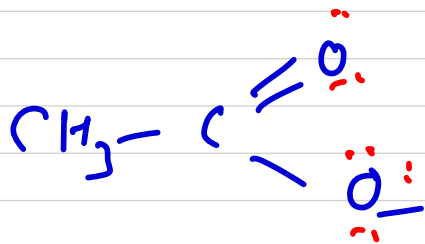
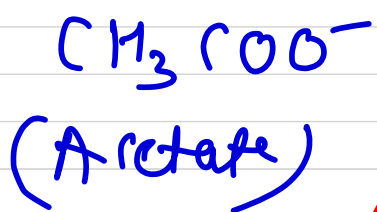
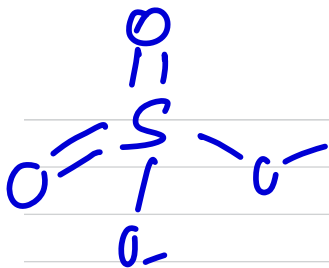


# Classification of bond

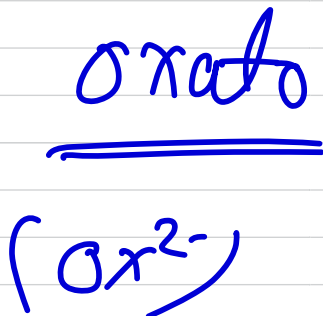
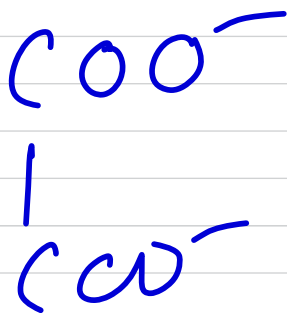
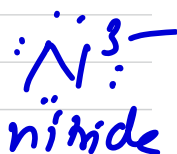
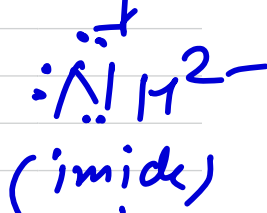
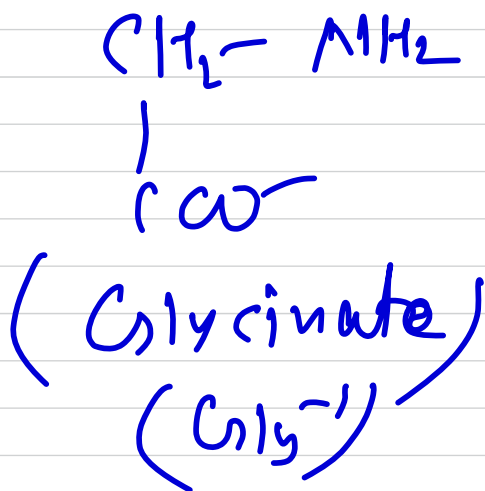
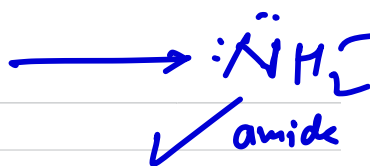
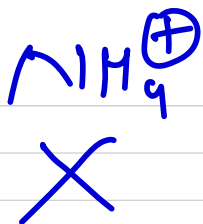
## Classification of bond on the Basis of charge

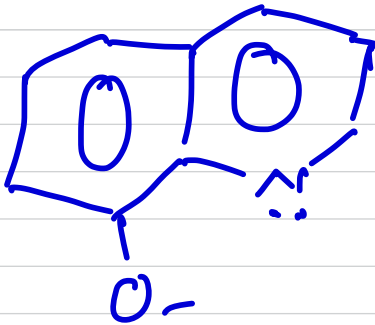
### 1. anionic:-





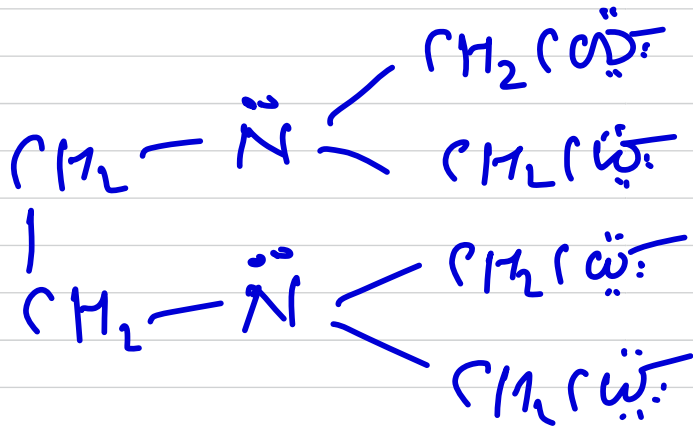






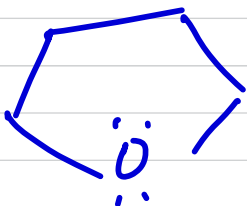
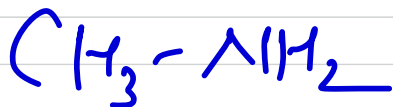
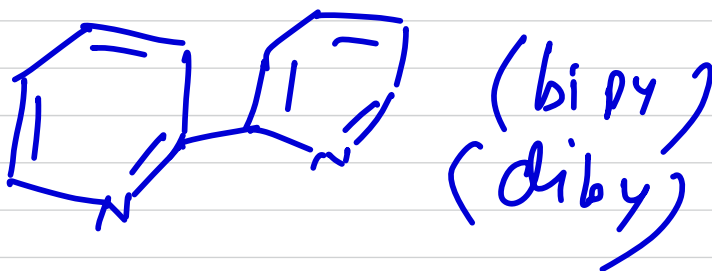
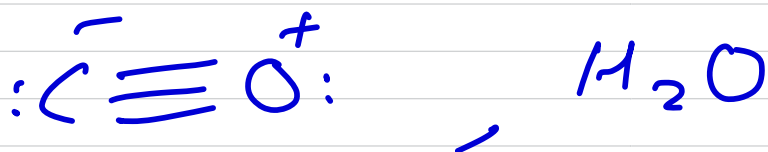
8-hydroxyquinoline  
(oxine<sup>-1</sup>)

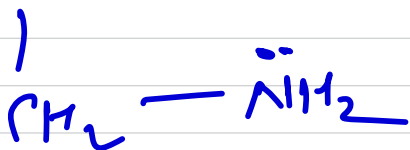
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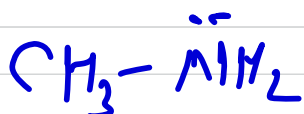
EDTA<sup>4-</sup>

Neutral lnd:-

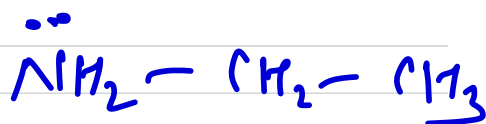




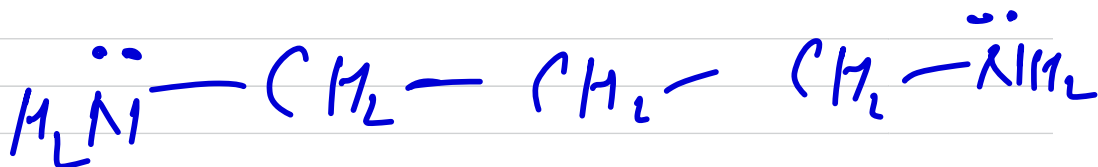
en (ethylenediamine)



(methyl amine)



ethyl amine



trimethylenediamine  
(tn)

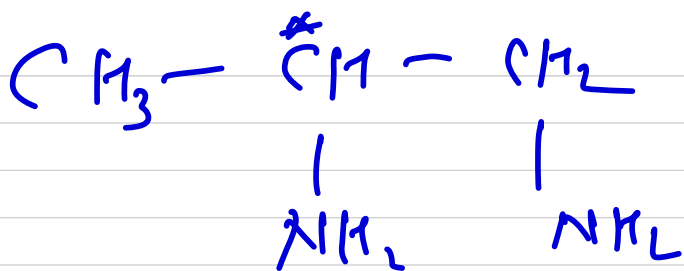
—  $\text{CH}_3$  methyl

>  $\text{CH}_2$  methylene

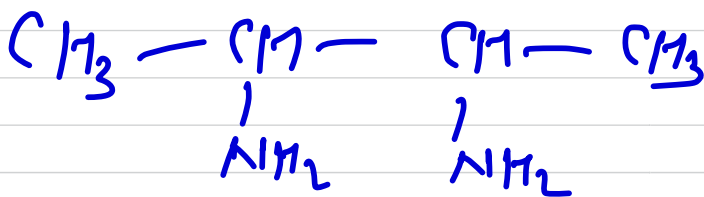
—  $\text{CH}_2$  —  $\text{CH}_3$  ethyle

$\text{CH}_2$  —  $\text{CH}_2$  ethylene

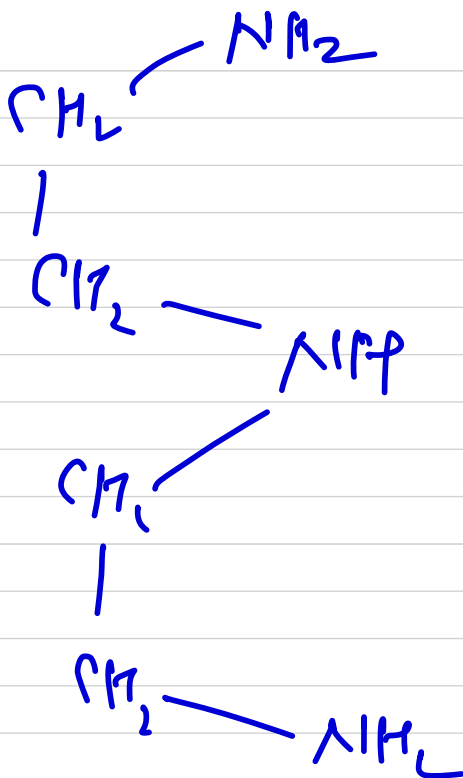
>  $\text{CH}$  —  $\text{CH}_3$  ethylidene



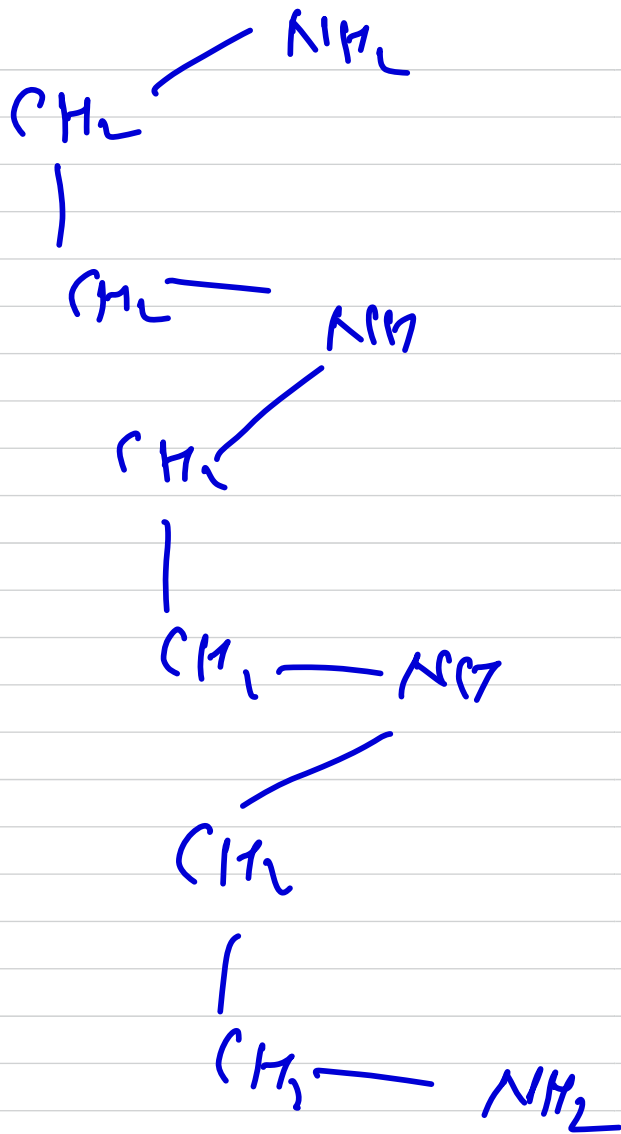
Propylene diamine (pn)



(butane diamine) (bn)



diethylamine (dien)



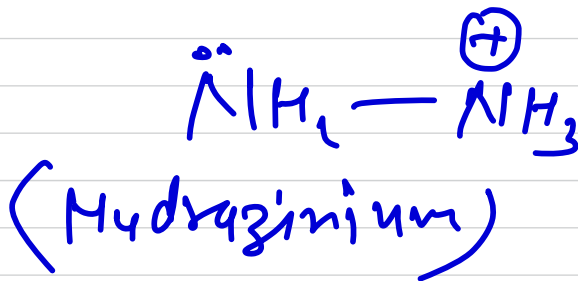
tricyclon tetraamine  
(trien)



Cationic:-



(Nitrogenium)



(Hydrazinium)

**RACE # 13**
**INORGANIC CHEMISTRY**
**M.M. : 36**
**TIME : 15 Min.**
**Only one correct :**

- Which of the following statements is the **CORRECT** order with respect to the given property ? [3]
 

(A) $\text{Sn}^{+2} < \text{Pb}^{+2}$ : reducing strength	(B) $\text{Ga}^{+3} < \text{Tl}^{+3}$ : Stability
(C) $\text{Mg}_3\text{N}_2 < \text{MgO}$ : lattice energy	(D) $\text{SnCl}_4 < \text{PbCl}_4$ : Oxidising power
- Out of the following which one has the highest values of covalent character [3]
 

(A) $\text{ZnCl}_2$	(B) $\text{CdCl}_2$	(C) $\text{HgCl}_2$	(D) $\text{CuCl}$
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- CORRECT** order of melting point is :- [3]
 

(A) $\text{BeO} < \text{BeF}_2$	(B) $\text{LiCl} > \text{CsCl}$	(C) $\text{ScN} < \text{TiC}$	(D) $\text{AlBr}_3 > \text{AlI}_3$
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- Which of the following order is correct of the given property. [3]
 

(A) $\text{LiCl} > \text{NaCl} > \text{KCl} > \text{RbCl} > \text{CsCl}$	: Thermal stability order
(B) $\text{BeF}_2 < \text{MgF}_2 < \text{CaF}_2 < \text{SrF}_2 < \text{BaF}_2$	: solubility order
(C) $\text{NO}_2 > \text{N}_2\text{O}_5 > \text{NO} > \text{N}_2\text{O}$	: acidic order
(D) $\text{BaO} > \text{SrO} > \text{CaO} > \text{BeO} > \text{MgO}$	: basic character order

**Paragraph for Q. No. 5 to 6**

Solubilities of ionic compounds in water depends upon hydration energy  $\left[ \Delta_{\text{H}_{\text{hyd}}} \text{H} \propto \left( \frac{1}{r_+} \right) + \left( \frac{1}{r_-} \right) \right]$  and

lattice energy  $\left[ \Delta_{\text{L}} \text{H} \propto \frac{1}{r_+ + r_-} \right]$  factors. The solubilities cover a wide range of values, some of the most

soluble being those for which there is the greatest difference between the radii of the cation and anion. Thermal stabilities of the ionic compounds are also depends on Lattice Energy and polarisation effect.

- Which of the following set of order is **CORRECT** against to their indicated properties? [3]
 

(A) $\text{Na}_{(\text{aq.})}^{\oplus} > \text{Mg}_{(\text{aq.})}^{2+} > \text{Al}_{(\text{aq.})}^{3+}$ ; Extent of Hydration
(B) $\text{LiF} < \text{LiCl} < \text{NaCl}$ ; Solubility in water
(C) $\text{PbF}_2 > \text{PbCl}_2 > \text{PbI}_2$ ; Thermal stability
(D) $\text{K}_2\text{O} < \text{CuO} < \text{CO}_2 < \text{H}_2\text{O}$ ; Acidic Nature
- Out of given the compound (X) which is least soluble have higher Lattice energy than that of hydration energy, compound (X) is :- [3]
 

(A) $\text{MgS}_2\text{O}_3$	(B) $\text{CaS}_2\text{O}_3$	(C) $\text{SrS}_2\text{O}_3$	(D) $\text{BaS}_2\text{O}_3$
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*One or more than one option(s) is/are correct*

7. Which of the following order is/are **CORRECT** for give properties? [3]  
 (A)  $\text{CsCl} > \text{RbCl} > \text{KCl} > \text{NaCl} > \text{LiCl}$  : (% ionic character)  
 (B)  $\text{Zn}^{+2} < \text{Cd}^{+2} < \text{Hg}^{+2}$  : (Effective nuclear charge)  
 (C)  $\text{Ti}_2\text{O}_3 < \text{Ga}_2\text{O}_3$  : Basic strength  
 (D)  $\text{Be}(\text{OH})_2 < \text{Ba}(\text{OH})_2$  : Solubility in water
8. Which of the following order is/are **CORRECT** with respect to the given property? [3]  
 (A)  $\text{Mg}_3\text{N}_2 > \text{Ca}_3\text{N}_2 > \text{Sr}_3\text{N}_2$  (thermal stability)  
 (B)  $\text{Li}_2\text{CO}_3 > \text{Na}_2\text{CO}_3 > \text{K}_2\text{CO}_3$  (solubility)  
 (C)  $\text{HgCl}_2 > \text{HgBr}_2 > \text{HgI}_2$  (covalent character)  
 (D)  $\text{TiC} > \text{ScN} > \text{MgO}$  (melting point)

*Subjective :*

9. Find the number of compounds which are more covalent in nature compared to  $\text{AlCl}_3$  from the following.  
 $\text{AlBr}_3, \text{AlI}_3, \text{BeCl}_2, \text{BeBr}_2, \text{AlF}_3, \text{BeI}_2$  [Given :  $r_{\text{Be}^{2+}} : 0.31 \text{ \AA}$ ,  $r_{\text{Al}^{3+}} : 0.5 \text{ \AA}$ ] [4]
10. Find number of ions which have pseudo inert gas configuration. [4]  
 $\text{Zn}^{2+}, \text{Ga}^{3+}, \text{Ge}^{2+}, \text{Ge}^{4+}, \text{Cu}^{2+}$
11. In the given following, find out the total number of compounds having more covalent than  $\text{ZnCl}_2$ . [4]  
 $\text{CuCl}, \text{HgCl}_2, \text{GaCl}_3, \text{AlBr}_3, \text{CdCl}_2, \text{CaCl}_2, \text{BaCl}_2, \text{KCl}$

(+ Allotrope of sulphur)  
 + liquid form