

INORGANIC CHEMISTRY

FULL SYLLABUS

TIME : 30 MIN

SECTION-I : (i) Only One option correct Type

This section contains **06 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct. **3(-1)**

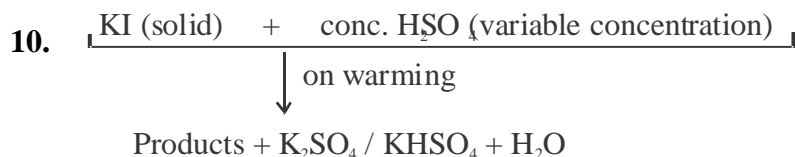
- By Le-blanc process potassium carbonate can be prepared but by solvay process it is not possible, why
(A) Due to presence of massive H-bonding in KHCO_3
(B) KHCO_3 soluble in water
(C) KHCO_3 insoluble in water
(D) Thermal stability of KHCO_3 is greater than NaHCO_3
- Which of the following statement is **INCORRECT** for hydra acid of halogen :-
(A) Down the group, as value of 'n' increases, size of 'ns' and 'np' orbital increases
(B) Down the group, acidic strength increases
(C) Down the group, orbital length of 'np' increases which increases the bond length of H-X bond
(D) Down the group, bond energy of H-X bond increases
- Statement-1** : When H_2S gas is passed through Na-nitroprusside solution it gives purple colouration
Statement-2 : H_2S is a weak acid
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.
- Which of the following statements are **INCORRECT** regarding $\text{Mn}(\text{CO})_5$?
(A) It can undergo reduction as well as dimerisation
(B) Synergic bonding is involved
(C) (C - O) bond length in $\text{Mn}(\text{CO})_5$ is shorter than (C - O) bond length in CO
(D) It is an organometallic compound
- Which of the following ore is/are mixed oxides ?
(A) Pyrolusite (B) Chromite (C) Ruby copper (D) Limonite
- Find the maximum number of electrons in Cr, if $l + m \Rightarrow 2$
(A) 2 (B) 4 (C) 5 (D) 7

(ii) One or more options correct Type

This section contains **04 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE or MORE** are correct. **4(-1)**

- Select **CORRECT** statement (s) -
(A) White phosphorus produces PH_3 with NaOH conc. as one of the products.
(B) CN^- is a pseudohalide ion
(C) White phosphorous is poisonous in nature
(D) FeI_3 does not exist
- Which of the following products are formed when AgCl fused with Na_2CO_3
(A) Ag (B) Ag_2O (C) CO_2 (D) Ag_2CO_3

9. Select the **CORRECT** statements -
- (A) The hydrogen carbonates of the alkali metal are soluble in water and NaHCO_3 have lowest solubility
- (B) Solution of carbonate forms reddish brown pptⁿ basic mercury(II) carbonate ($3\text{HgO} \cdot \text{HgCO}_3$) on reaction with Mercury(II) chloride
- (C) When AgNO_3 reacts with sulphite ion no visible change occurs initially because of the formation of soluble sulphitoargentate ion.
- (D) On standing in air the precipitate BaSO_3 is slowly oxidised to it's sulphate.



Here products may be ?

- (A) I_2 (B) O_2 (C) O_3 (D) SO_2

(iii) Paragraph Type

This section contains **02 paragraphs** each describing theory, experiment, data etc. **Four questions** relate to two paragraphs with two questions on each paragraph. Each question of a paragraph has **only one correct answer** among the four choices (A), (B), (C) and (D).

Paragraph for Q. No 11 to 12

Stereoisomerism of complex arises due to difference in spatial arrangement of ligand around central metal ion. Tetrahedral complex can show optical isomerism. Square planar complex can show geometrical isomerism under some condition. Octahedral complex can show geometrical & optical isomerism both

11. One octahedral complex having metal ion with two identical monodentate ligands & other nonidentical monodentate ligand.

Now if the number of possible stereoisomers when two identical ligands are at trans position is x & if the number of possible stereoisomerism when two identical ligands are at cis position if y then find the value of y-x

- (A) 6 (B) 7 (C) 8 (D) 9

12. For the complex $\left[\text{Pt} \left(\text{CH}_3 - \underset{\text{NH}_2}{\underset{|}{\text{CH}}} - \underset{\text{NH}_2}{\underset{|}{\text{CH}}} - \text{CH}_3 \right)_2 \right]^{2+}$ the number of stereoisomers having COS is y

then the value of y is

- (A) 1 (B) 2 (C) 3 (D) 4

Paragraph for Q. No 13 to 14

Inert gases are good reference points to locate the position of an element in periodic table. Consider an element 'X' of p-block having total five valence electrons and placed in the same period in which transition elements of 3d series are present.

Answer the following question :

13. Element 'X' belongs to following period and group respectively :
 (A) 3, 15 (B) 4, 15 (C) 4, 17 (D) 5, 15
14. Element just below to this element 'X' is :
 (A) I (Iodine) (B) Sb (Antimony) (C) Ge (Germanium) (D) As (Arsenic)

SECTION-II : Matrix-Match Type

This Section contains **02** question. Question has **four** statements (A, B, C and D) given in **Column I** and five statements (P, Q, R, S and T) in **Column II**. Any given statement in Column I can have correct matching with **ONE** or **MORE** statement(s) given in Column II. For example, if for a given question, statement B matches with the statements given in Q and R, then for the particular question, against statement B, darken the bubbles corresponding to Q and R in the ORS. **8(0)**

1. Match the column:

Column I (Radicals)

- (A) Cl^-
- (B) Br^-
- (C) CH_3CO_2^-
- (D) NO_3^-

Column II (Incorrect characteristics)

- (P) Produces white ppt. with AgNO_3 solution
- (Q) Produces coloured gas with hot conc. H_2SO_4
- (R) Produces colourless gas or vapour with dil. H_2SO_4
- (S) Produces no ppt. with AgNO_3 solution.
- (T) Produces white ppt. with BaCl_2 solution.

2. Column-I

- (A) MgO
- (B) BeO
- (C) $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
- (D) $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$

Column-II

- (P) Dissolve both in acid and alkali
- (Q) Ingredient of sorrel's cement
- (R) Epsom salt
- (S) Salt of dibasic oxyacid
- (T) Suspension in water is not amphoteric

SECTION-IV : Numerical Answer

1. How many molecules are pyramidal in shape but does not have $p_\pi-d_\pi$ bonding ?

$\text{P}(\text{SiH}_3)_3$, $\text{N}(\text{CH}_3)_3$; $\text{N}(\text{SiH}_3)_3$; $\dot{\text{C}}\text{F}_3$, $\dot{\text{C}}\text{H}_3$, $\overset{+}{\text{C}}\text{Me}_3$, $\overset{+}{\text{C}}(\text{CN})_3$; sulphite ion; chlorate ion, XeO_3 .

2. $(\text{CH}_3)_n\text{SiCl}_{4-n}$ are called methyl substituted chlorosilanes. If $n = \text{one}$, find maximum number of Si-O linkages on each Si in product obtained by hydrolysis & condensation.

3. Find number of species which not produces ppt/turbidity in lime water

$\text{CO}_{2(g)}$, HCO_3^- , CO_3^{2-} , HSO_3^- , SO_3^{2-} , $\text{HCl}_{(g)}$, $\text{SO}_{2(g)}$, $\text{C}_2\text{O}_4^{2-}$, NO_3^- , H_2S

4. Total number of electrons present in spherical shape orbitals in Cu ($Z = 29$)

5. Find sum of the oxidation number of specified atom in product of given reactions.

(i) $\text{NaI} + \text{conc. H}_2\text{SO}_4 \longrightarrow$ oxidation number of iodine

(ii) $\text{P}_4 + \text{conc. H}_2\text{SO}_4 \longrightarrow$ oxidation number of phosphorus

(iii) $\text{S}_8 + \text{conc. HNO}_3 \longrightarrow$ oxidation number of sulphur

(iv) $\text{FeO} \cdot \text{Cr}_2\text{O}_3 + \text{Na}_2\text{CO}_3 + \text{O}_2 \xrightarrow[\text{fused}]{\Delta}$ oxidation number of chromium