

INORGANIC CHEMISTRY

FULL SYLLABUS

TIME :30 Min

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

This section contains **5 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct. **3(-1)**

- If s and p mixing is absent and Hund's rule is violated then the magnetic behaviour and bond order of C_2 molecule is :-
(A) Diamagnetic, bond order = 2 (B) Paramagnetic, bond order = 2
(C) Diamagnetic, bond order = 1 (D) Paramagnetic, bond order = 1
- Which of the following sodium salt react with dil. H_2SO_4 & gives triatomic gas
(A) Na_2CO_3 (B) Na_2SO_3
(C) Na_2S (D) All of the above
- Give the correct order of initials true (T) or False (F) for following statements.
(I) For transition elements the d-subshells are filled with electrons monotonically with increase in atomic number
(II) For hydrogen atom 3s, 3p & 3d orbitals all have the same energy
(III) For ground state configuration Hund's rule is valid for atomic oxygen but as per MOT it is not valid for molecular oxygen
(A) F, T, F (B) F, T, T (C) T, F, T (D) F, F, T
- Which of the following complex does **NOT** have $\Delta > PE$? (Δ = CFSE, PE = Pairing Energy)
(A) (A) $[Ni(CN)_4]^{2-}$ (B) $[NiF_6]^{-2}$ (C) $[PdCl_2(SCN)_2]^{2-}$ (D) $[Mn(NH_3)_6]^{+2}$
- In which of the following reaction given change is correctly represented :-
(A) $NO \rightarrow NO^+$ (Internuclear distance increases)
(B) $Na^+ \rightarrow Na$ (Size increases)
(C) $^{10}_5B \xrightarrow{+^1_0n} ^{11}_5B$ (Size increases)
(D) $Pb^{4+} \rightarrow Pb^{+2}$ (Oxidising power of cation increases)

SECTION-I : (ii) One or more options correct Type

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

- 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
- ✓ In which of the molecule on hydrolysis proton donor oxyacid is formed from their central atom-
(A) NCI_3 (B) PCl_3 (C) SF_4 (D) P_4O_{10}
- Which of the following statement is incorrect -
(A) Ca^{2+} and Mg^{2+} ions do not form complex with EDTA
(B) $Be(OH)_2$ is only acidic in nature
(C) Na_2O_2 is an oxidising agent and it oxidises charcoal, CO, NH_3 , SO_2 etc.
(D) On heating white colour of K_2O become changed into black.
- Which of the following oxide does not give hydrogen peroxide on reaction with a dilute acid is -
(A) PbO_2 (B) Na_2O_2 (C) MnO_2 (D) TiO_2

(iii) Paragraph Type

This section contains **2 paragraphs** each describing theory, experiment, data etc. Each question of a paragraph has **only one correct answer** among the four choices (A), (B), (C) and (D). **3(0)**

Paragraph for Q. No. 10 and 11

Read the following paragraph which involve extraction procedure of **Mercury** and answer the following questions :

Mercury is mainly exist as bright red coloured ore cinnabar. The ore is crushed and concentrated by gravity separation or froth floatation. Concentrated ore is heated in air to produce Hg vapours (B.P. = 357°C) and condensed to Hg(ℓ). Hg obtained in this way contain traces of other metals dissolved in it, particularly Pb_(B.P.=1751°C) Zn_(B.P. = 908°C) Cd_(B.P. = 765°C)

10. Process which are involved in the extraction of Hg from cinnabar :
- (A) Roasting, Self reduction, Carbon reduction
(B) Calcination, Carbon reduction, Liquiation
(C) Roasting, Self reduction, Distillation
(D) Roasting, Electrolytic reduction, Vapour phase refining
11. When zinc amalgam (Zn – Hg Alloy) react with dil. H₂SO₄ it produce :
- (A) ZnSO₄ + HgSO₄ + H₂↑ (B) ZnSO₄ + Hg + SO₂↑
(C) Zn + HgSO₄ + SO₂↑ (D) ZnSO₄ + Hg + H₂↑

Paragraph for Q. No. 12 and 14

- (i) Compound 'A' $\xrightarrow{\text{blue}} \text{B} + \text{C}$
- (ii) Aq. solution of 'B' + N,N-dimethyl-p-phenylenediamine + FeCl₃ solution $\xrightarrow{\text{H}^+}$ deep blue solution (M)
- (iii) Aq.solution of (A) + S-powder $\xrightarrow{\text{boil}}$ compound (D).
- (iv) Compound (D) (aq.solution) + [Ni(en)₃](NO₃)₂ \longrightarrow Violet ppt (E).
- (v) Aq. solution of (C) + HgCl₂ \longrightarrow yellow ppt. (F).
12. Compound 'F' has the formula of -
(A) Hg₂SO₄ (B) HgO.H₂SO₄ (C) Hg₂O.HgSO₄ (D) HgSO₄.2HgO
13. Which of the following compound produces colourless gas with dil.H₂SO₄
(A) A (B) B (C) D (D) All of these
14. The number of homocyclic ring present in the compound (M) in -
(A) 1 (B) 2 (C) 3 (D) 4

SECTION-II : Matrix-Match Type

This Section contains **TWO questions**. Each question has **four statements** (A, B, C and D) given in **Column I** and **five statements** (P, Q, R, S & 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

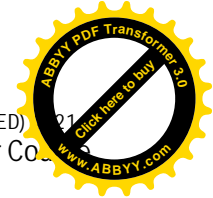
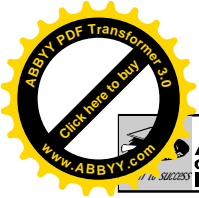
(Type of complex)

- (A) [Ti(H₂O)₆]³⁺
(B) [Cu(NH₃)₄]²⁺
(C) [Fe(H₂O)₅NO] SO₄
(D) [CrO₄]²⁻

Column-II

(Correct characteristics of the complex given)

- (P) Diamagnetic
(Q) Coloured
(R) d²sp³
(S) central metal atom or ion in their highest oxidation state
(T) Does not show geometrical isomerism



2. **Column-I**

- (A) $S + \text{conc. HNO}_3 \rightarrow$
(B) $\text{Cu} + \text{dil. HNO}_3 \rightarrow$
(C) $\text{Cu} + \text{conc. HNO}_3 \rightarrow$
(D) $\text{Zn} + \text{dil. HNO}_3 \rightarrow$

Column-II

- (P) NO is formed
(Q) NO_2 is formed
(R) N_2O is formed
(S) $\text{Cu}(\text{NO}_3)_2$ is formed
(T) Redox reaction

SECTION-IV : Numerical Answer

This section contains **4 questions**. The answer to each question is a **single digit Integer**, ranging from **0 to 9** (both inclusive) **3(0)**

1. Find the number of the following molecules having 3c–2e bond(s) is present
(a) $\text{Al}_2(\text{CH}_3)_6$ (b) BeCl_2 (c) $\text{BeH}_2(\text{solid})$ (d) B_2H_6 (e) Fe_2Cl_6 (f) $\text{PCl}_5(\text{solid})$
2. Find the number of O-atoms present in $[\text{Ni}(\text{gly})_2]$
3. Total number of process which are not common during the extraction of metal from two different ores calamine & zinc blende out of following is –
Froth Floatation, Gravity Separation, Calcination, Sintering, Distillation, Electro-refining
4. The ionization energy of a representative element is given below (in KJ/mol) :-

IE_1	IE_2	IE_3	IE_4	IE_5
756	2300	3500	25060	32900

Find out the IUPAC group number of the element.

If your answer have more than one digits fill your answer as sum of digits till you get the single digit answer.