



VIGNAN HIGH SCHOOL

Evaluation Spectrum

Class : Class 7

Subject : IIT Foundation Chemistry

Chapters : 5. Concept of Valency and Electropositive Ions,6. Electronegative Ions,7. Formula,8. Physical and Chemical Changes

Exam : IIT / NEET CUMULATIVE TEST - 2 (Foundation)

Subject Avg : 29

Overall Performance Analysis

| Category | Evidence of Strength | Evidence of Weakness |

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| **Valency & Ionic Charges** | • Correct identification of the Al^{3+} cation in Al_2O_3 .

• Accurate determination of the valencies of Na, P, Ca, and Al in the given simple oxides and chlorides.

• Able to assign the proper valency of nitrogen in NH_3 (3). | • A few students showed uncertainty around the charge state of hydride and carbides, indicating a need for deeper review of multi-atomic ions. |

| **Electronic Configuration** | • Correctly selected the "2, 8, 8, 2" arrangement for Ca, confirming familiarity with the Mendeleev-periodic pattern. | – |

| **Ionic Species Identification** | • Correctly matched Cl^- and NO_3^- , distinguished anionic charges, and identified acetate (CH_3COO^-).

• Recalled "blue vitriol" as CuSO_4 , indicating solid-state chemistry knowledge. | • A notable percentage struggled with the decomposition sequence of "A" (heating → yellow → cooling → white).

• Confusion around naming the correct magnesium sulfide radical formula (MgS). |

| **Formula vs. Symbolic Representation** | • Identified "formula" as the symbolic representation of atom counts (C, D). | – |

| **Physical vs. Chemical Change** | • Recognised a physical change as merely *temporary* (A). | – |

Strengths

1. **Valency & Charge Fundamentals** – Students consistently applied oxidation states in simple binary compounds and recognized the role of the oxygen anion (O^{2-}) in determining cation charges.

2. **Periodic Table Core Structure** – The correct electron-configuration answer shows a solid grasp of shell capacities and the transition from 1s to 4s for Ca.

3. **Common Ions & Nomenclature** – Clear linkage between ionic species (Cl^- , NO_3^- , acetate) and their names/charges demonstrates good rote memorisation and contextual understanding.
4. **Basic Physical Chemistry** – Correct distinction between physical (temporary) and chemical (permanent) processes indicates conceptual clarity.

Weaknesses

1. **Complex or Less-Common Phenomena** – The uncertain answer regarding the heat-induced colour change issue (question about “A”) highlights trouble with decomposition reactions of carbonate species and the interpretation of colour changes.
2. **Multi-Atomic Ion Charges** – Some confusion over the correct “tetra-valent” ion (g., Carbide vs. Hydride) suggests a gap in understanding ionic radii/valency beyond monatomic ions.
3. **Radical/Noble-Gas-Like Species Naming** – Misidentification of MgS vs. Mg_3S_2 patterns points to a need for practicing stoichiometric rules when forming binary ionic compounds.

Recommendations for Improvement

1. Reinforce Oxidation-State Rules

- * Use diagrammatic “charge-balance” worksheets for 2-sided compounds (e.g., X_2O_3 , AX_2).
- * Include mixed-anion systems (NO_2^- , SO_4^{2-}) to solidify the rule that the sum of ionic charges equals zero.

2. Deep-Dive Into Decomposition Reactions

- * Provide case studies of CO_2 evolution from bicarbonates/ carbonates, noting colour/solid changes.
- * Conduct a bench-experiment on NaHCO_3 or CaCO_3 decomposition to visualise the colour shift and open discussion.

3. Map Ion Charges to Placement in the Periodic Table

- * Create a “valency grid” (Table I: Alkali A (1), Ammonium (1), Transition (2–6), Alkaline Earth (2), etc.) and have students colour-code ions.

4. Practice Radical/Binary Compound Formulae

- * Use algorithmic formula generation: “sum of metal charges = sum of non-metal charges” and test students with Mg-S , Al-O , Ca-F examples.

5. Include Visual Charts for Common Ions

- * Handouts showing popular ions (acetate, nitrate, carbonate, hydroxide, oxides) with their charges and typical compound associations.

6. Cross-Check Problem-Solving Approach

- * Encourage students to write down “known charges” for each atom in a compound and proceed

step-by-step, reducing spontaneous guesswork.

7. Quizzes & Peer Discussions

- * Conduct short, timed quiz rounds on the weak topics identified.
- * Use pair-work so students can explain reasoning to each other, reinforcing the curriculum.

By channeling focused practice in the weaker areas while celebrating the robust foundational concepts already demonstrated, students will achieve a balanced, confident mastery of inorganic chemistry essentials.