2025 Ch H1 Q21

Section: Chemical Changes and Structure

Topic: Structure and Bonding

Question Summary

A mixture contains AlPO4 and Al2(SO4)3.

It has 5 mol Al3+ ions and 1 mol PO4^3- ions.

Calculate the moles of SO4^2- ions present.

Options: A 1, B 2, C 4, D 6.

Worked Solution

PO4^3- comes only from AlPO4. 1 mol PO4^3- $\rightarrow$ 1 mol AlPO4.

Al3+ total: 1(from AlPO4) + 2y(from Al2(SO4)3) = 5.

2y = 4 $\rightarrow$ y = 2 mol Al2(SO4)3.

Each Al2(SO4)3 has 3 sulfate ions.

SO4^2- = 3 × 2 = 6 mol.

Final Answer D

6 mol of sulfate ions.

Revision Tips

- Identify sources of each ion separately.
- Use subscripts to count ions per formula unit.
- Form simple equations when two substances contribute ions.
- Always check totals match question data.