

- 注意事項： 1. 答案一律寫在試卷上，否則不予計分。
2. 請標明題號依序作答，不必抄題。
3. 試題應隨同試卷繳回，不得攜出試場。

- Write chemical formula for the following: (6%)
 - potassium bicarbonate
 - dimethylamine
 - tetraaquadibromochromium(III) nitrate
- Predict the hybridization of the central atom and draw the geometry for each of the following species: (6%)
 - XeF₂
 - BCl₃
 - Ni(CN)₄²⁻
- Choose and explain:
 - higher ionization energy: N or O (4%)
 - smaller bond angle: NO₂ or NO₂⁻ (4%)
 - higher boiling point: CH₃OH or CH₃SH (4%)
 - larger bond dissociation energy: C₂⁺ or C₂⁻ (6%)
- Give the crystal field stabilization energy (CFSE) of each of the following complex ions: (6%)
 - Fe(CN)₆³⁻
 - CoF₆³⁻
 - CoCl₄²⁻ (tetrahedral)
(₂₆Fe, ₂₇Co)
- Will any CdS precipitate from a solution that is 0.10M in Cd²⁺ if it is acidified with HCl so that the [H₃O⁺]=1.0M, and saturated with H₂S so that [H₂S]=0.10M? (K_{sp}(CdS)=4×10⁻²⁹, K_{a1}(H₂S)=1.0×10⁻⁷, K_{a2}(H₂S)=1.3×10⁻¹⁴) (6%)
- When 2.00 mol of SO_{2(g)} react completely with 1.00 mol of O_{2(g)} to form 2.00 mol of SO_{3(g)} at 25°C and a constant pressure of 1.00 atm, 198 KJ of energy are released as heat. Calculate ΔH and ΔE for this process. (R=8.314 JK⁻¹mol⁻¹) (8%)