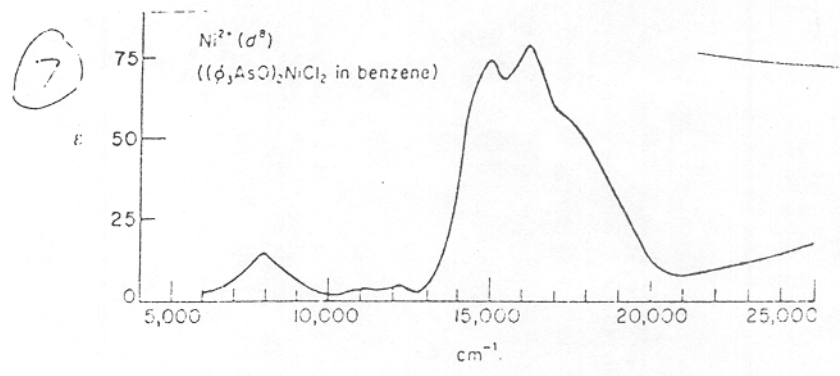
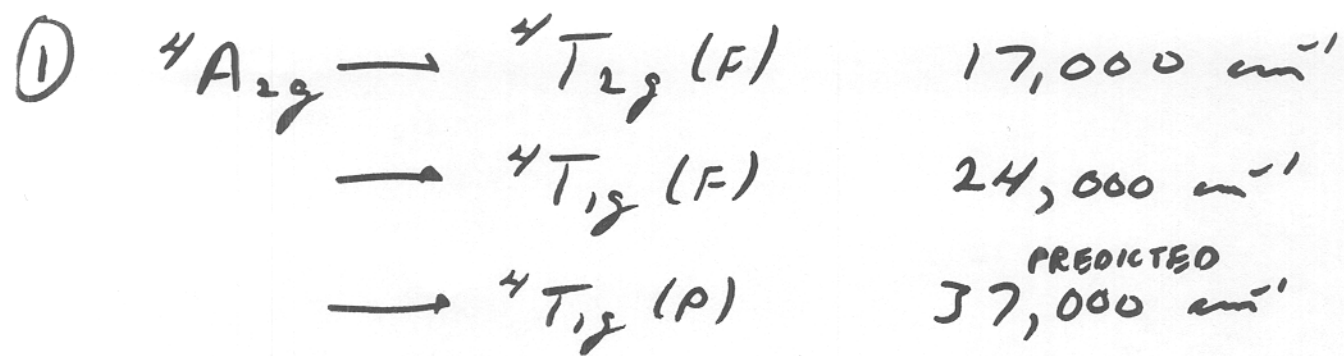


USING TANABE-SUGANO DIAGRAM
ASSIGN SPECTRA, DETERMINE $10Dq$
AND B . COMPARE B WITH FREE ION VALUE
QUESTIONS 1, 2, 3, 4, 5, 6
COMPLEXES OF THE FORMULA.
 $[M(H_2O)_6]^{n+}$, HIGH SPIN

QUESTION 7. TETRAHEDRAL
COMPLEX.





BEST FIT FOR TWO LOWER BANDS OCCURS AT

$$|Dq/B| = 2.45$$

TO SOLVE FOR B + Dq

$$\frac{{}^4A_{2g} \rightarrow {}^4T_{2g}}{B} = \frac{17,000}{B} = 2.45$$

HENCE $B = 695 \text{ cm}^{-1}$

+ $10Dq = 17,000 \text{ cm}^{-1}$



ALL SPIN FORBIDDEN TRANSITIONS

④ ${}^6A_{1g} \rightarrow$

\rightarrow	${}^4T_{1g} (G)$	18,600 cm^{-1}	
\rightarrow	${}^4T_{2g} (G)$	22,900	
\rightarrow	${}^4E_g (G)$	24,900	D_2/B AT 1.1
\rightarrow	${}^4A_{1g} (G)$	25,150	
\rightarrow	${}^4T_{2g} (O)$	27,900	$B = 770 \text{ cm}^{-1}$
\rightarrow	${}^4E_g (O)$	29,700	

$10D_2 = 8,500 \text{ cm}^{-1}$

⑤ ${}^2T_{2g} \rightarrow {}^2E_g$ 20,300 $\text{cm}^{-1} = 10D_2$

⑥ ${}^3T_{1g} \rightarrow$

\rightarrow	${}^3T_{2g} (F)$	17,200 cm^{-1}
\rightarrow	${}^3T_{1g} (P)$	25,600

D_2/B AT 2.8

$B = 665 \text{ cm}^{-1}$

$10D_2 = 18,600 \text{ cm}^{-1}$

⑦ ${}^3T_1 (F) \rightarrow$

\rightarrow	${}^3A_2 (F)$	7,800 cm^{-1}
\rightarrow	${}^3T_1 (P)$	16,000 cm^{-1}
\rightarrow	${}^3T_2 (F)$	PREDICTED AT 3,500 cm^{-1}

$D_2/B = 0.5$

$B = 850 \text{ cm}^{-1}$

$10D_2 = 4,200 \text{ cm}^{-1}$