P-8

Sem-6

Ce-14 (class-3)

We know, Rotational energy in terms of wave number ($\frac{1}{\lambda}$)

$$\bar{J} = \frac{1}{\lambda} = BJ(J+1) \text{ cm}^{-1} \quad \text{...(13)}$$

where $B = \frac{h}{8\pi^2 I c}$ = Rotational constant.

Puting the value of $J = 0, 1, 2, 3$ we get

When, $J = 0$, $\bar{\nu} = 0$

$J = 1$, $\bar{\nu} = 2B$

$J = 2$, $\bar{\nu} = 6B$

$J = 3$, $\bar{\nu} = 12B$

$J = 4$, $\bar{\nu} = 20B$

$J = 5$, $\bar{\nu} = 30B$

$J = 6$, $\bar{\nu} = 42B$

NOTES

30 5th Week • 030-336
JANUARY
Thursday

The allowed rotational energy level diagram is given below for a rigid diatomic molecule

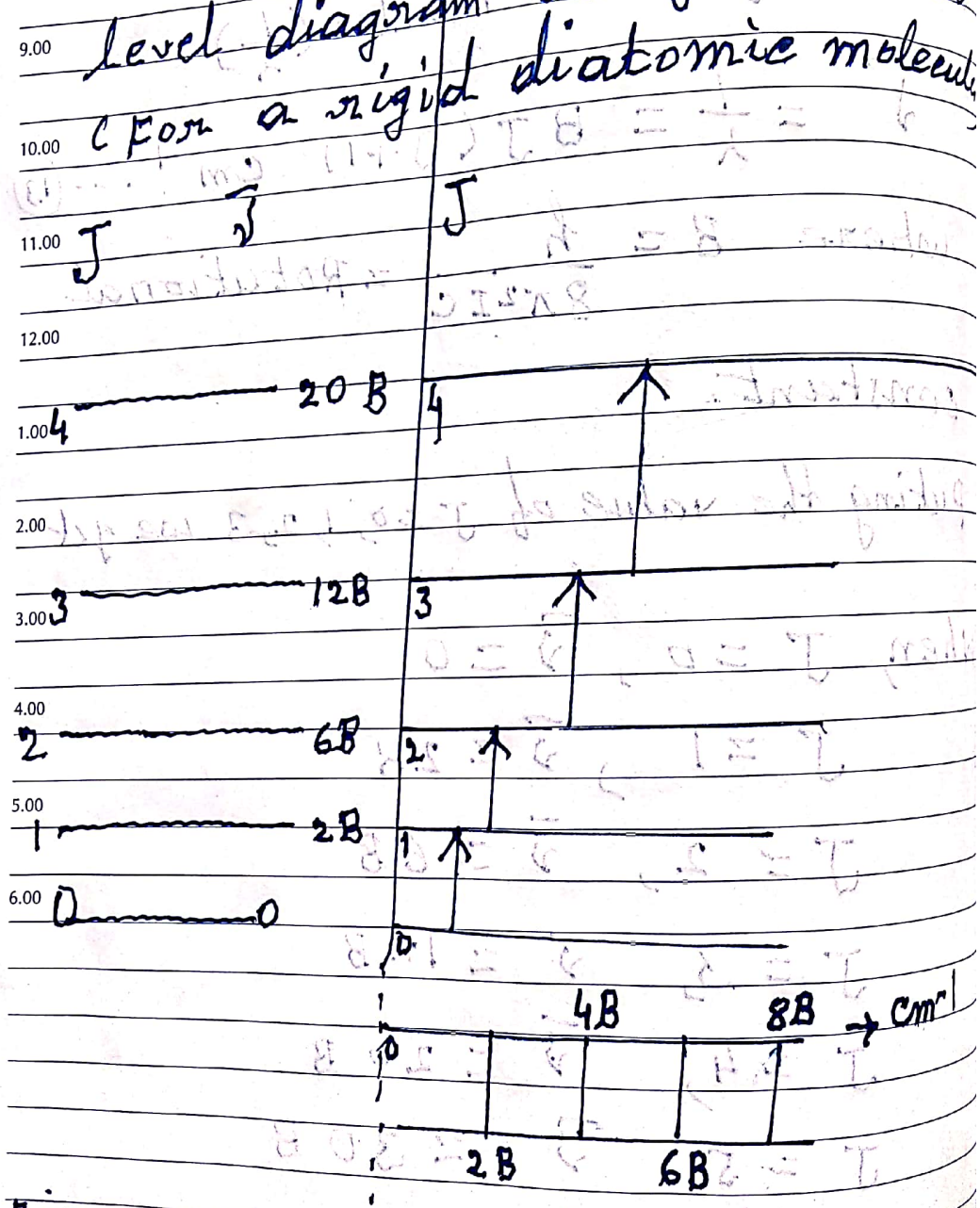

Fig-1 Fig-2

Fig-1 : The allowed rotational energy levels of a rigid diatomic molecule.

Fig-2 Allowed transitions between the energy levels of a rigid diatomic molecule and the spectrum which arises from them.