1. $\lambda = 1098.7$ nm

2.

n	(0.49 − 0.51)	(0.24 − 0.26)
1	0.0399	0.02
2	5.25×10^{-5}	0.0399

Plot of $|\psi_n|^2$
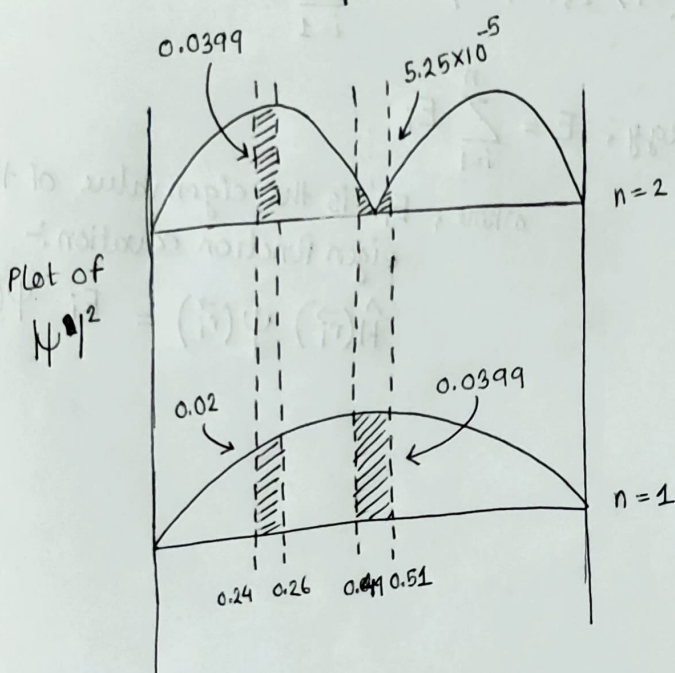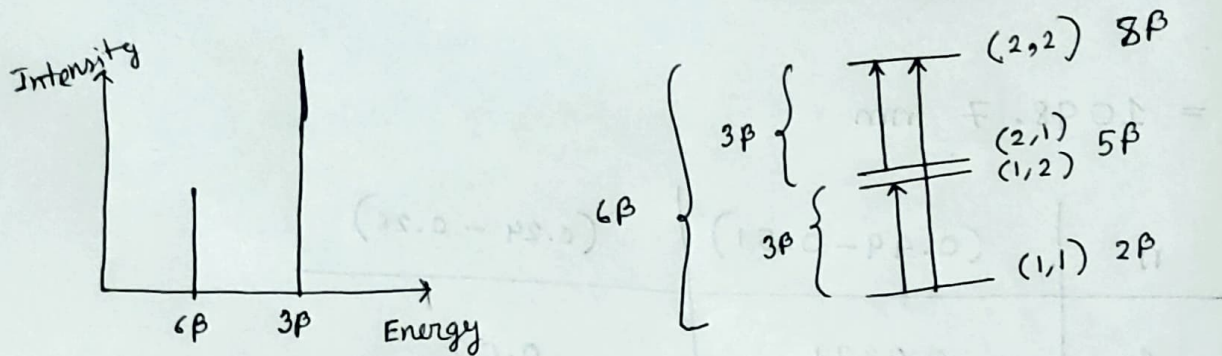

3.
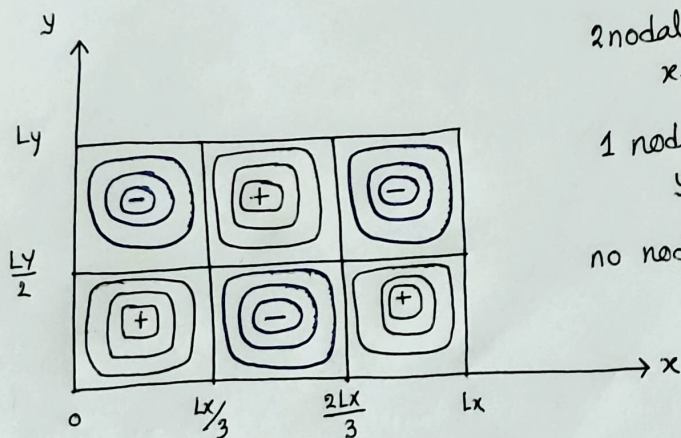
2 nodal lines along x-direction

1 nodal line along y-direction

no nodal points!

4. 2 distint transitions will be observed

Assumption 2

$(2,2) \quad 8\beta$

$3\beta \left\{ \begin{array}{l} \\ \end{array} \right.$ $\quad (2,1) \quad 5\beta$
$\quad (1,2) \quad 5\beta$

$6\beta \left\{ \begin{array}{l} \\ \end{array} \right.$

$3\beta \left\{ \begin{array}{l} \\ \end{array} \right.$ $\quad (1,1) \quad 2\beta$

5. Hamiltonian operator is additively seperable [condition]

$$\Rightarrow \quad \hat{H}(\vec{r_1}, \vec{r_2}, \ldots \vec{r_n}) = \sum_{i=1}^{n} \hat{H}(\vec{r_i})$$

Total energy, $E = \sum_{i=1}^{n} E_i$

where, E_i is the eigen value of the following eigen function equation :-

$$\hat{H}(\vec{r_i}) \, \psi(\vec{r_i}) = E_i \cdot \psi(\vec{r_i})$$