



Basic Physical Chemistry I

Jun Okabayashi
2020.6.16

Q21

Summarize the principle of synchrotron radiation.

Q22

Prove the Fermi's golden rule.

Q23

Prove \mathcal{H}_{SO} from Biot-Savart's law and Dirac equation.

Q24

Estimate the energy splitting under the spin-orbit coupling ξ between $j = l + \frac{1}{2}$ and $j = l - \frac{1}{2}$.

Q25

Summarize the principle of photoemission spectroscopy.

Q26

Explain the origin of chemical shift in XPS.

Q27

Draw the C 1s XPS line shapes in $\text{CH}_3\text{COOCH}_3$ and $\text{CH}_3\text{-CHCl-CHI-CH}_2\text{-CH}_3$.

Q28

Explain about Angular overlap model (AOM).

Q29

Explain the principle of transistor.

Q30

Explain the reason why Coulomb potential in O_h symmetry is written as follows. Here, $A = \frac{6Ze^2}{a}$ and $D = \frac{35Ze^2}{4a^5}$ are defined using the distance a , electron number in center ions Z , and electron charge e .

$$U = A + D \left(x^4 + y^4 + z^4 - \frac{3}{5} r^4 \right)$$

(Summation of symmetric six kinds of sites and spherical harmonic functions are necessary for the calculation.)

Q31

Explain about your research if relates to spectroscopy.