Unit 11 - Week - 8 - Electronic Transitions

Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

1) For centrosymmetric molecules, transition from d orbital to d orbital is — *1 point*

- Spin forbidden
- Laporte forbidden
- Laporte allowed
- Spin allowed

No, the answer is incorrect.
Score: 0
Accepted Answers:
Laporte forbidden

2) Find the spin allowed transition form the following — *1 point*

- $^1\Sigma \rightarrow {}^1\Pi$
- $^1\Sigma \rightarrow {}^3\Pi$
- $^3\Sigma \rightarrow {}^3\Pi$
- $^3\Sigma \rightarrow {}^1\Pi$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$^1\Sigma \rightarrow {}^1\Pi$

3) Which of the following transition is Laporte allowed — *1 point*

- $^1\Sigma_g \rightarrow {}^1\Delta_g$
- $^1\Sigma_g \rightarrow {}^1\Delta_g$
- $^1\Sigma_g \rightarrow {}^1\Pi_u$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
$^1\Sigma_g \rightarrow {}^1\Pi_u$

4) The given transition, $^1\Sigma_g \rightarrow {}^1\Pi_u$ is — *1 point*

- Spin allowed but Laporte forbidden
- Laporte allowed but Spin forbidden
- Both spin and Laporte allowed
- Both spin and Laporte forbidden

No, the answer is incorrect.
Score: 0
Accepted Answers:
Both spin and Laporte allowed

5) For naphthalene, what will be the state corresponding to given configuration? — *1 point*

$b_{1u}^2\, b_{1g}^2\, b_{2g}^0\, b_{1u}^2\, a_u\, b_{3g}$

- B_{3u}
- B_{3g}
- A_{1g}
- A_{2u}

No, the answer is incorrect.
Score: 0
Accepted Answers:
B_{3u}

6) If the given transition is spin allowed. $^{(2s+1)}\Sigma_g \rightarrow {}^1\Gamma_u$ then what is the value of 's'? — *1 point*

- 0
- 1
- 1/2
- 2

No, the answer is incorrect.
Score: 0
Accepted Answers:
0

7) For a transition from Ψ to Ψ', the transition moment integral (M) is given as — *1 point*

$$M = \int \Psi'_{ev}\Psi'_{vb}\,d\tau \int \Psi'_{rt}\Psi'_{sp}\,d\tau \int \Psi'_{el}\hat{\mu}_e\Psi_{el}\,d\tau + \int \Psi'_{ev}\Psi_{el}\,d\tau \int \Psi'_{el}\hat{\mu}_N\Psi_{el}\,d\tau$$

[Where,$\Psi = \Psi_{ev}\Psi_{el}$ and further $\Psi_{ev} = \Psi_v\Psi_r$ and $\mu = \mu_e + \mu_N$; v stands for vibration and depends on nuclear coordinations]

Now, the second integral $\int \Psi'_{ev}\Psi_{el}d\tau \int \Psi'_{el}\,\hat{\mu}_N\,\Psi_{el}\,d\tau$ becomes zero, because of the fact

- $\int \Psi^*_{sp}\hat{\mu}_N\Psi_g\,d\tau = 0$, because Ψ_{sp} and Ψ_g are orthogonal
- $\int \Psi^*_{evp}\Psi_{es}d\tau = 0$, because μ_N is zero
- $\int \Psi^*_{evp}\Psi_{es}d\tau = 0$, because Ψ_{evp} and Ψ_{es} are othogonal
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:

$$\int \Psi^*_{evp}\Psi_{es}d\tau = 0, \text{ because } \Psi_{evp} \text{ and } \Psi_{es} \text{ are othogonal}$$

8) Consider the integral of Question no.7. After equating the second part on the right hand side to zero, it gets simplified to — *1 point*

$$M = \int \Psi'_{ev}\Psi_{ij}\,d\tau \int \Psi'_{el}\Psi_{i}\,d\tau \int \Psi'_{el}\hat{\mu}_e\Psi_{e}\,d\tau$$

The first integral $[\int \Psi_{ij}{}^* \cdot \Psi_i\, d\tau]$ is known as

- Franck-Condon factor
- Laporte factor
- Spin selection factor
- (a) and (b) both

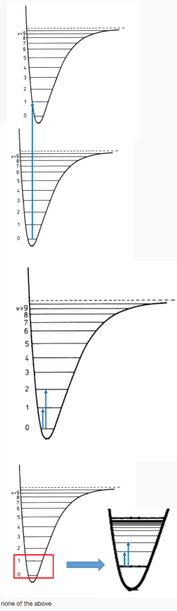
No, the answer is incorrect.
Score: 0
Accepted Answers:
Franck-Condon factor

9) Given that the energy integral $\int \Psi_i H \Psi_j\, d\tau$ is non-zero. Then Ψ_i and Ψ_j _____. — *1 point*

- belong to two different IRs
- belong to the same IR
- ust belong to two different IRs having different dimentionalities
- none of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
belong to the same IR

10) Which of the following picture represents an electronic transition — *1 point*



- none of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: