Unit 6 - Measurement Techniques in Ultrafast Spectroscopy, and their kinetic and quantum mechanical models

Course outline

- How to access the portal?
- Introduction and Mathematical Representation
- Nonlinear Effects
- Dispersion Effects and Transverse Electromagnetic Mode
- Construction of Ultrafast Laser and Measurement of Pulses
- Measurement Techniques in Ultrafast Spectroscopy, and their kinetic and quantum mechanical models
  - Measurement Techniques in Ultrafast Spectroscopy
  - Kinetic Model of Ultrafast Spectroscopy
  - Kinetic Model of Ultrafast Spectroscopy (Continued .)
  - Quantum Mechanical Model of Ultrafast Spectroscopy
  - Quiz : New Assessment week 5
- Ultrafast Processes in Physical Chemistry – Photophysics, Photochemistry, Solid State, Transition Metal Complexes and Biomolecules
- Maxwell's Equations
- Ab Initio Molecular Dynamics of Photochemistry and Photophysics – Part 1
- Ab Initio Molecular Dynamics of Photochemistry and Photophysics – Part 2
- Attosecond Chemical Dynamics – Theoretical Point of View
- Attosecond Chemical Dynamics – Experimental Point of View
- Femtochemistry of Nanocatalysis

New Assessment week 5

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

Due on 2019-09-04, 23:59 IST.

1) Probability of nonadiabatic surface jump from upper electronic state to lower electronic state: *1 point*

- is proportional to the energy gap between the electronic states
- is inversely proportional to the energy gap between the electronic states
- does not depend on the energy gap between the electronic states
- only depends on the mass of the particle

No, the answer is incorrect.
Score: 0
Accepted Answers:
is inversely proportional to the energy gap between the electronic states

2) For a diatomic molecule, two electronic states of same symmetry *1 point*

- may cross, depending on the mass of the atoms
- will always cross
- may cross depending on the energy gap between the two states,
- will never cross.

No, the answer is incorrect.
Score: 0
Accepted Answers:
will never cross.

3) Which one of the following is the representation of Born expansion of the total wave function *1 point*

- $\Psi=\sum_i \chi_i \Phi_i$
- $\Psi=\chi_i \Phi_i$
- $\Psi=\chi_i$
- $\Psi=\Phi_i$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\Psi=\sum_i \chi_i \Phi_i$

4) Plasmon excitation in a nanoparticle is nothing but *1 point*

- a HOMO-LUMO transition
- an electronic transitio
- a phonon transitio
- a collective oscillation of all the electrons

No, the answer is incorrect.
Score: 0
Accepted Answers:
a collective oscillation of all the electrons

5) Which one of the following is true? *1 point*

- Frenkel excitons typically exhibit larger exciton binding energies than Mott-Wannier exciton
- Mott-Wannier exciton binding energies are not comparable to the thermal energy kT
- Frenkel excitons binding energies are comparable to the thermal energy kT
- Mott-Wannier exciton typically exhibit larger exciton binding energies than Frenkel excitons.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Frenkel excitons typically exhibit larger exciton binding energies than Mott-Wannier exciton

6) Typical lifetime of Plasmon of a nanoparticle is *1 point*

- 2 ps
- 2ns
- 2fs
- 2 µs

No, the answer is incorrect.
Score: 0
Accepted Answers:
2fs

7) Rate of IC and ISC can be comparable in a photochemical process due to *1 point*

- strong spin-spin coupling
- strong spin-orbit coupling
- strong orbital angular momentum
- strong spin angular momentum

No, the answer is incorrect.
Score: 0
Accepted Answers:
strong spin-orbit coupling

8) A common trend of photochemistry of molecules containing C=C is *1 point*

- rotation of the C=C bond
- cis-cis isomerization
- trans-trans isomerization
- cis-trans isomerization

No, the answer is incorrect.
Score: 0
Accepted Answers:
cis-trans isomerization

9) ISC in a photochemical process represents a transition: *2 points*

- from a singlet state to another singlet state
- from a singlet to a triplet state
- from a triplet to another triplet state
- from upper vibrational state to the lower vibrational state in a singlet state

No, the answer is incorrect.
Score: 0
Accepted Answers:
from a singlet to a triplet state

You were allowed to submit this assignment only once.