ASSIGNMENT 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-02-20, 23:59 IST.

1) Wavefunctions of a harmonic oscillator are:

- [ ] Real
- [ ] Imaginary
- [ ] sinusoidal
- [ ] exponential

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

2) For a harmonic oscillator,

- [ ] the lowest possible energy is zero
- [ ] the lowest possible energy is non-zero
- [ ] only the lowest energy level is usually occupied at room temperature
- [ ] higher energy levels can usually be occupied at room temperature

No, the answer is incorrect.
Score: 0
Accepted Answers: the lowest possible energy is non-zero only the lowest energy level is usually occupied at room temperature

3) Selection rule for harmonic oscillators arise from

- [ ] recursion formula of Hermite polynomials
- [ ] recursion formula of Legendre polynomials
- [ ] requirement of non-zero transition moment integral

No, the answer is incorrect.
Score: 0
Accepted Answers:
4) Spacing between successive energy levels of a harmonic oscillator 1 point

- is same
- increases with increase in energy
- decreases with increase in energy
- goes through a maximum

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

5) For IR activity, it is essential that the molecule 1 point

- has a permanent dipole moment
- lacks a permanent dipole moment
- has a dipole moment induced by vibration
- lacks a dipole moment induced by vibration

No, the answer is incorrect.
Score: 0
Accepted Answers: has a dipole moment induced by vibration

6) Spacing between successive energy levels of an anharmonic oscillator 1 point

- is same
- increases with increase in energy
- decreases with increase in energy
- goes through a maximum

No, the answer is incorrect.
Score: 0
Accepted Answers: decreases with increase in energy

7) The zero-point energy of the vibration of $^{35}$Cl$_2$ mimicking a harmonic oscillator with a force constant $k = 2293.8$ N/m is 1 point

- $10.5 \times 10^{-21}$ J
- $14.8 \times 10^{-21}$ J
- $20.9 \times 10^{-21}$ J
- $20.6 \times 10^{-21}$ J

No, the answer is incorrect.
Score: 0
Accepted Answers: $14.8 \times 10^{-21}$ J

8) The wave function for a harmonic oscillator described by $N_x \exp(-ax^2/2)$ has 1 point

- one maximum only
- one maximum, one minimum only
- two maxima, one minimum only
- two maxima, two minima only
No, the answer is incorrect.
Score: 0
Accepted Answers:
one maximum, one minimum only