

9. Electrons that are in different energy levels have
- a. Same probability distribution
 - b. Different probability distribution
 - c. Equivalent probability distribution
 - d. None of the above.
10. Electrons traveling in an elliptical orbit would have in addition to its angular momentum a component momentum along
- a. Radial direction
 - b. Tangential direction
 - c. X- axis
 - d. None of the above.
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(Descriptive)

Time : 1 hr. 15 mins.

Marks:25

[Answer question no.1 & any two (2) from the rest]

1. a. Calculate the formal charge of NO₂ molecule. 1+2+2
=5
b. How to calculate electronegativity in Mulliken's scale?
c. Give a brief account of Dual Nature of electron.

2. a. Show the molecular orbital energy level diagram for O₂⁺ ion 5+5=10
and calculate the bond order and magnetic moment for this ion.
b. Explain the hybridization of PCl₅ and SF₆ molecule using valence bond theory.

3. a. What is called hydrogen bonding? What are the different types of hydrogen bonding? Explain with examples. 3+4+3
=10
b. Define electronegativity and electron affinity? Explain their periodic trends.
c. What is Zeeman Effect? How this led to the formulation of Magnetic Quantum Number?

4. a. Explain Slater's rule. 5+5=10
b. Find out effective nuclear charge for a valence electron of Sulphur.

5. a. What is Line Spectra? How is it produced? 2+3+5
=10
b. Write notes on Heisenberg's Uncertainty Principle.
c. Derive Schrodinger's Wave Equation. What are Eigen Values & Eigen Functions?

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