

Multiple choice test questions will have the style and difficulty level as follows:

1. Which is true for the photoelectric effect?

- A) If the incoming intensity is large, the effect always immediately occurs.
- B) The effect occurs only if the frequency is large enough.
- C) We can always see the effect independently of the frequency of the light.
- D) The energy of the incoming photon is always smaller than the energy of the emitted electron.
- E) The effect occurs only in the case of some discrete frequencies.
- F) If the incoming intensity is small, we have to wait for the effect for hours or days.

-1	4	
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2. Which formula can give the f_{nm} frequencies of the radiation emitted by a Hydrogen atom?

- A) $\frac{E^*}{h} \left(\frac{1}{m^2} - \frac{1}{n^2} \right)$ B) $(n-m)\hbar$ C) $(n^2 - m^2)\hbar$ D) $\frac{E_n - E_m}{c}$ E) $\frac{E^*}{c} \left(\frac{1}{m} - \frac{1}{n} \right)$

-2	4	
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3. If the wave function of an electron is e^{2ix} then which quantity has the largest standard deviation?

- A) velocity B) momentum C) kinetic energy D) x coordinate

-1	3	
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You can choose one of the given 2 elaborative questions from this list:

- 1) Some basic elements of special relativity theory
- 2) Blackbody radiation
- 3) Photoelectric effect and the momentum of the photon
- 4) Line spectra of atoms and the Bohr model
- 5) Wave particle duality of particles, de-Broglie hypothesis
- 6) Wave Function and the principle of superposition
- 7) Operators and eigenvalues
- 8) The concrete form of the operators
- 9) The Hamiltonian and the Schrödinger equation
- 10) Heisenberg's uncertainty principle