Assignment 3

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UID-21BCS7093

Section – 401(B)

UNIT 3

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| **Nanoparticle Type** | **Properties** |
| Carbon-based | Extremely high strength, electrical conductivity |
| Ceramic | Heat resistance, chemical inertness |
| Metal | High surface energy, small molecule adsorption |
| Semiconductor | Wide bandgaps, quantization of energy levels |
| Polymeric | Encapsulated morphology, biodegradable/biocompatible |
| Lipid-based | Self-assembly, biocompatible |

Quantum confinement effects describe electrons in terms of energy levels, potential wells, valence bands, conduction bands, and electron energy band gaps. The quantum confinement effect is observed when the size of the particle is too small to be comparable to the wavelength of the electron. Obviously, the confinement of an electron and hole in nanocrystals significantly depends on the material properties, namely, on the Bohr radius *a*B.

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Unit 1 Assignment

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Bohr correctly proposed that the energy and radii of the orbits of electrons in atoms are quantized, with energy for transitions between orbits given by , where is the change in energy between the initial and final orbits and hf is the energy of an absorbed or emitted photon.

Spontaneous emission takes place without interaction with other photons, and the direction and phase are random. Stimulated emission takes place when the excited electron interacts with another photon.

When an isolated atom is excited into a high-energy state, it generally remains in the excited state for a short time before emitting a photon and making a transition to a lower energy state. This fundamental process is called spontaneous emission.

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Unit 2 Assignment

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