



*Arab Academy for Science & Technology & Maritime Transport  
(AASTMT – Cairo Branch)*

*College of Engineering & technology*

*Electronics & Communication Engineering Department*

Course : Solid State Electronics

Course Code : EC210

## Sheet #8

### TextBook

'Principles of Electronic Materials and Devices', Third Edition, S.O. Kasap © McGraw-Hill, 2006

### Constants:

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ Fm}^{-1}$$

$$\text{Charge of electron (q)} = 1.6 \times 10^{-19} \text{ C}$$

$$\text{Mass of electron (m}_e\text{)} = 9.1 \times 10^{-31} \text{ kg}$$

$$\text{Plank's Constant (h)} = 6.63 \times 10^{-34} \text{ Js}$$

### Solve the following problems

- [1] Consider an electron in an infinite potential well of size 0.1nm (typical size of an atom).
- What is the ground energy of the electron?
  - What is the energy required to put the electron at the third energy level?
  - How can this energy be provided?
  - Plot the corresponding E-k diagram.
  - Find the expression for the wavefunction of the first and second energy level, with all constants replaced with values.
- [2] Example 3.10 p.220.
- [3] Example 3.11 p.220