Nepal college of information echnology

Assessment

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| Level: Bachelor | Semester – Fall | Year : 2014 | |
| Programme: BE-ELX/CE | | Full Marks : 100 | |
| Course: Electrical Engineering Materials | | Time : 3hrs. | |
| *Candidates are required to give their answers in their own words as far as practicable.* | | |
| *The figures in the margin indicate full marks.* | | |
| Attempt all the questions. | | |

1. a) Find the necessary mathematical expression for Schrodinger’s wave equation. 7

b) An electron is confined to an infinite potential well of size 0.1 nm. Calculate the ground energy of the electron and radian frequency. How this electron can be put to the fourth energy level? 4

c) What is contact potential? Explain in short. 4

2. a) What is effective mass? Find the necessary mathematical expression. 7

b) Calculate the drift mobility of electrons in copper at room temperature. Conductivity, mass and density of copper are 5.9 \* 105 Sm/cm, 63.5 gm/ Mol and 8.93 g/ cm3 respectively. 8

3 a) Explain the process of ionic conduction in liquid with necessary figure. 7

b) Compare and contrast Insulator, Conductor and Semiconductor? 8

4. a) What is Einstein relationship? Find the necessary mathematical expression for this 7

b) Prove that Fermi energy lies at the center of valence band and conduction band? 8

5. a) Compare and contrast insulator, semiconductor and conductor to each other. 4

b) What is barrier potential? Find the necessary mathematical expression of built in potential/ Junction potential of PN junction. 7

c) An n type semiconductor doped with 1016/cm3 phosphorous atoms has been doped with 1017/cm3 boron atoms. Calculate the electron and hole concentrations in S/C. 4

6. a) Explain different biasing in pn junction. 7

b) Define wafer? Explain Czochralski method of crystal growing. 8

7. Write short notes. (Any two) 2×5

a) E-K relationship

b) Photolithography

c) Metal semiconductor junction.

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