Microelectronics Exercises of Topic 1

ICT Systems Engineering EPSEM - UPC

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1 Introduction to integrated circuits and microelectronics

EXERCISE 1.1 Define what is meant by intrinsic and extrinsic semiconductor material. Indicate the types of current carriers present in each.

EXERCISE 1.2 Explain how pure silicon can be modified to exhibit electrical conductivity by means of electrons or by means of holes as the majority charge carriers. Compare electron mobility with hole mobility and justify the reasons behind the observed difference.

EXERCISE 1.3 Describe the main properties that characterize the following materials: monocrystalline silicon, polycrystalline silicon (polysilicon), silicon dioxide and amorphous silicon.

EXERCISE 1.4 Define what is meant by integrated circuit. Make a list of the advantages of this type of circuit compared to circuits made with discrete components. Please also indicate the difference between a monolithic integrated circuit and a hybrid integrated circuit.

EXERCISE 1.5 Explain the main physical phenomena that occur in a PN junction and its behavior as it is forward biased or reverse biased.