

## Exercise 2.6-1

### All Quick Questions / Class Exercises to

#### 2. Semiconductor Materials and Products

##### Subchapter 2.1: General Chemistry and Structure

- Ponder the [history](#) of "**LCD**" flat panel displays.
- [Why does the world need saving](#)? How shall it be done?
- [Why do we use crystals](#), preferably single crystals, preferably "perfect" single crystals in case of doubt?
- Supply [examples for critical parameter](#) - component couplings.
- [What makes a semiconductor interesting](#) for technology?
- How would you like your [bandgap](#), Sir?
- What does it mean to [dope a semiconductor](#) in reality?
- Come up with **2 - 3** examples where [product requirements transfer to shape / structure requirements](#).
- [Can you still afford it](#) if your present product is hugely successful? - What could that mean?
- [Provide examples \(and criteria\)](#) for the products listed

##### Subchapter 2.2: Silicon

- What is the [approximate lateral](#) size of **one** transistor in an IC?
- Why are there no **16 GB memory chips** *now*?
- What [properties](#) should a semiconductor have for making IC's?
- What exactly produced [complexity and market growth rates](#) of **30 %** for more than **30** years (for **Si IC's**)?
- [Where will it end?](#)
- What do you know about **MEMS**?
- Are there any [other uses of Si](#) you know off (or can find quickly)?

##### Subchapter 2.3: III-V Semiconductors

- [What band gaps of which type](#) would we like to have for **III-V** properties?
- [What are the requirements for substituting light bulbs by LED's](#)? Compare your answers to the list in the script.
- What are the requirements for substituting light bulbs by **LED's**? What is the [state of the art](#)?
- [Amend and discuss](#) the list of optoelectronic products given so far.

##### Subchapter 2.4: Other Semiconductors and Products

- What are the strengths and weaknesses of **Ge**?
- Why is **SiC** both very desirable and very difficult as a semiconductor material?
- What are **II-VI** semiconductors and *chalcogenides*? Why are these materials of some interest?
- Name at least two important semiconductors of the above groups and what they are used for.
- What are *organic semiconductors* and their important uses?