

Wireless Sensor Networks 201000075 - Exam

The exam consists of the questions below. Be concise and to the point, all questions can be answered in less than 10 lines. Every question has an equal weight, so 2 points each.

Good luck!

- 1) Energy consumption of WSNs are for a large extend caused by the energy consumption of the wireless communication.
 - a) Not all that energy consumption is actually effective. What are the main causes of energy consumption overhead in MAC protocols for WSNs? Mention at least four.
 - b) There are large differences between wireless communication in air (using RF) and water (using acoustic). Underwater communication has several special characteristics. Mention the 3 most relevant characteristics related to wireless transmission in underwater environments.
 - c) Explain how much the aforementioned (1a) energy consumption overheads are important in MAC protocols in the two media (air and water).

- 2) There are two main streams in MAC protocol methodology: time schedule based, and contention based.
 - a) What are the major advantages and disadvantages of time schedule based protocols. Mention three of each.
 - b) The tradeoff may actually depend also on the traffic over the network. What traffic types fit better to contention based methods, and what types better to time based methods?

- 3) 3. Most WSN network architectures are based upon mesh networking, and few on a star network topology.
 - a) What are the main advantages of a mesh network, and what are the main disadvantages? Mention at least 3 of each.
 - b) There are actually several tradeoffs to be made on the aspect of energy consumption in a star network and in a mesh network. Many people say that a mesh network consumes less energy because the transmission range is smaller. Give some counter arguments why that is not always the case.

- 4) 4. Standardization is getting importance in the area of WSN.
 - a) Give five examples of relevant standardisation activities related to wireless communication, and indicate at what part of the protocol stack they are positioned.
 - b) What are the two major standardisation activities that are specifically designed to be used in industrial environments?
 - c) What makes them suitable for these environments?

- 5) 5. Delay Tolerant Networks and opportunistic networks are a subclass of WSNs.
 - a) What is an opportunistic sensor network?
 - b) What are the three main phases in routing in a DTN?
 - c) What are the five main differences between WSN and DTN?