

Wireless Sensor Networks 201000075 - Exam

November 7, 2014, RA 4327

8:45 – 10:15

The exam consists of the questions below. The duration of the exam is one hour and a half. Be concise and to the point, all questions can be answered in less than 10 lines. No books or other reading material is allowed.

Good Luck!

1. Energy efficiency is one of the major goals when designing a MAC protocol for WSNs.
 - a. Give three main reasons what causes a MAC protocol to be in-efficient in regards to energy consumption.
2. Low Power Listening protocols are commonly used in WSNs
 - a. What is the basic principle of Low Power Listening protocols?
 - b. What are two major disadvantages of Low Power Listening (LPL) protocols?
3. An approach to achieve energy efficiency in WSN communication is by using Time Division Multiple Access (TDMA) protocols.
 - a. What is the major reason why TDMA protocols can be more efficient?
 - b. What is the major disadvantage of TDMA in respect to energy efficiency?
4. What are major reasons to use multi-channel network protocols?
5. WirelessHART is a wireless protocol that a.o. aims to achieve a high reliability. What are the basic mechanisms used to achieve that reliability in WirelessHART?
6. Operating systems for Wireless Sensor Networks are important to ease programming and to provide a level of abstraction to the platforms used.
 - a. What are the two major operating systems in use by WSN community?
 - b. What are the main differences?
7. Positioning or localization systems is an important issue in WSN. Using received signal strengths indication (RSSI) is commonly used as a basic sensing technique.
 - a. What are the two basic mechanisms for which you can use RSSI to implement a localization system?
 - b. What are mechanisms to improve the accuracy of positioning systems?
8. Opportunistic sensor networks are getting much attention recently.
 - a. What is an opportunistic sensor network?
 - b. What are the main challenges involved in such networks?
9. High density networks are networks in which many sensor devices are in close communication range of each other.
 - a. When the density of sensor nodes in an area is getting too high, several problems will arise. What are those problems?
 - b. What are basic mechanisms to handle high density sensor networks?