USN ☐☐☐☐☐☐☐☐☐☐

12SCN331

Third Semester M.Tech. Degree Examination, Dec. 2013/Jan. 2014
Wireless Sensor Networks

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Show that power advantage of an N – hop transmission versus a single – hop transmission is $N^{\alpha-1}$, using usual notations, where α is RF attenuation exponent.   **(06 Marks)**
   b. Prove that, with detection advantage an increase in sensor density by a factor of K improves the SNR at a sensor by 10 log K dB.   **(08 Marks)**
   c. Explain how networked sensors help making roads safer and less congested.   **(06 Marks)**

2 a. In tracking scenario, as a target 'x' moves from left to right across the sensor field, list and explain the activities that are initiated in the network.   **(10 Marks)**
   b. Describe two common types of sensors, acoustic amplitude sensor and direction – of arrival (DOA) sensors used for tracking.   **(10 Marks)**

3 a. Explain Bayesian state estimation used to obtain good estimate of target state.   **(10 Marks)**
   b. What are the reasons that make tracking multiple objects more challenging? How are they addressed using state – space decomposition?   **(10 Marks)**

4 a. Explain the S – MAC protocol and IEEE 802·15·4 standard and ZigBee used for medium access control.   **(10 Marks)**
   b. Explain in detail, unicast geographic routing.   **(10 Marks)**

5 a. Explain the process of clock phase difference estimation, using three message exchanges with a supporting diagram.   **(10 Marks)**
   b. With reference to infrastructure establishment. explain :
      i) Topology control
      ii) Location services.   **(10 Marks)**

6 a. With respect to sensor tasking and control explain the roles of sensor nodes and utilities.   **(10 Marks)**
   b. Draw the flowchart of the information – driven sensor querying (IDSQ) algorithm for sensor and explain briefly.   **(10 Marks)**

7 a. List and explain sensor database challenges.   **(10 Marks)**
   b. With example, explain how In –network aggregation help energy savings when serving aggregate queries.   **(10 Marks)**

8 a. Briefly explain node – level simulators.   **(10 Marks)**
   b. Discuss a list application areas that are expected to be early adopters of wireless sensor networks.   **(10 Marks)**

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