

M. Tech. Distributed & Mobile Computing 1st Year 2nd Sem. Exam. 2019
SUBJECT: Wireless Sensor Networks

Time: Three hours

Full Marks: 100

Answer any five questions.

1. a) What are the similarities and differences between sensor network and ad-hoc network?
 b) How can the sensor node's lifetime be maximized?
 c) What should be the main issues in designing protocols for sensor network?
 d) "Constraint on power consumption is a major design challenge in wireless sensor network."
 Discuss your views on this issue.
 4+4+4+8=20

2. a) When it is advantageous to increase number of hops in wireless sensor networks?
 b) How does routing affect the lifetime of a sensor network?
 c) Describe the Directed Diffusion routing in wireless sensor network.
 d) Discuss the basics of position based routing protocols for WSN.
 4+2+8+6=20

3. a) How does S-MAC solve the problem of collision and overhearing avoidance?
 b) Discuss how the sleep/listen schedules are maintained by the nodes in S-MAC protocol.
 c) Discuss how the nodes synchronize while implementing S-MAC protocol.
 8+7+5=20

4. a) What is the importance of localization in wireless sensor networks? What are the basic phases of existing location discovery approaches?
 b) Why GPS doesn't work well in sensor localization? How RSSI and TDoA are used to determine the distance between two sensor nodes?
 c) What is multi-lateration?
 (3+3)+(2+8)+4=20

5. a) When $R_c > 2R_s$ (R_c is the communication range of a sensor node, and R_s is the sensing range), how can you ensure both coverage and connectivity?
 b) What is 'coverage hole'? State some repair policies of coverage hole.
 c) Give a formal definition of Voronoi diagram and Delaunay triangulation.
 d) What are the different sensing models of a sensor node.
 e) Explain k-barrier coverage problem.
 6+5+3+4+2=20

6. a) What are the different programming models in WSN OS. Indicate which model is best suited for WSN?
 b) What are the desired OS properties of sensor networks? How Tiny OS architecture fulfills those requirements.
 4+(8+8)=20

7. Write short notes on the following :
 a) MAC level challenges in WSN
 c) Greedy Perimeter Stateless Routing (GPSR)
 b) In-network processing
 d) Area coverage
 5X4=20