Ref No: Ex/PG/DMC/T/129A/2018

M. Tech. Distributed & Mobile Computing 1st Year 2nd Sem. Exam. 2018

SUBJECT: Wireless Sensor Networks

Time: Three hours | Full Marks: 100

Answer any five questions.

1. a) Explain the hardware architecture of a sensor node.
   b) Write about the operational states of a sensor node.
   c) Discuss some QoS attributes which are applicable to WSN. "QoS attributes in WSN highly depend on the application." - Explain it.
   d) How does in-network processing help in saving energy in sensor networks ?
   [5+5+(3+3)+4=20]

2. a) Explain the different ways of deploying sensor nodes.
   b) How art-gallery problem is related with sensor coverage problem?
   c) Why Voronoi Diagram is called dual to the Delaunay Triangulation?
   d) What is barrier-coverage problem? Discuss a computational geometry based approach to provide solution for barrier coverage problem. [4+4+2+(3+7)=20]

3. a) Discuss at least two advantages and drawbacks of schedule based protocols.
   b) What are the major sources of energy waste in the MAC layer of WSN? Explain how these energy waste can be minimized using S-MAC protocol.
   a) Explain how the nodes in WSN select their transmission schedules using TRAMA protocol. [4+(4+4)+8=20]

4. a) What are the distance estimation techniques in sensor localization?
   b) Describe trilateration technique with example.
   c) What are the differences between range-based and range-free localization algorithms? Describe one range-free localization approach. [4+8+(4+4)=20]

5. a) Comment critically on the following statement and justify your opinion : "Network survivability is a useful metric for the performance of a routing protocol in WSN."
   b) Discuss a hierarchical routing algorithm.
   c) Explain how the gradient establishment and reinforcement is created in Directed Diffusion.
   [5+7+8=20]

6. a) Give an overview of Tiny-OS architecture. Briefly discuss the Tiny-OS memory model.
   b) What motivates the event-based execution in Tiny-OS? How event-based design improves the low power consumption of a mote? [(5+5)+(5+5)=20]

7. Write short notes on the following : [5X4=20]
   a) Data-centric Network
   b) Duty cycle of a sensor node
   c) Hop-stretch factor
   d) Target coverage