

2125

B.E. (Computer Science and Engineering)
Seventh Semester
CS-704D: Wireless Sensor Network

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C.

x-x-x

SECTION-A

- Q1. a) Why are sensor nodes typically resource-constrained?
b) Which factors affect signal propagation at the physical wireless layer of a WSN?
c) What is the difference between flat routing and hierarchical routing in WSNs?
d) How is Quality of Service maintained in WSNs, especially for applications requiring low delay or high reliability?
e) What is the role of the sink/base station? 10

SECTION-B

- Q2. a) With visual representation, explain the main components of a WSN architecture. 5
b) Describe in detail the key design challenges in Wireless Sensor Networks 5
- Q3. What are the key features required in an operating system for wireless sensor networks? Why traditional desktop/server OSs are not suitable for sensor nodes. Also explain components of OS like the scheduler, communication stack, memory manager, file system, and device drivers with examples. 10
- Q4. a) Explain the major design challenges of MAC protocols in Wireless Sensor Networks. 5
b) What is the difference between naming and addressing and list the drawbacks of using IP addressing in WSNs? 5

SECTION-C

- Q5. a) Why is energy-efficient routing important in WSNs?
b) Name two examples of hierarchical routing protocols in WSNs.
c) What is the main idea behind LEACH protocol? 10
d) What is the difference between range-based and range-free localization?
e) How does mobility affect positioning accuracy?
- Q6. What is the role of the transport layer in WSNs? Explain the key transport layer challenges in WSNs, including congestion control, reliability, energy efficiency, scalability, and event-based data flow. 10
- Q7. Explain the following: 10
a) main hardware components of a sensor node
b) common power sources used in sensor nodes
c) communication standard in Berkeley motes
d) difference between event-driven and thread-driven programming
e) node-level simulators in WSNs

x-x-x