Registration no: | | | | | | | | | | |

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B.Tech
PECS5407

8th Semester Regular / Back Examination 2016-17
WIRELESS SENSOR NETWORKS
BRANCH(s): AEIE, EIE, IEE

Time: 3 Hours
Max Marks: 70
Q.CODE: Z116

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Define and differentiate between homogenous and heterogeneous deployment in wireless sensor network.
b) How random graph model is used to represent wireless sensor network.
c) What is the minimal information required for coarse-grained localization.
d) What are the empirical measurements required for RADAR?
e) What are the advantages of Contention-based MAC protocols over Contention-free MAC protocols
f) Explain exposed node problem with suitable example.
g) Explain the different components of B-MAC protocol.
h) What data-forwarding interruption problem?
i) Define and differentiate between MOR and MER metrics.
j) Explain Pull versus push diffusion.

Q2 **a)** What is Black hole attack in wireless sensor network? **(2)**

b) Explain different types of data aggregation attacks in case of sensor networks with its corresponding countermeasures. **(8)**

Q3 **a)** How linear parameter-based synchronization is used to provide the deterministic bounds on relative clock drift and offset between sender-receiver synchronization. **(5)**

b) How Echolocation technique is used for ordering the received radio signal strengths from different reference nodes as the basis for localization. **(5)**

Q4 **a)** Consider a remote deployment consisting of three sensor nodes A, B, C, and a gateway node D. The following set of stationary packet reception probabilities (i.e. the probability that a packet is received successfully) has been determined for each link from experimental measurements: [A–B: 0.65, A–C: 0.95, A–D: 0.95, B–A: 0.90, B–C: 0.3, B–D: 0.99, C–A: 0.95, C–B: 0.6, C–D: 0.3]. Assuming all traffic must originate at the sources (A, B, C) and end at the gateway (D), explain why a single-hop star topology is unsuitable for this deployment, and suggest a topology that would be more suitable. **(5)**

b) How cone-based topology control (CBTC) technique is used to provide the connectivity in the networks while keeping the power usage of each node as small as possible. **(5)**

Q5 **a)** What is the significance of network topology during deployment of sensors? Analyze the functionality and performance of two-tier hierarchical cluster topology in comparison to other topology. **(5)**

b) Describe the architecture of IEEE 802.15.4 MAC with neat diagram. **(5)**

Q6 **a)** Explain the forwarding routing mechanism for gradient broadcast routing protocol. **(5)**

b) Explain how packets are routed using greedy perimeter stateless routing protocol (GPSR). **(5)**

Q7 Explain different types of traditional approaches for time synchronization in wireless sensor network with suitable examples. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) TinySQL
b) Mobile Deployment
c) Angle of arrival (AoA)
d) S-MAC Protocol