Registration no:

8th Semester Regular / Back Examination 2016-17
WIRELESS SENSOR NETWORKS
BRANCH(S): CSE, IT, ITE, MECH
**Time: 3 Hours**
Max Marks: 70
Q.CODE: Z167
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) What are the difference among unicast multicast and broadcast transmission?
   b) Explain two main objectives of sensor nodes deployment.
   c) What is enclosure graph? What it application?
   d) How the neighboring node is discovered by CBTC protocol.
   e) How maximal breach path is calculated using Voronoi diagram.
   f) Differentiate between Coarse-grained and Fine-grained localization approaches.
   g) Assume that A, F, C, H are the transmitter nodes. Calculate the ID-Code of other nodes from the given graph.
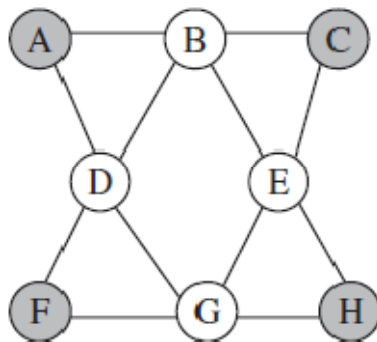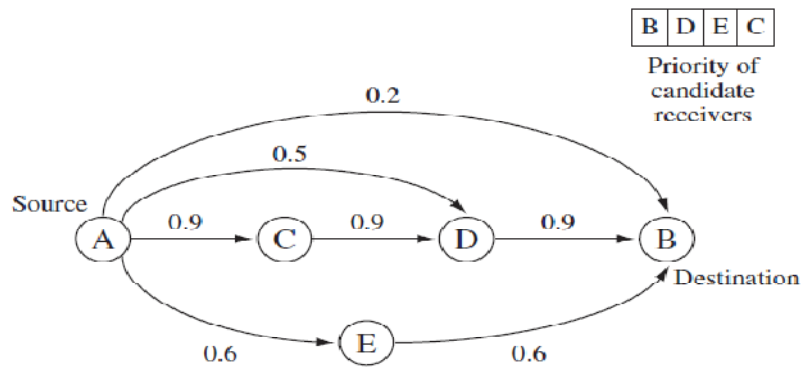

   h) Explain different characteristics of Contention-Free MAC Protocols
   i) Why negative reinforcements are used in directed diffusion protocol?
   j) What is Braided multi-path routing?

Q2 **a)** If a transmitter sends a 20-byte-long preamble on a 10kbps channel, how frequently does a receiver need to sample the medium to ensure that it can wake-up to the receive the packet?   **(2)**
   b) Determine the locations of all unknown nodes in a sequential manner using centroids. Specifically, calculate each unknown node's location in an appropriate sequence as the centroid of three neighboring known locations (either references or previously calculated locations) in the   **(8)**

given graph.

(0,10)
C   F   D (10,10)

(5,5)
E

G   L   J   I

K

A   H   B
(0,0)   (10,0)
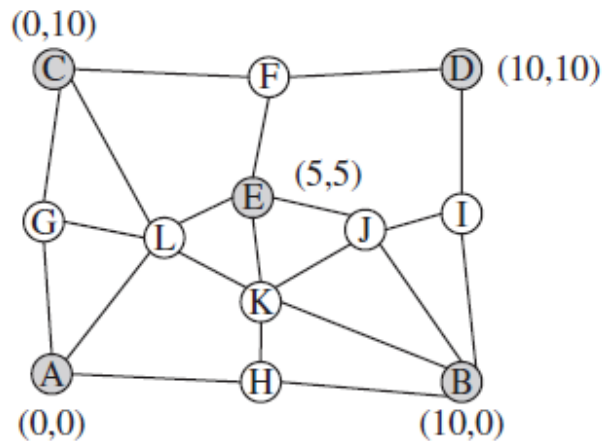
Q3 a) How future-request-to-send (FRTS) is used to avoid the Early sleeping problem in case of T-MAC protocol. **(5)**

b) What is ETX metric? Determine the optimal ETX route from node A to node B in the given graph. Assume that the reverse probabilities for all routes are 1. The packet reception rate (probability of successful delivery) on a link in the forward direction is shown in graph. **(5)**

B	D	E	C

Priority of candidate receivers

0.2

0.5

Source

A   0.9   C   0.9   D   0.9   B

Destination

0.6   E   0.6

Q4 a) Let there are three known reference nodes located at (−2, 0), (1, 1), (2, −2) respectively. Using Triangulation using distance estimation approach estimate the position of an unknown node, if the measured distances from these reference nodes to that unknown node are 1.8, 1.2 and 3 respectively. **(5)**

b) Explain Cristian's time-synchronization algorithm to synchronize the clock time between two nodes with suitable diagram. **(5)**

Q5 **a)** Why CSMA protocol fails to avoid collisions and inefficient in wireless networks. **(5)**

b) Explain how time slots are assigned using traffic adaptive medium access. **(5)**

Q6 **a)** What is early sleep problem in T-MAC protocol? Explain the solution to avoid the early sleep problem in T-MAC protocol. **(5)**

b) Explain different Challenges of Security in Wireless Sensor Networks. **(5)**

Q7 What is Geographic routing in sensor network? How queries are propagated from sink to all sensor nodes using Geographical energy-aware routing (GEAR). **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**
a) Rumor routing
b) Pump Slowly Fetch Quickly(PSFQ)
c) MOR metric
d) S-MAC