

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**M.E –II<sup>st</sup> SEMESTER–EXAMINATION – JULY- 2012**

**Subject code: 725307**

**Date: 14/07/2012**

**Subject Name: Wireless Sensor Networks**

**Time: 10:30 am – 13:00 pm**

**Total Marks: 70**

### **Instructions:**

- 1. Attempt to question 1 is compulsory and answer any five questions from the rest.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

Q. No. 1

[2 Marks X 10 = 20 Marks]

- a. Why lifetime of WSN is an important design consideration?
- b. Explain why MAC addresses should be unique within 2-hop neighborhood with a example
- c. What are the different types of MAC protocols?
- d. What are advantages of multihop communication over single hop communication
- e. Explain steiner tree
- f. Differentiate between STEM-B and STEM-T.
- g. What is black hole and misdirections in the context of security in wireless sensor networks?
- h. What is Denial-of-Service attack?
- i. Explain advantages of gossiping over flooding
- j. Why generally only half-duplex operation is realized in wireless medium?

Q. No. 2

- a. What are the key design challenges of wireless sensor network [5 Marks]
- b. Discuss the Enabling Technologies for Wireless Sensor Networks. [5 Marks]

Q. No. 3

- a. What are the main components of sensor node? Show how they are connected with each other. [4 Marks]
- b. Write a TinyOS application to Blink LEDs randomly after each 10 seconds interval on all sensor nodes [6 Marks]

Q. No. 4

- a. Discuss atleast two S-MAC protocols with suitable case study? [4 Marks]
- b. Discuss the routing strategies of WSN with suitable case study [6 Marks]

Q. No.5

- a. Explain any three routing protocols used for sensor Networks with suitable example [10 Marks]

Q. No.6

- a. Explain various mechanisms used by localization algorithms for measuring distance between nodes. [6 Marks]
- b. Draw schematic flow chart of slotted CSMA-CA used during Contention Access Period of IEEE 802.15.4 MAC protocol. [4 Marks]

Q. No. 7

- a. Explain topology control based on relay regions and enclosures with an example [6 Marks]
- b. Classification and Comparison of routing protocols in WSNs. [4 Marks]

Q. No. 8

- a. Compare microcontroller, microprocessor, FPGA and ASIC as controller component of sensor node. [6 Marks]
- b. Explain with example Cone-based topology control. What are the main goals and advantages of the method? [4 Marks]

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