

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER-V • EXAMINATION – WINTER • 2014

Subject Code: 2650007

Date: 05-12-2014

Subject Name: Wireless Sensor Network (WSN)

Time: 10:30 am - 01:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What are the challenges and hurdles that must be overcome for Wireless Sensor Networks? List them and also give countermeasures to overcome them. **07**
- (b) **Define the following:** **07**
- (i) Reflection (iv) Diffuse Multipath
(ii) Diffraction (v) Specular Multipath
(iii) Scattering (vi) Differential Modulation (vii) Null Spot
- Q.2** (a) What is CSMA/CA and CSMA/CD? Explain the problem of Hidden Node and Exposed Node problem. Explain collision avoidance using RTS/CTS handshaking. **07**
- (b) Which are the resource constraints of sensor nodes? **07**
- OR**
- (b) Explain the intrinsic factors that need to be taken into account for designing Wireless Networks or Wireless Sensor Networks. **07**
- Q.3** (a) Give IEEE 802.15.4 and ZigBee reference model. Also explain its importance in WSN. Give brief about ZigBee stack reference model. **07**
- (b) Explain LEACH protocol's Networking Model, LEACH Phases, features and its threshold cluster-head selection formula of $T(n)$. **07**
- OR**
- Q.3** (a) Explain the fields of general MAC frame, Beacon frame, Data and ACK frame, MAC command frame and Superframe structure as energy saver with proper figures. **07**
- (b) Explain SPIN protocol in detail. Also explain SPIN-PP and SPIN-BC. **07**
- Q.4** (a) List down all the existing Middleware. Explain MiLAN and IrisNet in detail. **07**
- (b) Explain the Management Architecture: MANNA. Also Explain Naming and Localization Issues Related to Network Management. **07**
- OR**
- Q.4** (a) List all the Operating Systems used with WSNs. (i) Explain Tiny OS (ii) Explain MANTIS. (iii) Explain SenOS. **07**
- (b) Explain RMST and PSFQ. **07**
- Q.5** (a) Explain Performance Modeling of WSNs by taking proper performance metrics and basic models. **07**
- (b) Write a note on Classification of routing protocols for wireless sensor networks. **07**
- OR**
- Q.5** (a) Explain Congestion in Transport Layer Protocol. **07**
- (b) Explain CODA with reference to Congestion Detection and Avoidance by Transport Control Protocol. **07**
