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:** (i) Reflection (iv) Diffuse Multipath (ii) Diffraction (v) Specular Multipath (iii) Scattering (vi) Differential Modulation (vii) Null Spot	**07**
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 take 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**

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