Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Regular Examination January / February 2011

Subject code: 710206N
Subject Name: Wireless Computer Networks

Date: 03 /02 /2011 **Time: 02.30 pm – 05.00 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) 1, State the expression, showing the relationship between transmitted power and received power, for the two ray model. Explain each parameter used in the expression. **07**
2, Explain in brief: Multipath Fading and Doppler

(b) Explain with appropriate diagrams Frequency Hopping Spread Spectrum and Direct Sequence Spread Spectrum modulation techniques. In what way these techniques are superior or inferior compared to narrowband modulation techniques? **07**

Q.2 (a) 1, For a CDMA system, if we take W as transmission bandwidth, R as information bandwidth, N as processing gain, Sr as signal to noise ratio, and M as the maximum number of users supported, then derive the relationship between M and W, R and Sr. Also discuss the effect of Sectorization Gain (G_A), the voice activity interference reduction factor (Gv) and the interference factor (Ho) on the value of M, by appropriately modifying the earlier derivation. **07**
2, Explain the Reservation ALOHA Based Wireless Random Access techniques.

(b) Explain the following Access Methods for Wireless LANs: **07**
1, CSMA CA as adopted by 802.11
2, RTS/CTS supported by 802.11.

OR

(b) 1, Compare the Ad-Hoc and Infrastructure Network Topologies. **07**
2, If W is the total available spectrum, B is the bandwidth needed per user, N is the frequency reuse factor, m is the number of cells required to cover an area, and n is the number of simultaneous users in the area covered by m cells, then give an expression that that shows the relation between n and the rest of the above variables.

Q.3 (a) Show that the minimum Sr required as a function of frequency reuse ratio N, for FDMA systems is given by ($3N^2/2$). **07**
Also show that the same Sr in decibels is given by 1.76 + 20 log N

(b) Explain the following capacity expansion techniques with neat diagrams and required mathematical treatment: **07**
1, Using Directional Antennas for Cell Sectoring
2, Lee's Microcell Method

OR

Q.3 (a) Explain Mobile IP. Why do we need it? Explain how Location and Handoff management issues are usually implemented on mobile IP. **07**

(b) Explain by clearly showing the activities taking place between various block / sub-blocks of GSM: **07**

1, The Registration Procedure
2, Call establishment Procedure

Q.4	**(a)**	Name various traffic and control channels of GSM. Clearly explain function of each of them.	**07**
	(b)	In the context of IS-95, what are soft, softer and soft-softer handoffs? Also discuss the open loop and close loop power control in IS-95.	**07**

OR

Q.4	**(a)**	Draw a neat diagram of GPRS system architecture. Explain the function of each block/sub-block. Also discuss the power control and security issues at GPRS.	**07**
	(b)	1, What is an SMS? Give an overview of SMS operation. 2, What is meant by WAP? With appropriate diagrams, explain WAP programming architecture.	**07**
Q.5	**(a)**	Give an overview of 802.11. Describe with good diagrams, its reference architecture as well as layered protocol architecture, explaining the function of each architectural as well as protocol entity, shown in the diagrams.	**07**
	(b)	State the functional requirements for WPANs. What is BLUETOOTH? Explain its overall architecture, protocol stack and physical connection, with neat diagrams.	**07**

OR

Q.5	**(a)**	Explain the registration, handoff and power management at 802.11.	**07**
	(b)	Explain the following: 1, WIMAX 2, Wireless Geo-location.	**07**

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