

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code:710601**Subject Name: Wireless and Mobile Communication****Date: 08 / 07 /2010****Time: 11.00am – 1.30pm****Total Marks: 60****Instructions:**

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

- Q.1** (a) Explain the forward channel modulation process in IS95-CDMA system. **06**
What are the principle differences between the Forward and Reverse Channel modulation process in CDMA?
- (b) What are the different methods for improving Coverage and Capacity in a Cellular System? Explain how sectorization helps in improving the S/I Ratio. **06**

- Q.2** (a) What are the different types of Small Scale Fading mechanisms? Explain each type with necessary equations. **06**
- (b) Prove that the Co Channel Interference is a function of D/R. Where D is the distance between centres of nearest Co Channel Cells and R is the centre to Vertex Distance in Hexagonal Cell Geometry. **06**

OR

- (b) Describe Okumura Model used to predict path loss. **06**
Find the Median path Loss in a suburban environment using Okumura's model for distance between the Transmitter & Receiver $d = 50$ Km, Height of the Transmitting Antenna $h_{te} = 100$ m, Height of the receiving antenna $h_{re} = 10$ m. The base station transmitter radiates an EIRP of 1 KW at a carrier frequency of 1800 MHz. Find the Power at the receiving antenna (Assume unity gain receiving antenna),
From the Okumura Curves for $h_{te} = 200$ m, $h_{re} = 3$ m
 A_{mu} for 1800 MHz, 50 Km = 82 dB
 $G_{AREA} = 10$ dB

- Q.3** (a) Explain GSM Architecture with all its sub systems. **06**
- (b) What is MSK? How one achieves GMSK? Explain why GMSK is used in GSM. **06**

OR

- Q.3** (a) Describe the various types of Channels used in GSM. **06**
- (b) Describe the propagation path loss for a mobile-radio environment over smooth terrain and derive the expression for E_r the Reflected Electric Field in terms of the incident field. **06**

- Q.4** (a) Discuss the different upgrade paths for Evolution of 2.5 G GSM standards. **06**
- (b) Explain in physical rather than mathematical terms why the average power received by the mobile directional antenna is roughly independent of the beam pattern. **03**
- (c) Explain why vertically polarized wave is preferred over horizontally polarized wave for mobile radio environment. **03**

OR

- Q.4** (a) Describe the QPSK Transmission and Detection Techniques. What is the advantage of Offset QPSK (OQPSK) over QPSK. **06**
- (b) Differentiate between Hard Handoff and Soft Handoff. **03**
- (c) What is the RF Channel bandwidth in GSM & IS-95 CDMA?. What is the data rate over the radio Channel in GSM? How many channels are there per carrier. Provide answer giving justification. **03**
- Q.5** (a) Explain in detail the Authentication and Encryption process in GSM. **06**
- (b) Explain the Signal Processing steps in GSM. **06**
- OR**
- Q.5** (a) Explain the Concept of Frequency Reuse & Find **06**
- (i) The number of Duplex Channels
- (ii) The total number of channels per cell site, if $N=4$ Cell reuse is used.
- For Duplex Wireless Cellular System having 20 MHz spectrum allocation & Channel Bandwidth of 25 KHz .
- (b) Explain a typical Call Flow sequence in GSM. **06**
