Reg. No. : | | | | | | | | | | | |

Question Paper Code : Q 2209

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Eighth Semester

(Regulation 2004)

Electronics and Communication Engineering

EC 1451 — MOBILE COMMUNICATION

(Common to B.E. (Part-Time) Seventh Semester – ECE – Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the advantages of micro cell zone concept?

2. Write four objectives of channel assignment strategies.

3. Calculate the Fraunhofer distance of an antenna at 60 MHz for a maximum dimension of 1m.

4. Calculate the Brewster angle for a wave impinging on ground having a permittivity of $\varepsilon_r = 4$.

5. What is CPFSK? What is the main feature of the CPFSK?

6. Mention the bit error probability of GMSK.

7. Why is CDPD advantageous?

8. What is Frequency Hopped Multiple Access (FHMA)?

9. What is Bluetooth?

10. What are the advantages of CCS over conventional Signaling?

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail the various applications of GPRS. (16)

Or

(b) Explain the operations of cellular systems. (16)

12. (a) Derive the equation of the Path loss for the two-ray model with antenna gains. (16)

Or

(b) (i) In a mobile network, the minimum required signal-to-noise-ratio is 10 dB. The background noise at the frequency of operation is - 115 dBm. If the transmitter power is 10 W, transmitter antenna gain is 3 dBi, the receiver antenna gain is 2 dBi, the frequency of operation is 800 MHz and the base station and mobile heights are 100 m and 1.4 m respectively, determine the maximum in building penetration loss that is acceptable for a base station with coverage of 5 km if the following path loss models are used.

Calculate :

(1) Free space path loss and

(2) Two ray path loss. (12)

(ii) What is the received power (in dBm) in free space of a signal whose transmit power is 1 watt and carrier frequency is 2.4 GHz if the receiver is at a distance of 1.6 km. (Assume antenna gains to be unity). (4)

13. (a) (i) What is Non-linear equalization? Explain the two methods used in 2 G and 3 G systems. (8)

(ii) Consider the design of the US digital cellular equalizer. If f = 900 MHz and the mobile velocity V = 80 km/hr, determine the following: (8)

(1) The maximum Doppler shift

(2) The coherence time of the channel

(3) The maximum number of symbols that could be transmitted without updating the equalizer, assuming that the symbol rate is 24.3 ksymbols/sec.

Or

(b) Explain MFSK and describe its frequency spectrum. (16)

14. (a) Discuss cellular CDMA capacity. (16)

Or

(b) Draw the block diagram of "linear predictive coders" coding system and explain. (16)

15. (a) Explain the GSM system channel types. (16)

Or

(b) Explain forward and reverse traffic channel modulation process in CDMA Digital cellular standard (16)