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Question Paper Code : 31296

10.5.13 - AN

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Eighth Semester

Electronics and Communication Engineering

080290073 — CELLULAR AND MOBILE COMMUNICATION

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is frequency reuse?
2. If a cellular operator is allocated 12.5 MHz for each simplex band, and if B_t is 12.5 MHz, B_{guard} is 10 KHz and B_c is 30KHz, find the number of channels available in an FDMA system.

(B_t – total spectrum, B_{guard} – Guard Band, B_c – Channel bandwidth)
3. Name the three basic propagation mechanisms.
4. Define fading.
5. What is the theoretical maximum data rate that can be supported in a 200 KHz channel for SNR = 10 dB, 30dB?
6. Find the 3-dB bandwidth for a Gaussian low pass filter used to produce 0.25 GMSK with a channel data rate of $R_b = 270\text{kbps}$.
7. State the main advantage of ADPCM over PCM.
8. Give the expression for the rate of Vector Quantizer.

9. What mechanisms would cause breakdown in the reverse link of an IS-95 CDMA system as the number of users in a sector approaches the theoretical limit?
10. What are the reasons for choosing $\pi/4$ QPSK modulation scheme for USDC against DQPSK?

PART B — (5 × 16 = 80 marks)

11. (a) Discuss in detail about
- (i) Frequency Hopped Multiple Access (8)
 - (ii) Spread Spectrum Multiple Access Techniques. (8)

Or

- (b) (i) Explain the techniques for improving coverage and capacity in cellular systems. (8)
 - (ii) With illustration, explain the handoff scenario at cell boundary. (8)
12. (a) (i) Derive the free space propagation model to predict the received signal strength. (10)
- (ii) If a transmitter produces 50W of power, express the transmit power in units of dBm and dBW. If 50 W is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at a free space distance of 100 m from the antenna. What is P_r (10 Km)? Assume unity gain for the receiver antenna. (6)

Or

- (b) (i) Derive the two ray ground reflection model. (10)
 - (ii) Write a note on knife edge diffraction model. (6)
13. (a) (i) Derive the Nyquist criterion for ISI cancellation. (8)
- (ii) Explain the BPSK receiver with carrier recovery circuit. (8)

Or

- (b) (i) Discuss in detail about Orthogonal Frequency Division Multiplexing. (8)
- (ii) With block diagram explain the operation of a RAKE receiver. (8)

14. (a) (i) Explain the uniform and nonuniform quantization techniques. (8)
(ii) With block diagram, explain the ADPCM encoder. (8)

Or

- (b) Discuss in detail about Linear Predictive Coding and its types. (16)

15. (a) Explain in detail about the architecture, channels and Frame structure of GSM. (16)

Or

- (b) (i) Explain the forward CDMA channel and reverse CDMA channel. (8)
(ii) Explain the WCDMA layer architecture. (8)
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