

C 44786

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Name.....

Reg. No.....

**EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE
[SUPPLEMENTARY] EXAMINATION, JUNE 2013**

EC 04 802—WIRELESS MOBILE COMMUNICATION

(2004 Scheme)



Time : Three Hours

Maximum : 100 Marks

- I. 1. Explain the Free Space propagation Model.
2. Write a note on Doppler Spread and Coherence Time.
3. Compare Frequency Selective and Frequency non-selective fading channels.
4. What is pre-detection and post-detection combining ?
5. Write a note on Channel assignment strategies.
6. If a signal-to-noise ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is :
- (a) $n = 4$,
(b) $n = 3$?

Assume that there are six co-channel cells in the first tier, and all of them are at the same distance from the mobile.

7. What is a Pseudo Noise sequence ? Explain.
8. Explain the synchronization of spread spectrum systems.

(8 × 5 = 40 marks)

- II. (a) (i) Briefly explain the two ray ground propagation model. (8 marks)
(ii) A mobile is located 5 km away from a base station and uses a vertical $\lambda/4$ monopole antenna with a gain of 2.55 dB to receive cellular radio signals. The E-field at 1 km from the transmitter is measured to be 10⁻³ V/m. The carrier frequency used for this system is 900 MHz. Derive an expression for the received power in Free Space Propagation Model. (7 marks)

Or

- (b) (i) Explain in detail about Reflection, Scattering and diffraction. (8 marks)
(ii) Write a note on Time Dispersion and Frequency Dispersion. (7 marks)

- III. (a) (i) Explain the calculation of error probabilities. (8 marks)
(ii) Briefly explain the tapped delay line model. (7 marks)

Or

Turn over

- (b) (i) With neat sketch, explain the frequency diversity and polarization diversity techniques. (8 marks)
- (ii) Explain the maximal ratio combining and equal gain combining. (7 marks)

IV. (a) With necessary illustrations, explain :

- (i) Cell Sectoring and
(ii) Cell Splitting.

(8 + 7 = 15 marks)

Or

- (b) (i) Explain in detail about Trunking and Grade of Service. (7 marks)
- (ii) A hexagonal cell within a four-cell system has a radius of 1.387 km. A total of 60 channels are used within the entire system. If the load per user is 0.029 Erlangs and $\lambda = 1$ call/hour, compute the following for an Erlang C system that has a 5% probability of a delayed call :
1. How many users per square kilometer will this system support ?
 2. What is the probability that a delayed call will have to wait for more than 10 s ?
 3. What is the probability that a call will be delayed for more than 10 seconds ?

(8 marks)

V. (a) Discuss in detail about the performance and analysis of Direct-Sequence spread spectrum technique.

Or

- (b) Discuss in detail about the Fast Frequency hopping and Slow Frequency hopping spread spectrum techniques.

[4 × 15 = 60 marks]