

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 131801

Roll No.

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**B.Tech.**

(SEM. VIII) THEORY EXAMINATION 2013-14

**WIRELESS & MOBILE COMMUNICATION**

Time : 3 Hours

Total Marks : 100

Note :— Attempt all questions. Each question carries equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**
  - (a) Explain and discuss various frequency dispersive parameters of fading channel.
  - (b) Write short notes on the following :
    - (i) Path loss models
    - (ii) Free space path loss model.
  - (c) Discuss survey of equalization.
  - (d) Discuss methods of co-channel interference reduction.
  - (e) List out various radio air-interface specifications of GSM.
  - (f) Verify the cluster size  $N = 1^2 + j^2 + ij$ , where  $l$  and  $j$  are the integers used to determine the co-channel cells.
2. Attempt any **four** parts of the following : **(5×4=20)**
  - (a) Explain and discuss the need to evolve third generation wireless standards.
  - (b) Find the radio capacity of the cellular system for a total allocated spectrum of  $B_t$ , channel bandwidth of  $B_c$ , and co-channel reuse factor  $Q$  for a cluster size  $N$ . Assume path loss exponent as  $n$ .

- (c) Explain the characteristics of a speech signal.
- (d) Write short note on any **one** of the following :
- (i) Near-far problem in CDMA.
  - (ii) Doppler effect on mobile receiver.
- (e) Explain the structure of a RAKE receiver with the help of a neat diagram.
3. Attempt any **two** parts of the following : **(10×2=20)**
- (a) Discuss various channel assignment strategies. Define the importance of frequency reuse distance, signal to interference ratio, Frequency reuse factor, pathloss exponent.
  - (b) Name the various outdoor propagation models. Find the received power at a distance  $d$  by using ground reflection two-ray model and the method of images.
  - (c) In case of both transmitter and receiver as stationary, the relative powers of the received impulses are 0 dB, -1 dB, 1.5 dB, and 0 dB. The corresponding times of arrival are  $t_1 = 2\mu\text{s}$ ,  $t_2 = 2.8\mu\text{s}$ ,  $t_3 = 3\mu\text{s}$ , and  $t_4 = 5\mu\text{s}$ . Show that the RMS delay spread is  $1.86 \times 10^{-6}$  s.
4. Attempt any **two** parts of the following : **(10×2=20)**
- (a) What are the factors influencing small-scale fading ? Show that the mobile radio channel can be modeled as a linear filter with time varying impulse response.
  - (b) Find the signal-to interference ratio for a 7-cell cluster layout with  $120^\circ$  sectors. Assume path loss exponent  $n = 4$ .
  - (c) Discuss in detail the features of IS-95.

5. Attempt any two parts of the following : (10×2=20)

- (a) Explain the term frequency reuse concept. With the help of received signal level plot, explain the hand off initiation mechanism.
- (b) Explain GSM system architecture with neat diagram.
- (c) Explain the working of Linear Predictive Coder (LPC) system and explain its functioning. What are the advantages of non-uniform quantization ?