

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

Paper ID : 121667

B.TECH.

Theory Examination (Semester-VI) 2015-16

WIRELESS COMMUNICATION

Time : 3 Hours

Max. Marks : 100

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

- (a) What do you mean by small-scale fading. Write its types.
- (b) What do you mean by power delay profile?
- (c) Define the use of outage and margin in cellular engineering.
- (d) Distinguish between DS-SS and FH-SS.
- (e) Explain frequency division multiplexing.

- (f) Comment on characteristics of speech signal.
- (g) What do you mean by handoff strategies?
- (h) What is the shape of a cell in cellular mobile communication? Explain with reason.
- (i) Compare TDMA and SDMA according to various characteristics.
- (j) What is price paid for error correction?

Section-B

Q2. Attempt any five questions from this section.

(10×5=50)

- (a) With necessary diagram, explain in detail about the Rate Receiver.
- (b) If a signal to interference 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 exponents is (i) $n = 4$, (ii) $n=3$? Assume that there are 6 co-channel cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations.

- (c) How can the delay spread be measured? Draw the block diagram of the setup and explain its working.
- (d) (i) What are the three partially separable effects of radio propagation in mobile environments? Explain in brief.
- (ii) Determine the maximum communication range of a wireless system having transmitted power of 1 Watt, and receiver sensitivity of -90 dBm for a specified threshold $BER = 3 \times 10^{-2}$. Assume $d_0 = 7\text{m}$ for this indoor wireless system applications and transmitting carrier frequency being 2.48 GHz. Assume ideal transmitting and receiving omnidirectional antenna.
- (e) Discuss about TDMA & FDMA techniques.
- (f) Discuss the standards of CDMA mobile cellular system.
- (g) What do you mean by multi-path fading? Comment on multipath shape factor for fading wireless channels.
- (h) Describe third generation cellular system. Also mention the services of 3G system.

Section-C

Note: Attempt any two questions from this section.

(15×2=30)

- Q3. (a) Comment on improving coverage.
- (b) What is the capacity in cellular system?
- Q4. (a) What is equalizer in communication receiver? Which equalization technique is used in communication?
- (b) Explain the performance of DS-SS in detail.
- Q5. (a) What do you understand by propagation model? Explain in brief.
- (b) How diffraction and scattering affects the performance of wireless channel?