NATIONAL INSTITUTE OF TECHNOLOGY, ROURKELA-8

Electronics and Communication Engineering

Mid-Semester (Autumn) Examination, 2012

Course Code: EC 415
Course Name: Mobile Communications
Full Marks: 30
Duration of Examination: 2 hours

Answer all the questions.

Q.No.		Marks
1 .a	List the characteristics of GSM mobile system. What are its merits and demerits?	4
b	Describe a cellular telephone system and explain how a cellular telephone call is made.	4
2 . a	Discuss different handoff strategies used in modern mobile cellular communication systems.	3
b	A cellular service provider uses TDMA scheme that can work under worst case SIR of 13dB. Find the optimal cluster size N for (i) omni-directional antenna, (ii) 120^0 sectoring and (iii) 60^0 sectoring. Consider a path loss exponent of 4. Assume other parameters if required.	4
3 a	What is the difference between Log-distance path loss model and Log-normal shadowing?	3
b	A transmitter provides 15 W to an antenna having 12 dB gain. The receiver antenna has a gain of 3 dB and receiver bandwidth is 30 kHz. If the receiver system noise figure is 8 dB and the carrier frequency is 1800 MHz, find the maximum T-R separation that will ensure that a SNR of 20 dB is provided for 95 % of the time. Assume n = 4, σ = 8 dB and d_0 = 1 km.	4
4 a	Discuss the impulse response model of a multipath channel and derive an expression for the impulse response.	4
b	A flat Rayleigh fading signal at 6 GHz is received by a mobile travelling at 80 km/hr. i) Determine the number of positive-going zero crossings about the rms value that occur over a 5 s interval. ii) Determine the average fade duration below the rms level. iii) Determine the average fade duration at a level 20 dB below the rms level.	4