Munish Sood

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- Oct 2017
B.Tech VII Semester

COURSE CODE: 10B1WEC731 MAX. MARKS:15
COURSE NAME: Mobile Communication
COURSE CREDITS: 4 MAX. TIME: One Hr

***Note:*** *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

**Q1)** What are the means to mitigate narrowband interference? What is the complexity of different solutions? **(2)**

**Q2)** Why can waves with a very low frequency follow the earth's surface? Why are they not used for data transmission in computer networks? **(1)**

**Q3)** In relation to hidden and exposed terminals problem in wireless networks, what happens in the case of such terminals if Aloha, slotted Aloha , reservation Aloha or MACA is used? **(2)**

**Q4)** A company with 100 employees was provided with wireless public phone service with four lines. Each employee on an average makes a three minute telephone call every two hours. Calculate (a) Traffic Load. (b) The Blocking probability. Assume Erlang B is used. **(2)**

**Q5)** A total of 24 MHz of bandwidth is allocated to a particular FDD cellular telephone system that uses two 30 KHz simplex channels to provide full duplex voice and control channels. Assume each cell phone user generates 0.1 Erlangs of Traffic. Assume Erlang B is used.

(a) Find the number of channels in each cell for a 4 cell reuse system. **(5)**

(b) If each cell is to offer 90% of perfect scheduling, find the maximum number of users that can be supported per cell where omni-directional antennas are used at each base station.

(c) What is the blocking probability of the system in (b) when the maximum number of users are available in the user pool?

(d) If each new cell now uses $120^0$ sectoring instead of omni-directional for each base station, what is the new total number of users that can be supported per cell for the same blocking probability as in (c) ?

(e) If each cell covers five square kilometers, then how many subscribers could be supported in an urban market that is 2500 square kilometers for the case of $120^0$ sectored antennas.

EC-7, BT

Q6) 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. **(3)**

(a) How many users per square kilometer will this system support?

(b) What is the probability that a delayed call will have to wait for more than 10 seconds.

(c) What is the probability that a call will be delayed for more than 10 seconds.