Question 1.

If a total of 33 MHz of bandwidth is allocated to a particular Frequency Division Duplex (FDD) cellular system which uses two 25 kHz channels to provide full duplex voice and control channels

(a) Find the number of channels available per cell if the system uses 4, 7, and 12 cell reuse.
(b) Assume that each cell requires 1 control channel for every 50 voice channels. Find the offered traffic per cell at 1% blocking probability for each of the 4, 7, and 12 cell reuse systems.

Question 2. (Rappaport Problem 3.13)

A certain area is covered by a cellular radio system with 84 cells and a cluster size $K$. 300 voice channels are available for the system. Users are uniformly distributed over the area covered by the cellular system, and the offered traffic per user is 0.04 Erlangs. Assume that blocked calls are lost, and that the designated blocking probability is 1%.

(a) Determine the maximum carried traffic per cell if a cluster size of $K=4$ is used. Repeat for cluster sizes of 7 and 12.

(b) Determine the maximum number of users that can be served by the system for a blocking probability of 1% and cluster size of $K=4$. Repeat for cluster sizes of 7 and 12.

Question 3.

Consider a microcell/macrocell system covering a large area. Assume that a macrocell covers an area equivalent to that of 7 microcells, and that microcell and macrocell systems both operate with a 7 cell reuse pattern.

If a total of 840 channels are available to the system, calculate the total system offered traffic per macrocell area at 1% blocking for various numbers of channels allocated to microcell and macrocell systems. What conclusions can you draw?