ECS702U/P Assignment (2021-22)

1. In a 9 cells per cluster cellular network. (3 marks)
    a. Make a copy of the blank cellular network grid (last slide of Lecture 2-2: Cellular Fundamentals 2) and use capital letters (A, B, C, …) or different colours to show in the whole network the co-channel reuse pattern and complete all network grid;
    b. Find the carrier to interference ration C/I in dB in this cellular network using a 120 degree directional antenna.

2. Assume that in a cell, the number of calls per hour in the busy-hour is 1080, the average call holding time is 160 seconds and GOS is 0.03. (6 marks)
    a. Calculate the offered traffic intensity in that cell;
    b. How many channels are needed (use Erlang B table provided), if an omni-directional antenna is used;
    c. How many channels are needed If 60 degree directional antennas are used;
    d. Compare and comment on the trunking efficiencies in b) and c).

3. Assume a system with seven cells, the maximum number calls per hour in each cell is 1600, 1800, 800, 500, 1200, 900, 800. Assuming that 65% of the subscribers will be using their mobile terminals during the busy hour traffic and one call is made per mobile. Calculate the estimated number of subscribers in the system. (1marks)

4. In GSM-900 network. (5 marks)
    a. Find how many users can be supported in a cell (cell capacity) and compare it with that being supported in an AMPS cell (Hints: The mobile operator can use entire GSM900 band, but either A or B band(including ES) in AMPS) ;
    b. If GOS is required to 0.02, find the traffic intensity can be supported in a cell;
    c. Find the carrier to interference ration C/I in dB.