جــــامعة المشــرق

Mashreq University

إمتحانات نهاية الفصل الدراسي الثاني للعام 2013-2014م

Sub: Mobile Communication System	Dep: Engineering	Class: 5th
Time: 2 hours	No of Page:2	Date: / /2014

Q1:

1. Define the following:
   - i. Setup call
   - ii. Blocked call
   - iii. Holding time
   - iv. GOS
   - v. Load

2. **Fill blank (14's):**

1. ____(1)____, _____(2)_____, ____(3)_____ are the three popular capacity improvement techniques are used in practice to expand the capacity of a cellular system.

2. A GSM system can be divided into three subsystems: ____(4)_____ at radio network, _____(5)_____ at the mobile switched network and _____(6)_____ at the management network.

3. The subscriber data that stored in Home Location Register (HLR) _____ (7) _____, _____ (8) _____ and _____(9)_____.

4. _____(10)_____ and _____(11)_____ are two duplex techniques used in mobile communication system.

5. To design the cellular system _____(12)_____, _____(13)_____, _____(14)_____.

Q2:

1. Draw the block diagram with the basic description to illustrate the procedures of a call originating from mobile in local area-A to mobile in local area-B.

2. Draw the block diagram with the basic description to illustrate the procedures of location update when a MS move from local area-A to local area-B.

3. Draw the reuse pattern of diagram for the 4 cell cluster case, draw at least 2 adjacent clusters and mark co-channel cell.

4.

Q3:

1. Draw the main diagram of cellular system.
2. Describe the meaning of the following:

MS, BTS, BSC, MSC, GMSC, ISC, OMC, HLR, VLR, EIR, AUC

Q4:

1. A total of 25 MHz of a bandwidth is allocated to a cellular telephone system for both uplink and down link channels which use 25 KHz wide bandwidth for each simplex channel. Find the number of channels available per cell if the cluster's size is (a) 4; and (b) 7
2. What is the received power (in dB) in the free space of a signal whose transmit power is 1W and carrier frequency is 2.4 GHz if the receiver is at a distance of 1 mile (1.6 km) from the transmitter? Assume that the transmitter and receiver antenna gains are 1.6.
3. A total of 1 MHz of bandwidth is allocated to a particular FDD cellular telephone system that uses two 5 kHz simplex channels to provide full duplex channel voice and control channels. Assume each cell phone user generates 0.1 Erlangs of traffic. Assume the Erlangs-B is used.
   a) Find the number of channels in each cell for a 4-cell reuse system.
   b) If each cell is offer capacity that is 90% of perfect scheduling, find the maximum number of users that can supported per cell where omnidirectional antennas are used at each base station.
   c) What is blocking probability of the system in (b) when the maximum numbers of users are available in the user of pool.

Table 1Erlangs B

No. of channel	GoS			
	=0.001	=0.005	=0.002	=0.002
2	0.153	0.105	0.065	0.046
4	0.896	0.701	0.535	0.439
24	15.3	14.2	13.0	12.2
100	84.1	80.9	77.4	75.2