TKK Tietoliikennelaboratorio
HUT Communications Laboratory

S-72.423 Exercise 3.

Return your answer no later than on Tuesday 11.11.2003 at 16:00 into the course's P.O. box at the third floor of the E-wing.
Please, include the following information in your answers:
- Your name
- Your student number

1. True or False,

   a. Loading Coils are required for the operation of ADSL.
   b. Reed-Solomon code is used for error correction.
   c. ADSL is not compatible with ATM/STM.
   d. Time Division Duplex is more suitable for long distance communication.
   e. Handover is used to drop the call when moving from one cell to another.
   f. Downloading a file from internet using V.90 modem is faster than using ADSL.
   g. Cross talk and interference reduces the quality of the local loop.

2. Compare TDD and FDD duplexing techniques.

3. Select the correct answer

   a. Diversity is used to counteract: (i)Path loss, (ii)handover, (iii)Rayleigh fading.
   b. When a new channel is selected in a cell that is managed by the same BSC and reswitching in GSM one BSC it is called: (i)Intra-MSC handover, (ii)Intra-cell handover, (iii)Intra-BSC handover.
   c. Reception of multipath signals reflected from objects in the vicinity causes: (i)Rayleigh fading, (ii)Shadow fading, (iii)Path loss.
   d. When the signals use the same frequency band at the same time, the access technique is: (i)TDMA, (ii)CDMA, (iii)FDMA.

4. Use the following words and the figure below to fill in the blanks:
   BTS112, BSC11, MSC1, BTS211, BSC12, MSC2, VLR, HLR, GMSC

   The mobile is in cell BTS112 and moving towards cell BTS211. Cell BTS112 is handled by BSC11 under MSC1, while cell BTS211 is handled by BSC21 under MSC2. The original connection is assumed to have been established between a subscriber in a fixed network – via GMSC, MSC1, BSC11, BTS112 – and the mobile.
   1. --------. informs its MSC that the mobile needs handover. It also indicates cells that are suited for handover and gives priority to BTS211.

2. MSC1 sends a signal to -----------, requesting handover to cell BTS211. MSC1 also sends the mobile's subscriber data which is stored in ---------.
3. MSC2 orders ---------- to allocate an idle traffic channel to the mobile.
4. BSC21 allocates an idle channel in BTS211 (provided such a channel is available).
5. MSC2 indicates the channel in -------- to which the mobile should be connected. Then MSC1 and MSC2 reserve new paths for the connection through their switches.
6. MSC1 orders ---------- to check that the mobile is connected to the new traffic channel in BTS211, and BSC11 orders the mobile to change channels.
7. After the mobile has changed channels, it must acknowledge this order. The acknowledgment is received by BSC21 and sent on to --------. If no acknowledgment is appears within a preset time, the connection is cleared.
8. MSC2 now makes through-connection from MSC1 to BSC21 in its own switch and sends the acknowledgment on to MSC1. MSC1 sets up the new path between the ------------- and MSC2 in its switch and disconnects the previous one between the GMSC and BS11. Then -------- is ordered to release the original traffic channel in BTS112.