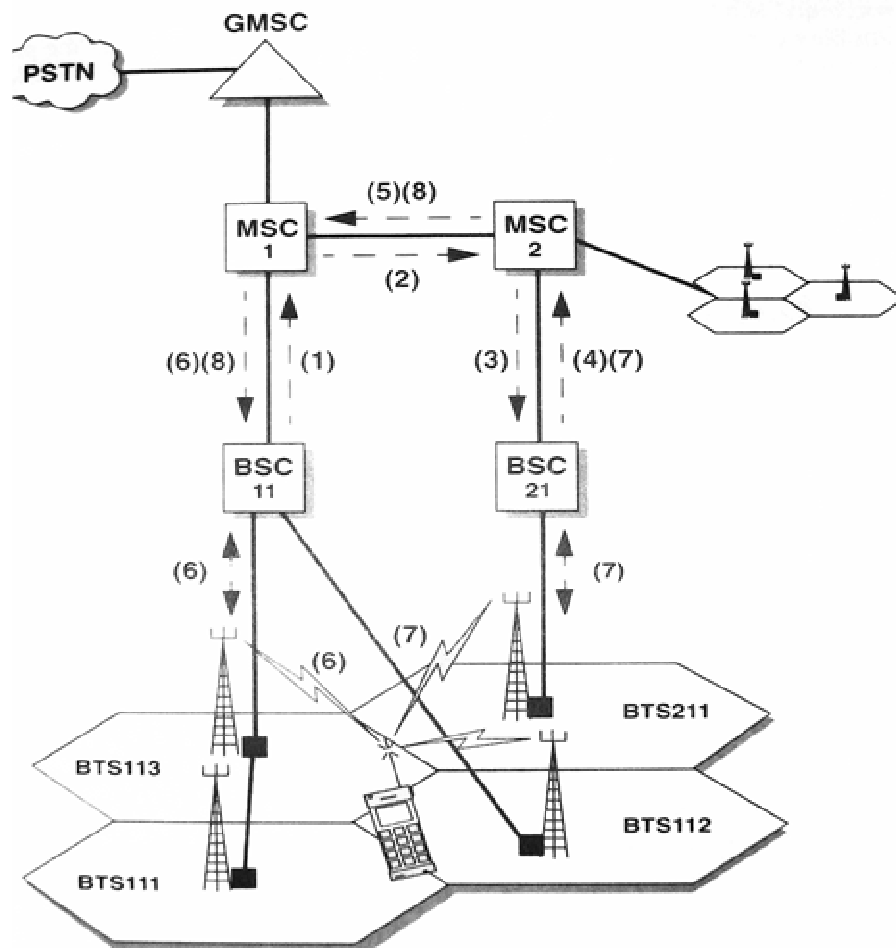


GSM Part

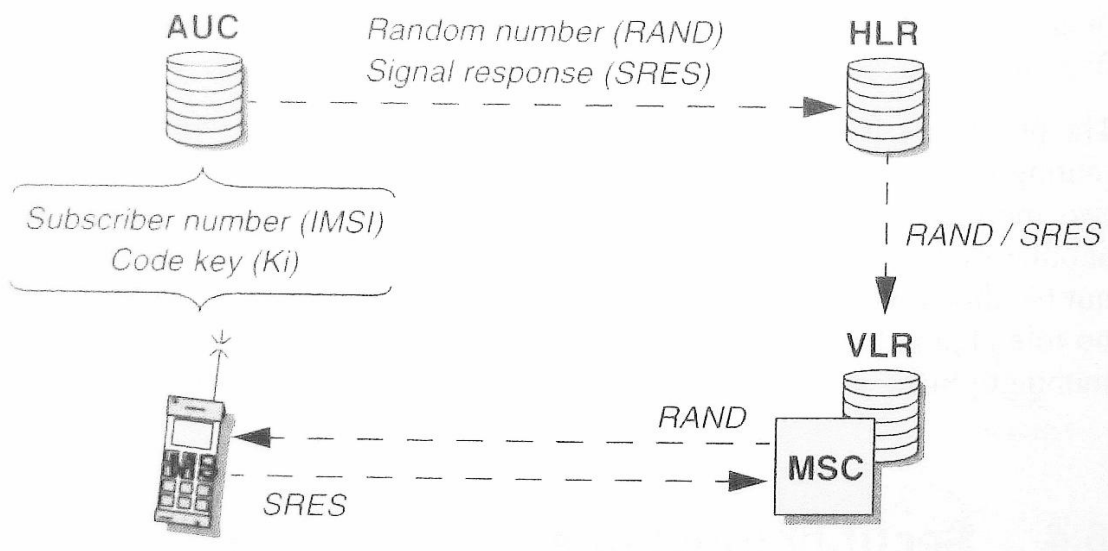
7. What is the operation performed in the following:
- In the figure below, the mobile is in cell BTS112 and moving towards cell BTS211. The locating function in BSC11 has identified the mobile's signal quality is deteriorating while moving.

Solution: **Inter-MSC Handover**



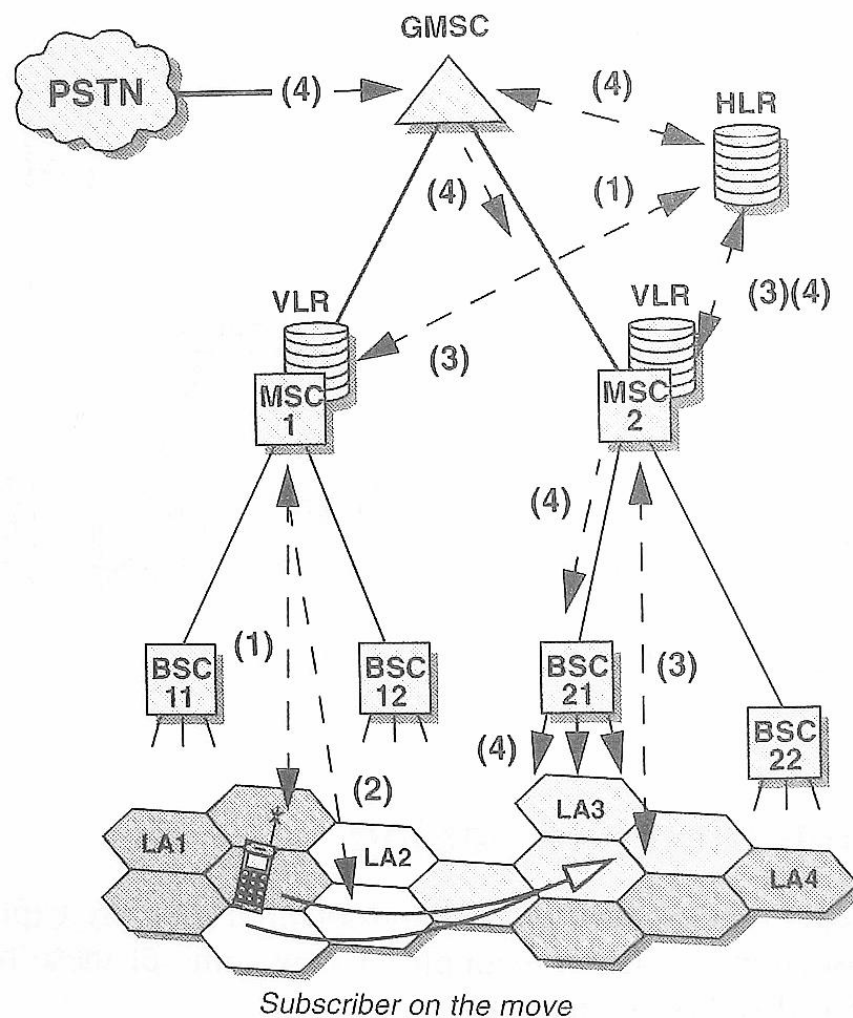
- b. Set-up or registration will not be accepted until the operation shown below has been performed.

Solution: **Authentication in GSM**



- c. The mobile is switched on (not calling) and moving in the network which is logically divided into four location areas, LA1-LA4, each corresponding to a BSC service area.

Solution: **Registration and Paging**



8. Compare TDD and FDD duplexing techniques.

Solution:

FDD

- Duplex filter is large and expensive
- Different fading in UL/DL
- Same UL/DL bandwidth

TDD

- Inefficient for large MS-BS separation
- Same fading in UL/DL
- Flexible UL/DL bandwidth allocation

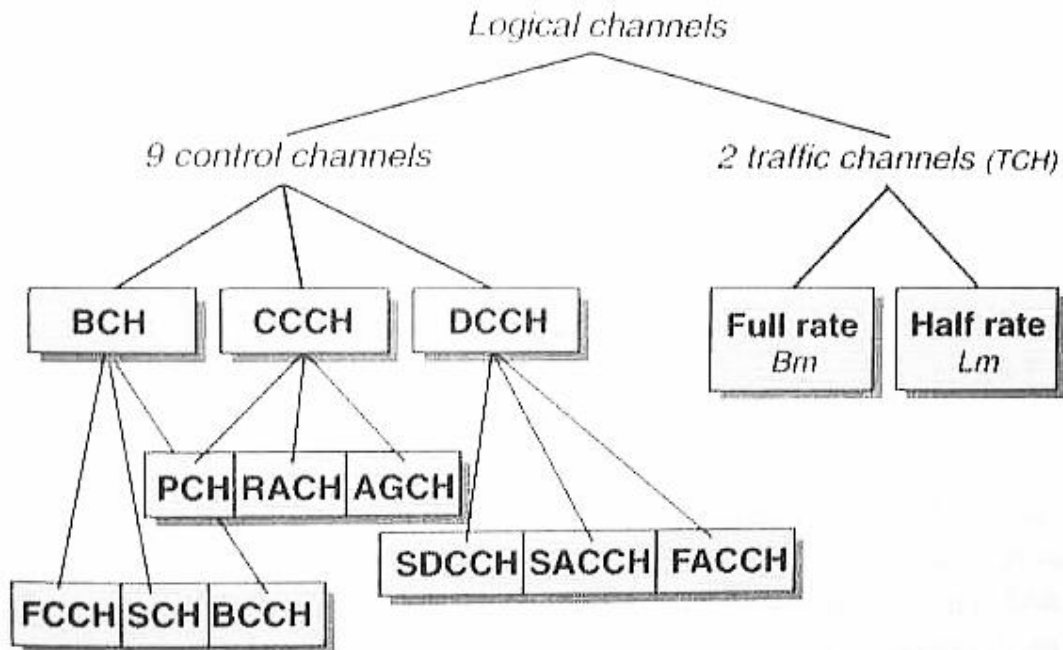
9. Select the correct answer

- 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 different times, the access technique is: (i)**TDMA**, (ii)CDMA, (iii)FDMA.

10. Describe (using a few sentences) the meaning of the all acronyms under the 9 control channel branch shown below.

Solution:

- i. BCH, Broadcast CHannels, continuously send information about cell and network parameters to the mobile. Unidirectional, BS to MS.
 1. FCCH, Frequency Correction CHannel, carries frequency correction information.
 2. SCH, Synchronization CHannel, carries frame synchronization and base station identification information.
 3. BCCH, Broadcast Control CHannel, carries cell-specific information.
- ii. CCCH, Common Control CHannels, used for access to the network.
 1. PCH, Paging CHannel, used by the network to call terminals.
 2. RACH, Random Access CHannel, used by MS to answer paging calls and call the network when the MS initiates set-up.
 3. AGCH, Access Granted CHannel, used by the network to allocate a dedicated control channel for continued signaling (SDCCH), or for handover (FACCH).



- iii. DCCH, Dedicated Control CHannels, used for signaling between MS and the network before and during a call. Allocated to individual connections and bidirectional.
1. SDCCH, Stand-alone Dedicated Control CHannel, used for signaling during set-up phase (before a traffic channel has been allocated). Used for registration, authentication and signaling in connection with clearing.
 2. SACCH, Slow Associated Control CHannel, used by the MS to continuously report received signal strength in the visited cell and from surrounding cells. Can be used for controlling MS output power.
 3. FACCH, Fast Associated Control CHannel, used for handover and only available in conversation state.