

### EITP30: Quiz 3

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1. If there is no data scheduled in an LTE FDD subframe (DL and UL) then:
  - The control region has no OFDM symbols assigned.
  - At least one OFDM symbol is assigned for the control part.
  - There is always data from eNB to UEs or vice versa.
2. LTE control signaling is transmitted at the beginning of a subframe. What would happen if it was transmitted at the end?
  - Nothing would change.
  - The latency to decode the data region would increase.
  - The data rate may decrease.
3. How does the UE know the size of the LTE control region in the current subframe?
  - Because the UE detects when the data region starts.
  - It is indicated in the region control of the previous subframe.
  - By decoding part of the control information in the current subframe.
4. To decode PDCCH, the UE needs to know the modulation scheme used, which is:
  - Indicated in the DCI.
  - QPSK.
  - Dependent on the scenario.
5. The signal level received by the UE is really low and there is an error decoding the H-ARQ indication for LTE. Which of these scenarios is the worst?
  - eNB transmits an ACK and UE decodes NAK.
  - eNB transmits an NAK and UE decodes ACK.
  - None of the previous ones.
6. For an incoming DCI, the UE shall:
  - Try to decode only if the UE knows there is data for it in the data region of the subframe.
  - Attempt to decode until it finds a DCI for itself.
  - Wait until a DCI is signaled to be present in the current subframe, then it can decode it.
7. What is the main difference between SU-MIMO and MU-MIMO in the UL?
  - In SU-MIMO only one user can transmit in a cell at a certain time as opposite to MU-MIMO where several users can transmit at the same time.
  - MU-MIMO allows for multiple users to transmit in the same frequency-time resources, increasing the spectral efficiency.
  - In MU-MIMO the devices need to be more sophisticated, requiring at least 2 antennas, as opposed to SU-MIMO where only one is needed.
8. The timing advance:
  - Is determined by the UE according to DL measurements.
  - Is known by the UE the first time it accesses the network.
  - Is determined by the eNB based on UL measurements.
9. 15kHz and 60kHz are two available SCSs in an NR system. Which one is the best?
  - 15KHz, since you can allocate more subcarriers within the same bandwidth.
  - 60KHz, since it produces shorter symbols, therefore the data rate increases.
  - It depends on the scenario.
10. Why does the PBCH occupy the 72 central subcarriers in LTE?
  - These subcarriers have the least channel attenuation.
  - The UE does not need to know the system BW to decode the PBCH correctly.
  - The amount of data is small, so such a small BW is enough.