1. LTE subcarrier spacing in LTE is:
   - ☐ 50kHz
   - ☐ 75kHz
   - ☐ 15kHz

2. Duration of the first OFDM symbol in a slot is:
   - ☐ 66.7us
   - ☐ 71.4us
   - ☐ 71.8us

3. The extended cyclic prefix in the LTE standard allows:
   - ☐ To have more time to transmit user data.
   - ☐ Protection against extensive delay spread like in large cells.
   - ☐ To have reduced sampling frequency.

4. The size of a resource block is?
   - ☐ 84 resource elements.
   - ☐ 72 resource elements.
   - ☐ Depends on the cyclic prefix.

5. The maximum number of resources blocks in a 20MHz LTE carrier is?
   - ☐ 84
   - ☐ 110
   - ☐ 150

6. A half-duplex device in a FDD cell:
   - ☐ Can transmit and receive at the same time using different frequencies.
   - ☐ Can be replaced by a TDD device, because it can transmit and receive at different time.
   - ☐ Does not need a duplex filter in order to operate correctly.

7. In a TDD cell:
   - ☐ Switching from DL to UL has to be done instantaneously.
   - ☐ Half of the frame is used for DL transmission and the other half for UL.
   - ☐ A sub-frame is allocated to DL or UL depending on the selected configuration.

8. Transmit Diversity with 2 antennas:
   - ☐ Has two layers.
   - ☐ Transmit the same information through both antennas.
   - ☐ Allows the radiated power to be focused in a predetermined direction.

9. In the DL-SCH processing, we have a 120 bits code-block to encode. How many bits we will have after the Turbo encoder?
   - ☐ 40
   - ☐ 240
   - ☐ 360

10. A codebook:
    - ☐ Increase the amount of signaling in DL and UL.
    - ☐ Allows to send only the index of the precoding matrix to use.
    - ☐ Is used in open-loop precoding.

ETTN15: Quiz Test 2
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1. 15kHz
2. Tu=66.7us. Tcp(OFDM #1)=5.1us. Tofdm = Tu+Tcp = **71.8us**.
3. Protection against extensive delay spread.
4. Depends on the cyclic prefix. 7symb*12sc=84RE (normal); 6symb*12sc=72RE(extended).
5. 110RB (20MHz).
6. Does not need a duplex filter.
7. Depends on the configuration.
8. Transmit the same information.
9. Turbo encoder 1/3 rate. 120 bits is encoded into 360 bits.
10. Allows to send only the index.