Review Questions for Lecture on: Wireless Evolving Architecture and Technologies: 4G, LTE, and 5G
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Q1. What is LTE, explain its key features and how is it different from the technologies of the past (2G and 3G).

Q2. What is OFDM, what are its advantages over the regular FDMA. Explain with the help of a block diagram the working of OFDM transmitter and receiver.

Q3. What are the impairments of OFDM and how are they overcome.

Q4. OFDM is considered to be a scalable architecture, give reasons.

Q5. Explain in detail the OFDM frame and channel structure for the uplink and downlink.

Q6. Give reasons as to why OFDM is only used for downlink and not the uplink.

Q7. Explain what is MIMO and the various ways in which MIMO can be used for the communication between the base-station and the UE.

Q8. Explain LTE uplink / downlink scheduling and resource allocation along with the data flow.

Q9. Explain what the key features of LTE advance are.

Q10. What are the key concepts, features and technologies for the 5G evolution?

Q11. If you are asked to design an OFDM system for 40 MHz, what would be the FFT size, sampling frequency, number of usable subcarriers and occupied bandwidth?

Q12. What is the orthogonal principle? Consider 2 sinusoids $s_1(t)$ and $s_2(t)$, the frequency of $s_2(t)$ is twice that of $s_1(t)$, assume the sample rate to be 8 times the symbol rate, using the property of orthogonality show that they are orthogonal. Using the sinusoids give the procedure for encoding the data {+1, -1} and then decoding the encoded data. (Similar to the example presented during the lecture).