

1. QPSK. Explain how QPSK can transmit 2 bits at the same frequency?
 - a. There are 2 analog message signals that change the amplitudes of the 2 waves, which use either the amplitude-shift keying digital modulation scheme or the amplitude modulation analog modulation scheme
2. Explain how time, frequency and code division methods control the simultaneous access to the medium by multiple sources or channels of mobile terminals and base transceivers.
 - a. Code Division Multiple Access (CDMA) spread spectrum work. Time Division Multiple Access (TDMA) is for the shared medium network which is a channel access method. After division it makes the users share the same frequency channel.
3. Show that any two of the three codes are mutually orthogonal. -1,-1,1,1,-1,-1,1,1; -1,1,1,-1,-1,1,1,-1; -1,-1,-1,-1,1,1,1,1
 - a. Work:
 - i. Multiply the 2 numbers cell by cell and then add them all together if you get 0 then it is orthogonal
 - b. Pairs:
 - i. 1,2
 - ii. 1,3
 - iii. 2,3
4. Describe the DSSS technique. Explain how it mitigates narrow band interference.
 - a. Direct Sequence Spread Spectrum is a spread spectrum modulation technique primarily used to reduce overall signal interface. Each spreading sequence bit which is known as a chip has a much shorter duration than the original message bits
5. What are the functions of a rake receiver?
 - a. They counter the effects of multipath fading. Because of obstacles, the radio channel consists of copies of the signal with different amplitudes, phases, and delays
6. Explain the basic features of CDMA systems. Explain soft handover.
 - a. A channel access method that is used by a lot of the radio technologies today. It can transmit information simultaneously over a single communication channel
 - b. Soft handover is when a phone is simultaneously connected to more cell phones during a call
7. Explain the use of multiple carriers by orthogonal coding. How does an OFDMA system differ from a CDMA system?
 - a. Multi carrier modulation transmits data by dividing up the components into smaller components
 - b. OFDM is a multi carrier system while CDMA is a single carrier system