1. Assume that a voice channel occupies a bandwidth of (**use last two digits of your student ID, for 17201314 it will be 14 KHz**) kHz. We need to multiplex 20 voice channels with guard bands of 500 Hz using FDM. **Calculate** the required bandwidth.

2. **Differentiate** between statistical TDM and synchronous TDM? **Why** is the synchronization bit required in TDM?

3. Using a diagram, show the contents of the six output frames for a synchronous TDM multiplexer that combines four sources sending one character in each input slot. **The third source is silent i.e. no data is passed by the third source.** Source 1 message: SECTOR
   a. Source 2 message: DATA
   b. Source 3 message:
   c. Source 4 message: CSE
   Now, **show** the diagram for statistical TDM.

4. The following **FDM** hierarchy has been used by a telephone company. How many voice channels can be multiplexed together in the master group? What is the required bandwidth for the multiplexing?
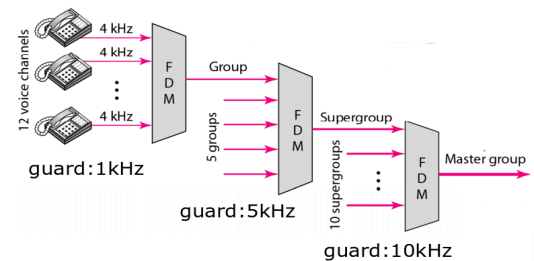
5. How do FHSS and DSSS achieve bandwidth spreading and provide privacy?

6. What is the difference between baseband and broadband transmission?

7. Suppose, you are given the k-bit pattern and Carrier Frequency as follows:

Draw the FHSS cycle 2 times using the above pseudo-random generated k-bit pattern and given frequency table. (** Hint: Draw the Carrier frequency graph against the hop period)	**k-bit pattern** 00 10 01 11	**k-bit**	**Carrier Frequency**
		00	250kHz
		01	100 kHz
		10	350 kHz
		11	400 kHz