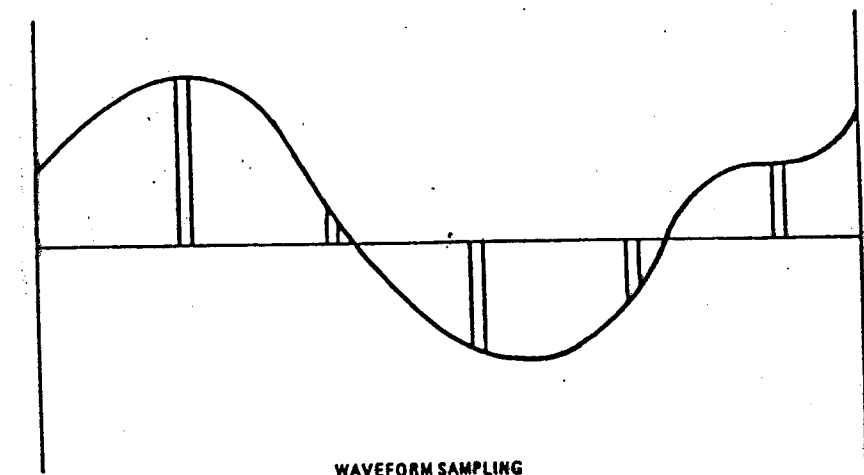
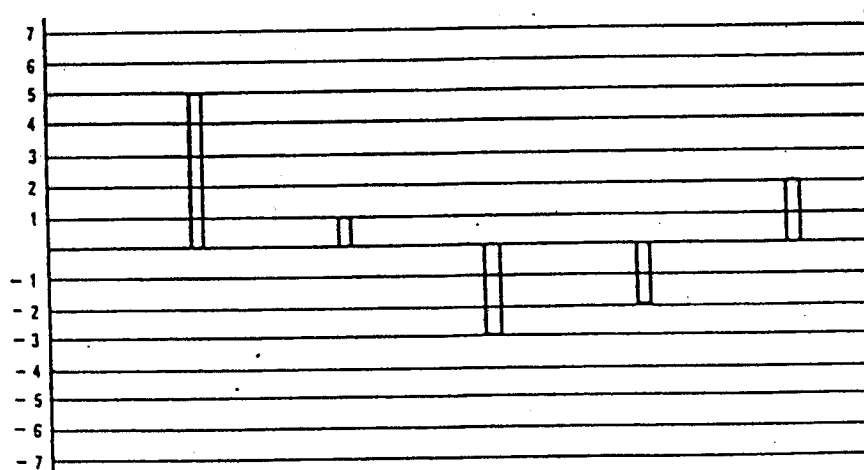


① ORIGINAL ANALOG VOICE WAVEFORM



WAVEFORM SAMPLING



QUANTIZATION

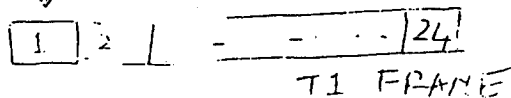
1101 1001 0011 0010 1010

② DIGITAL OUTPUT

CODING

Figure 1.25 Voice digitization process.

8 bits / SAMPLE



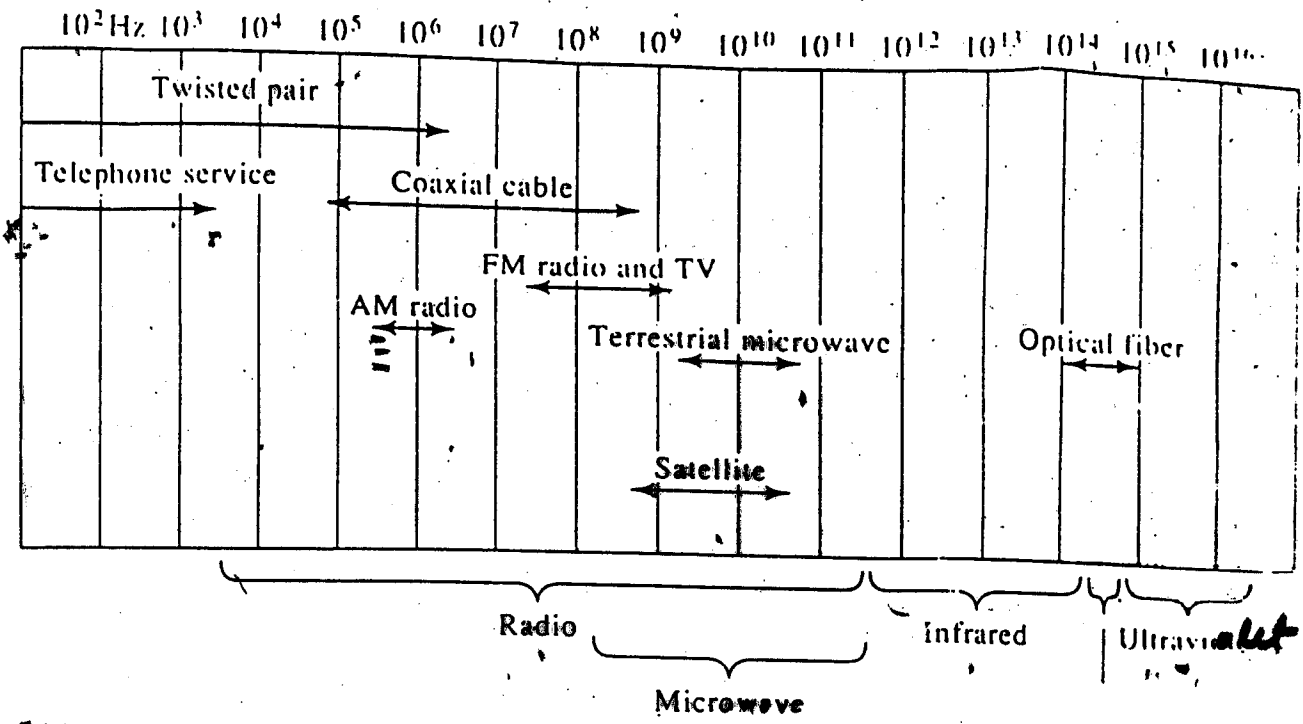
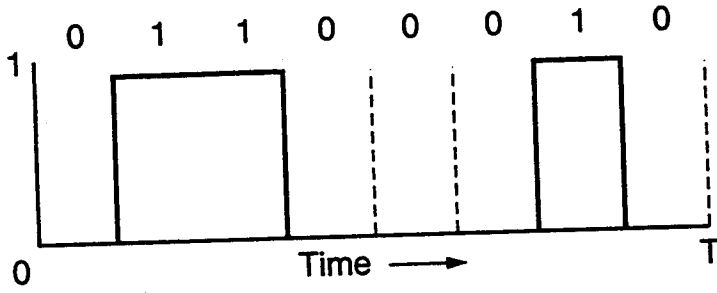
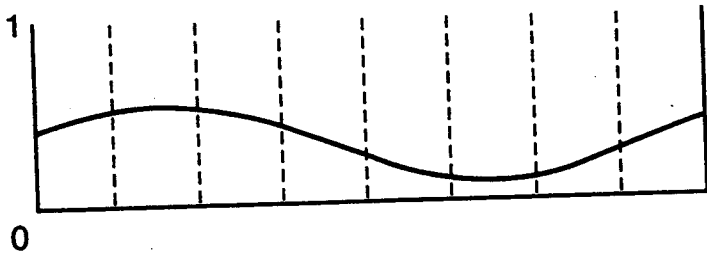
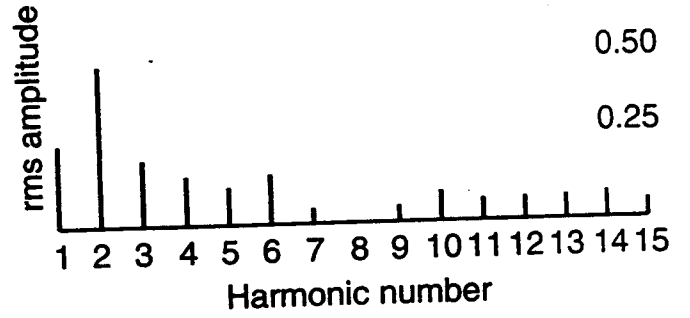


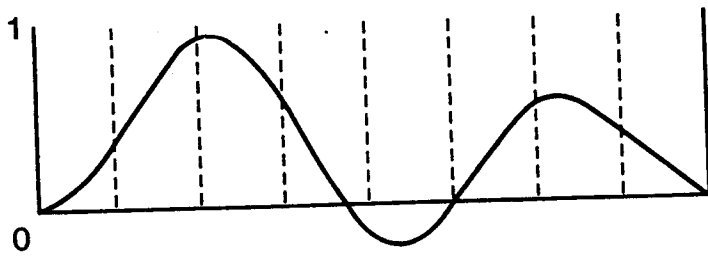
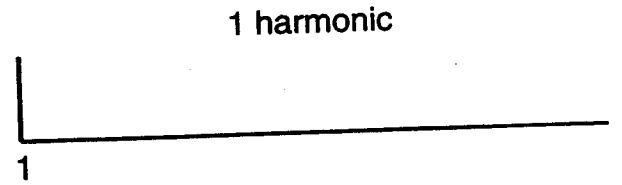
FIGURE 2.17. The electromagnetic spectrum.



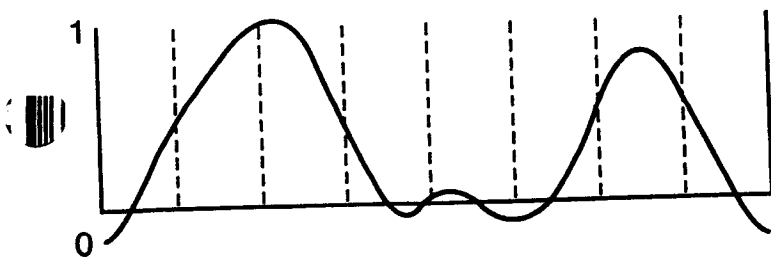
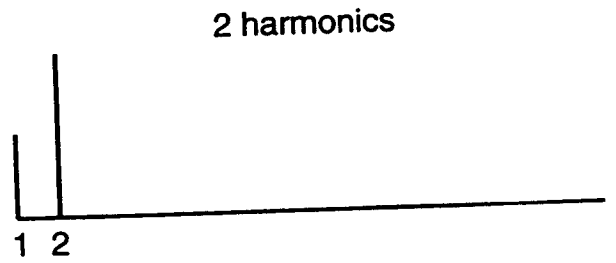
(a)



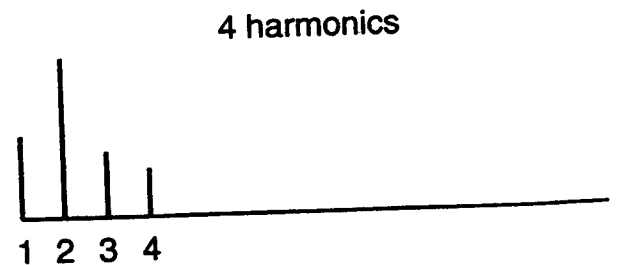
(b)

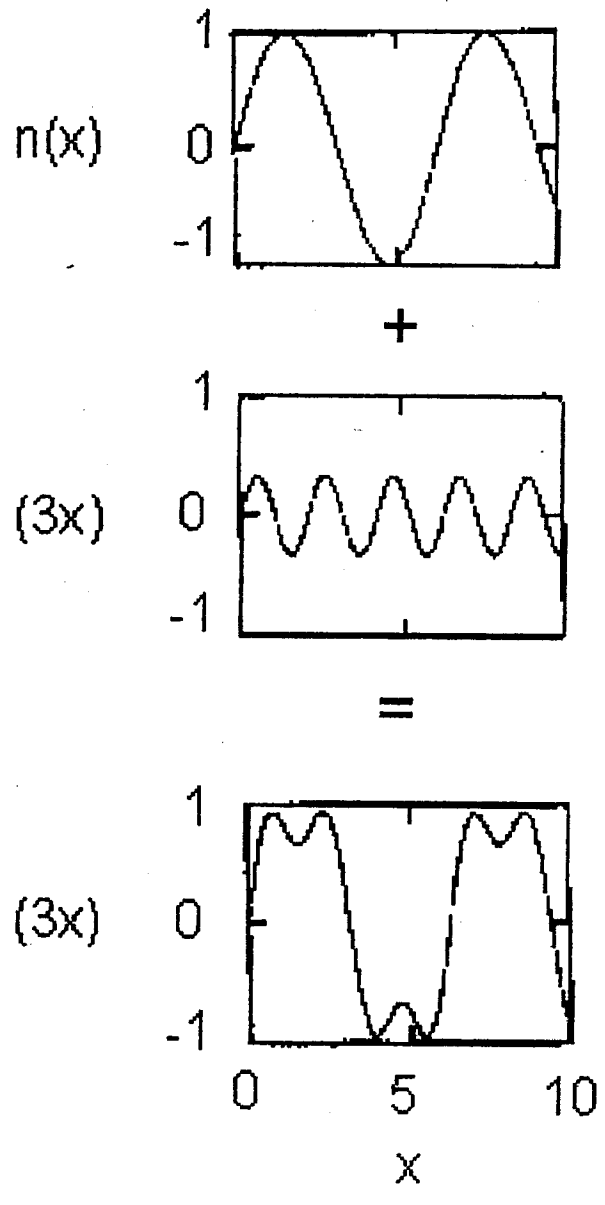


(c)



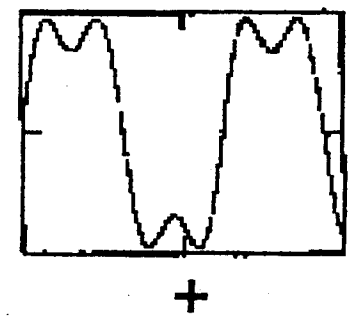
(d)





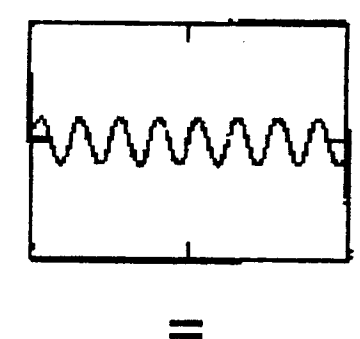
C

$\sin(x)+0.3\sin(3x)$



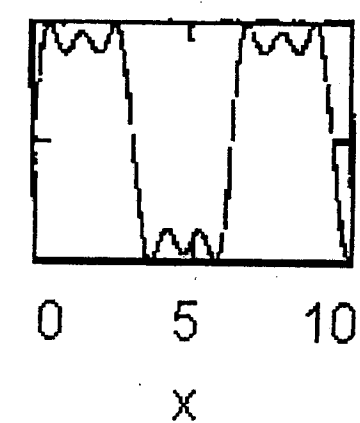
D

$0.2\sin(5x)$



E

$\sin(x)+0.3\sin(3x)+0.2\sin(5x)$



B 1000

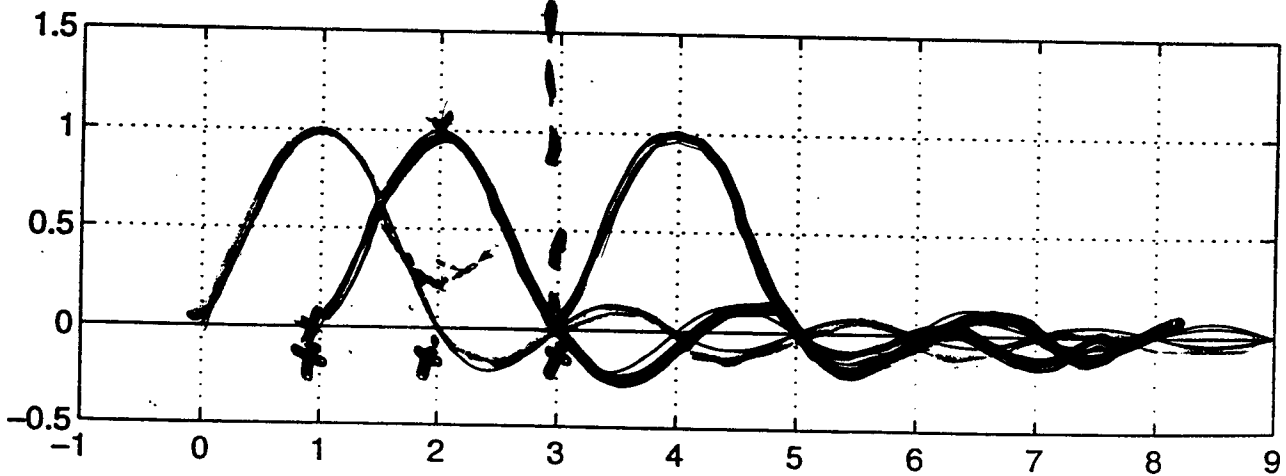
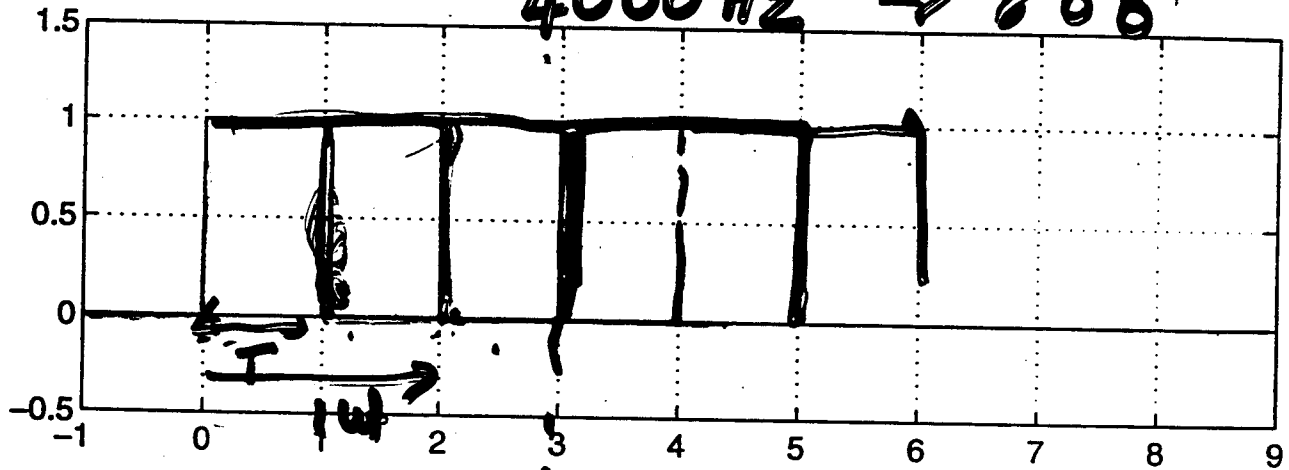
2B

Bandwidth of channel
is $\frac{B}{2}$

Nyquist Limit

500

4000 Hz \Rightarrow 800



$$\text{Signal frequency} = \frac{1}{T} = f$$

$$\text{Maximum Signal Rate} = \frac{2}{T} = 2f$$

works only if we have removed
frequency components above f