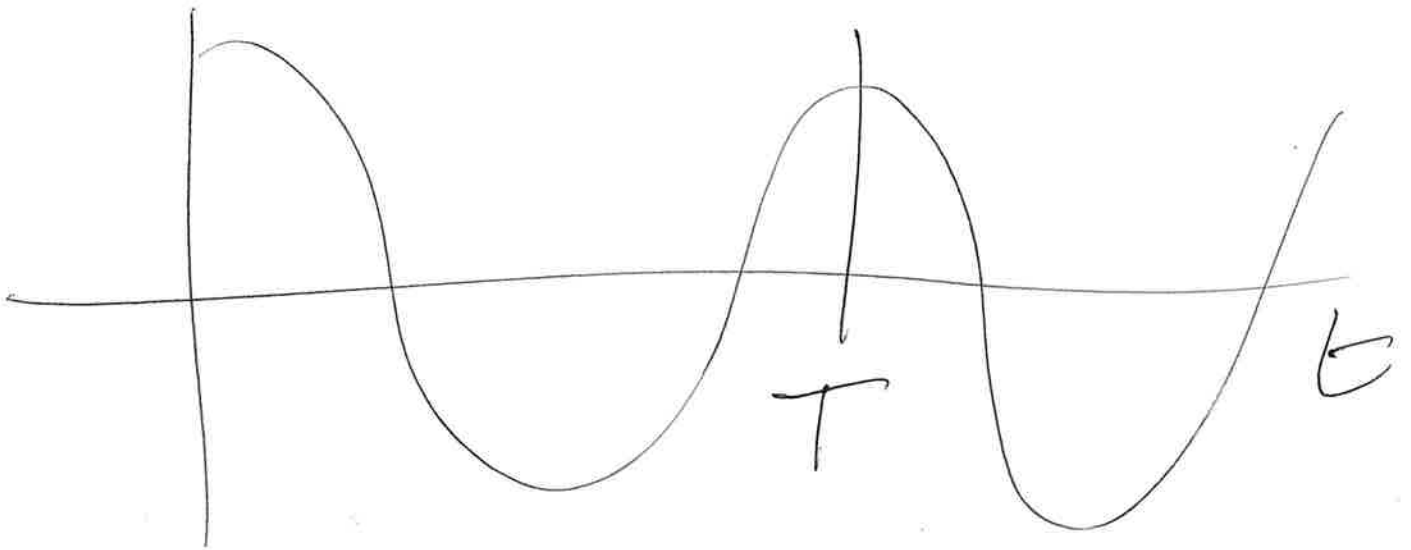


I) Sound

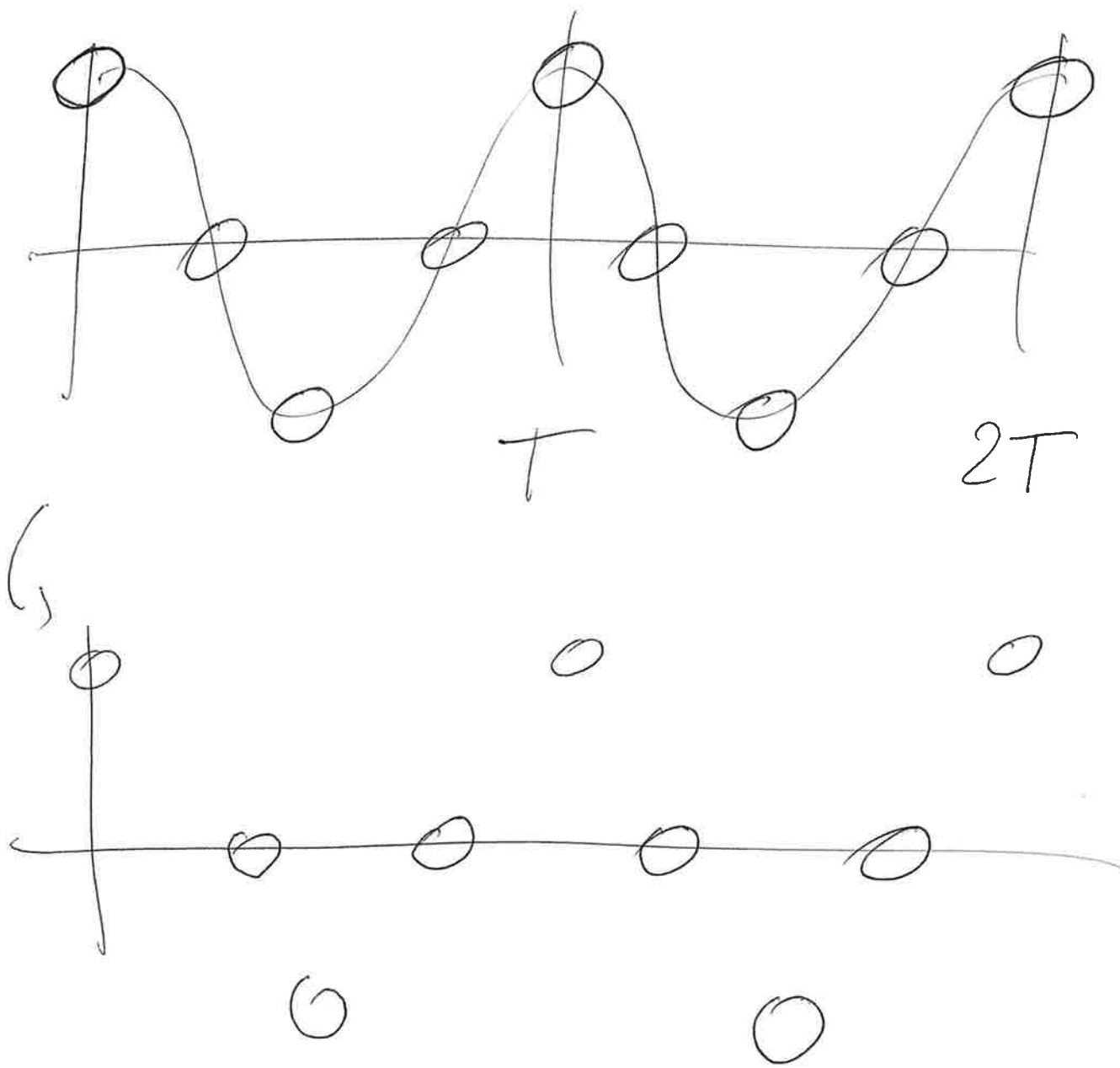
a sound is a time signal with repeats.

repeat time: T period

How often it repeats itself:

frequency: $f = \frac{1}{T(s)}$ Hertz

2



Sampling:

Nyquist theorem: Your sampling frequency needs to be strictly greater than twice the highest frequency in the signal.

Example:

(3)

How much space do I need on my hard drive to store a 5 min song?

Sound that humans can hear are between 0 to 20,000 Hz

Sampling rate: $f_s > 2 \times 20,000$

$$f_s = 44,100 \text{ Hz}$$

A sound sample is recorded at a speed of 44,100 points per second.

A point is recorded over 16 bits.

For 5 mins:

$$S = 5 \left[\frac{\text{mins}}{\text{min}} \right] \times 60 \left[\frac{\text{s}}{\text{min}} \right] \times 44,100 \left[\frac{\text{point}}{\text{s}} \right] \times 16 \left[\frac{\text{bit}}{\text{point}} \right]$$

$$S = 5 \times 60 \times 44,100 \times 16 \text{ (bit)}$$