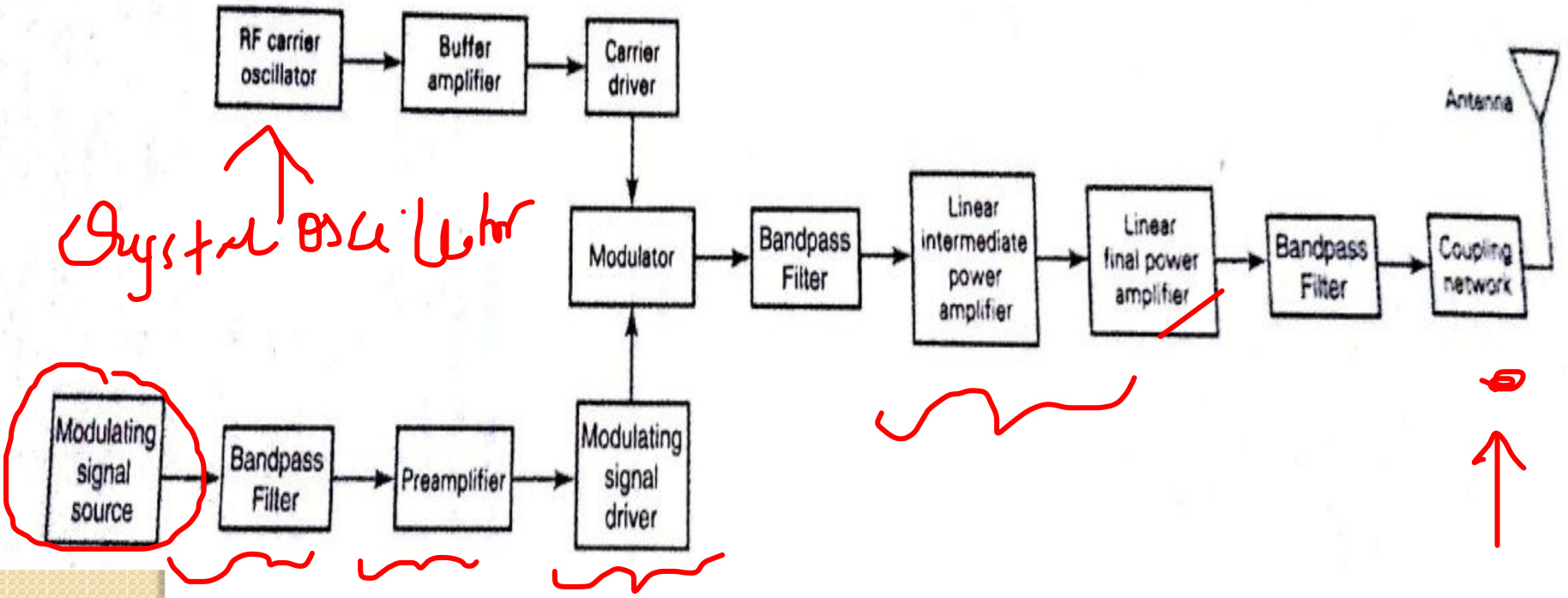
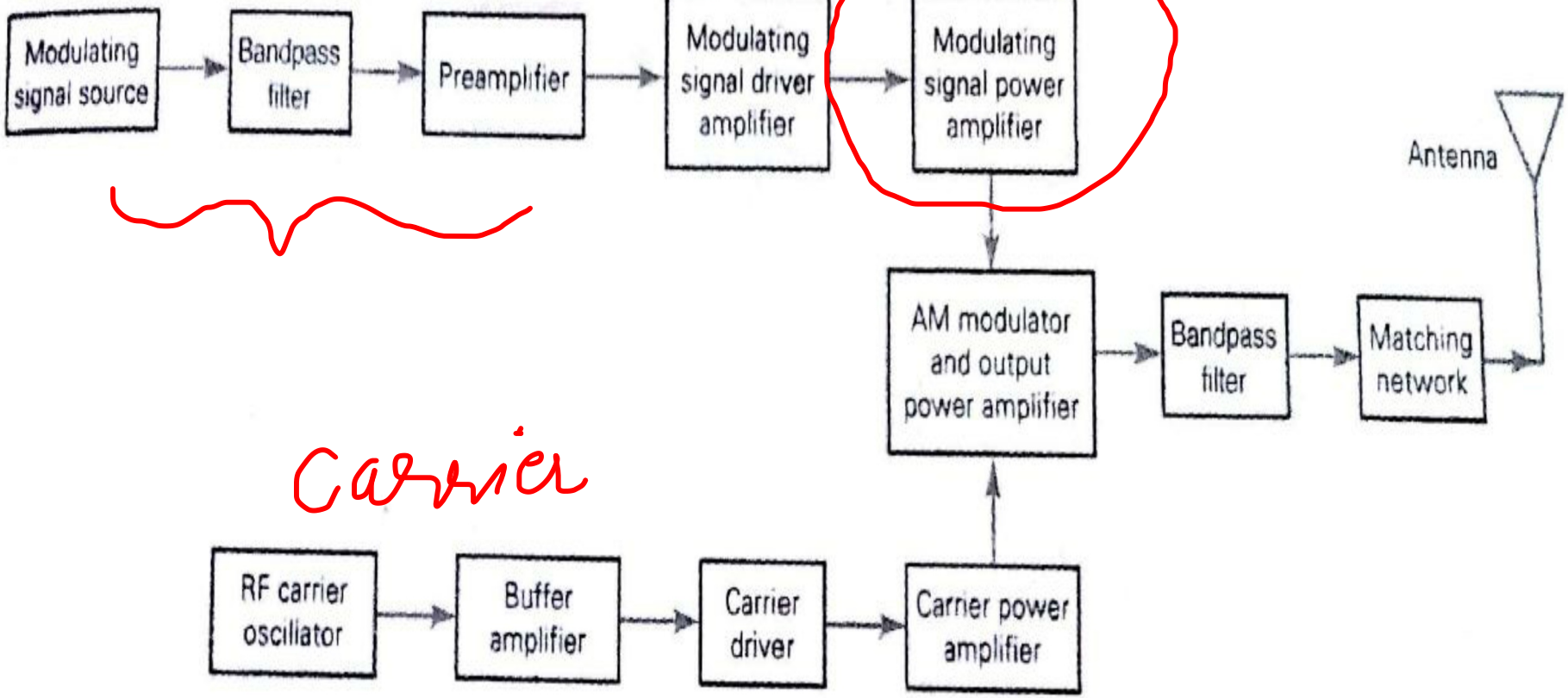
AM DSBFC Transmitter (Low Level)



AM DSBFC Transmitter (High Level)

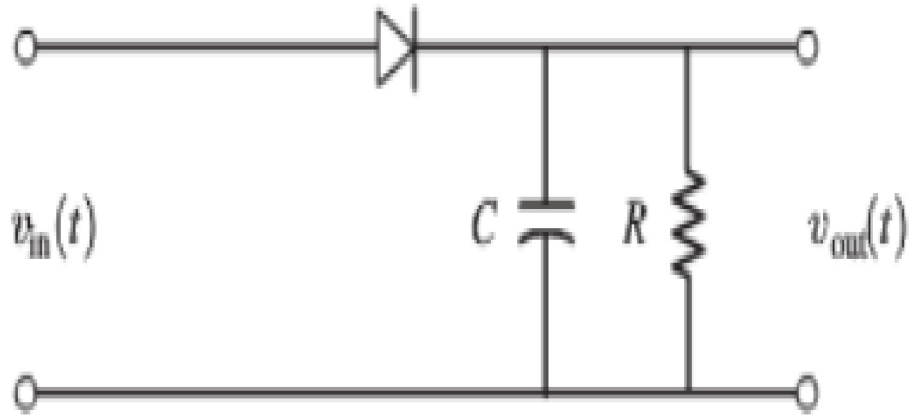


Methods of Detection

Non-Coherent Detection: No need to generate carrier at the receiver for demodulation

Coherent Detection: The carrier is locally generated at the receiver for demodulation.

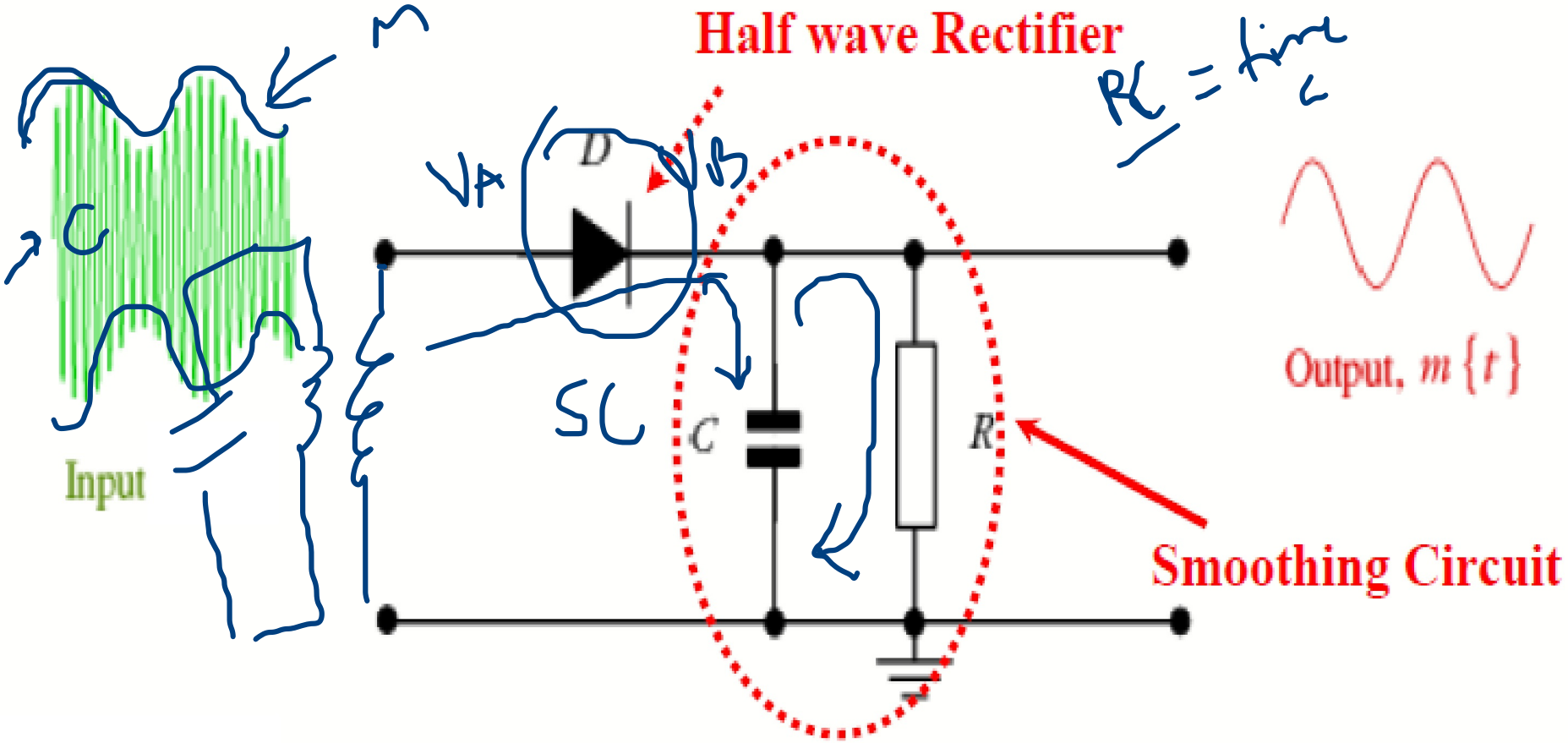
Simple Diode Detector



Basic operation: Assume fc = 300 KHz and fm = 2KHz

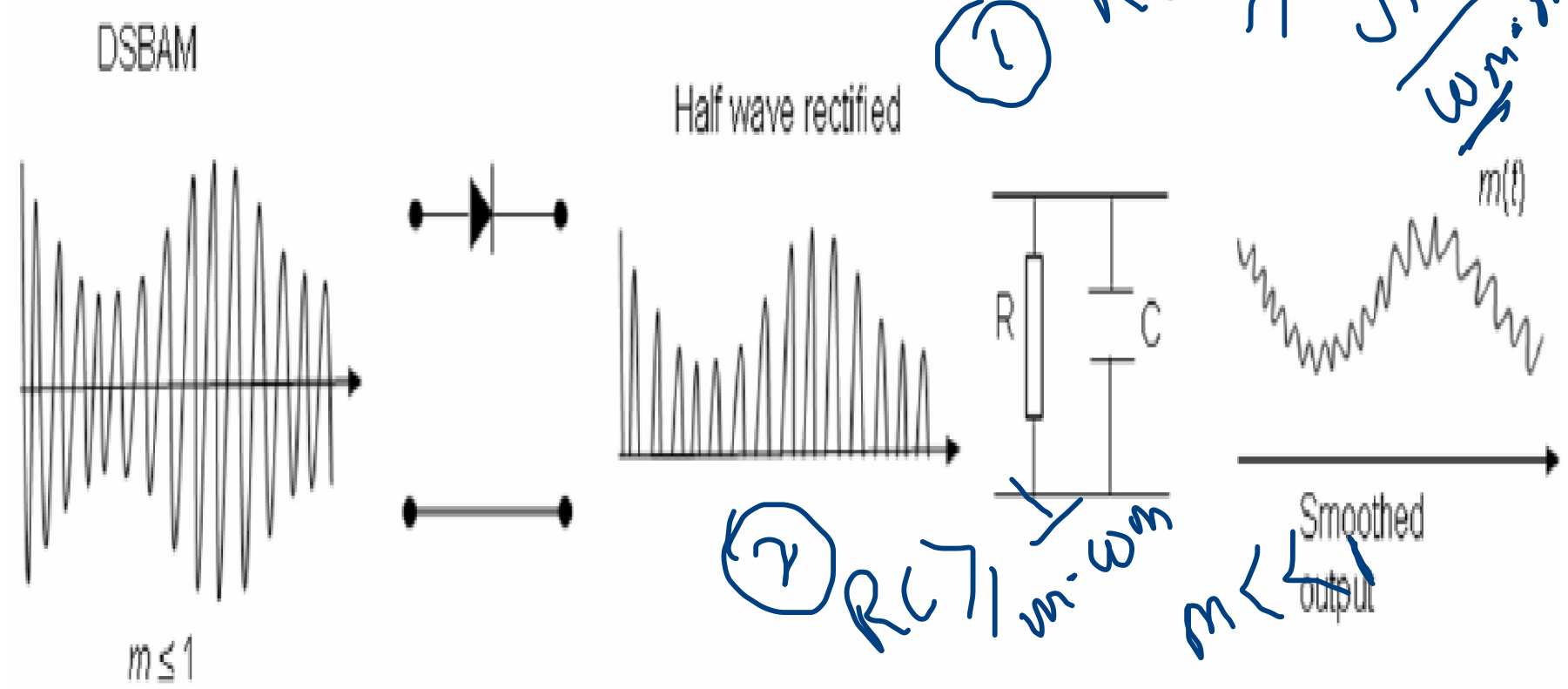
- Then there will be frequencies 298, 300, 302 KHz
- The detector will detect many different frequencies
- AM frequencies + AM harmonics + SUM of AM frequencies + DIFF of AM frequencies
- The RC LPF is set to pass only DIFF frequencies

Circuit Diagram

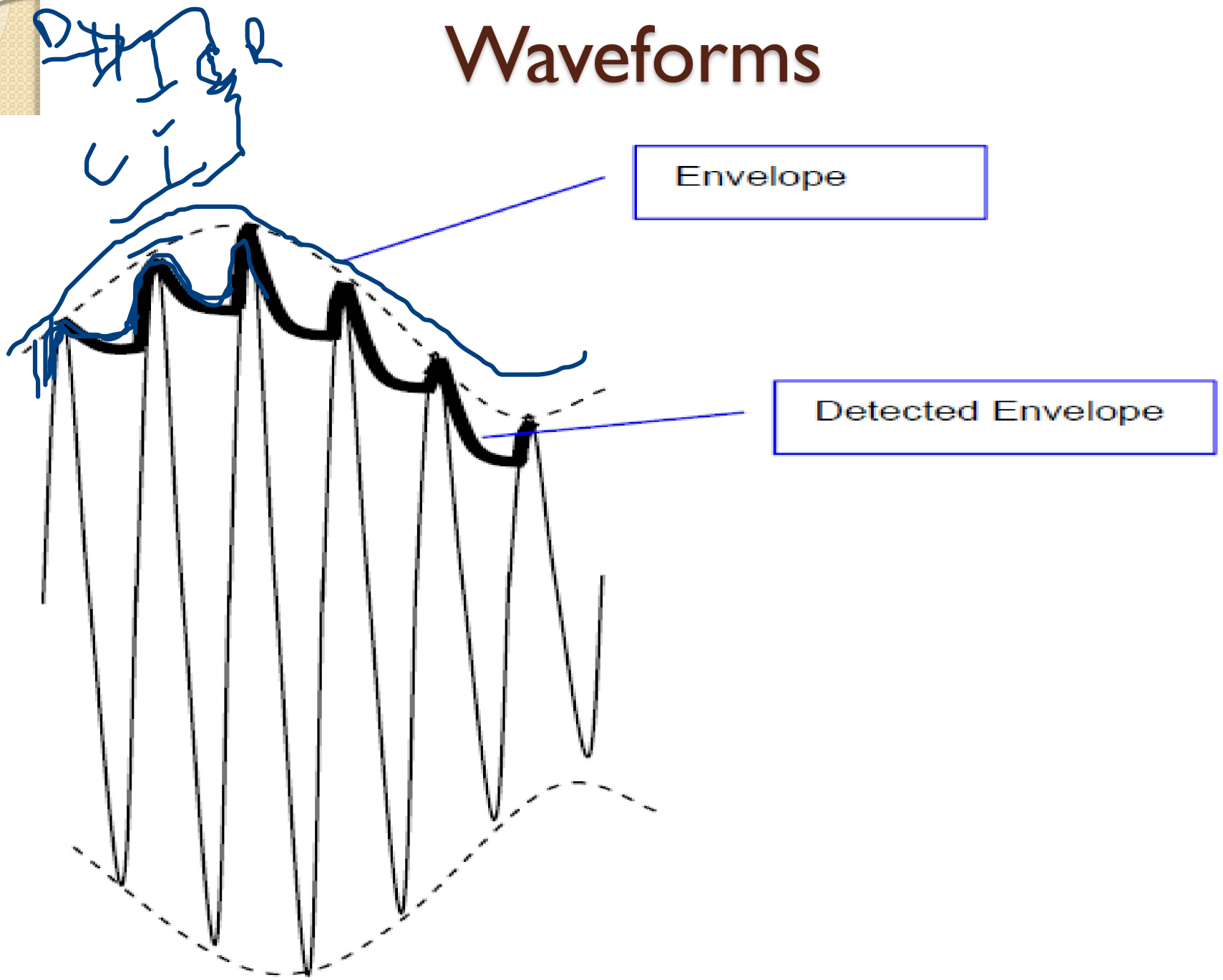


Envelope Detector (AM Demodulator/Detector).

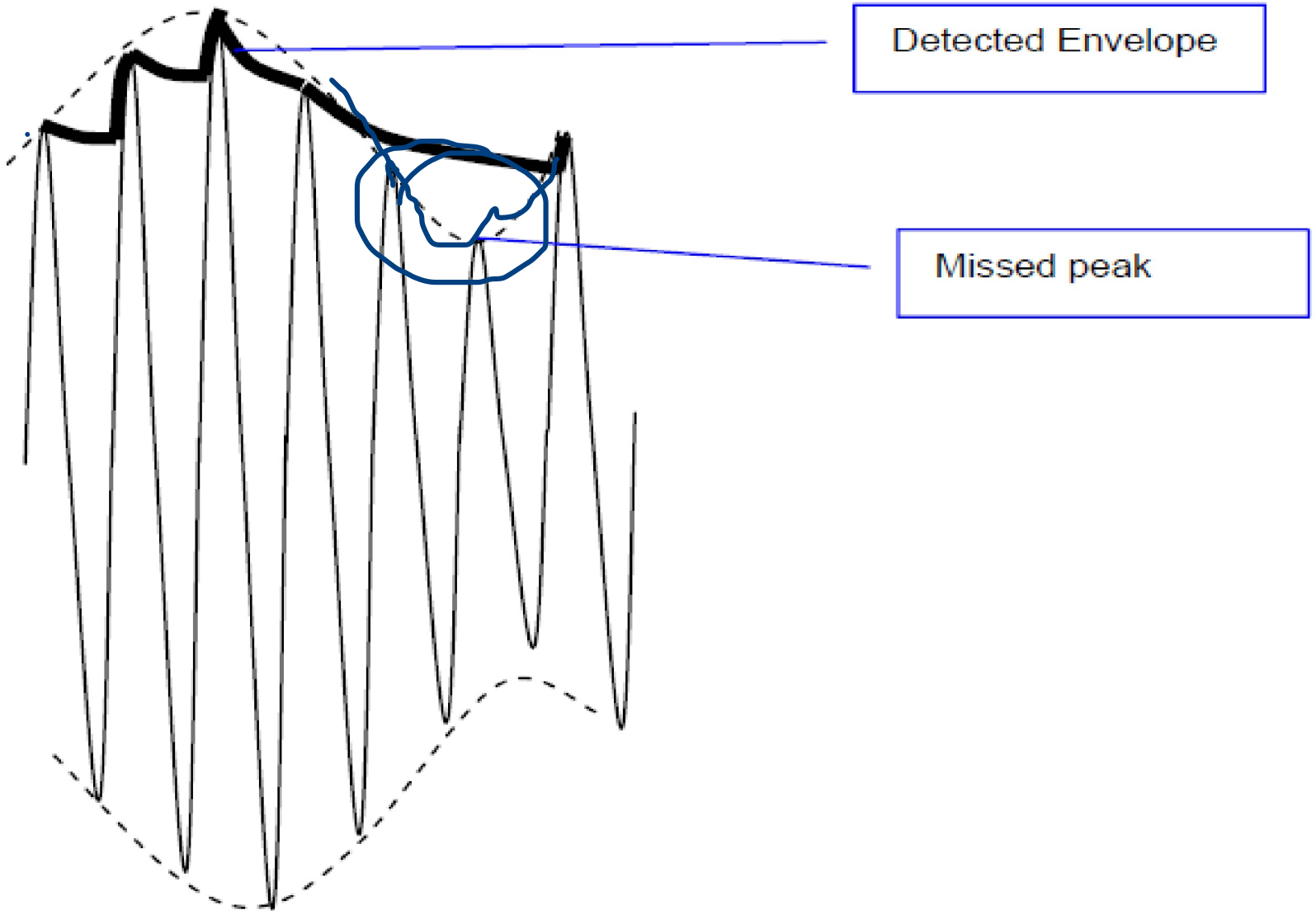
Waveforms at different stages



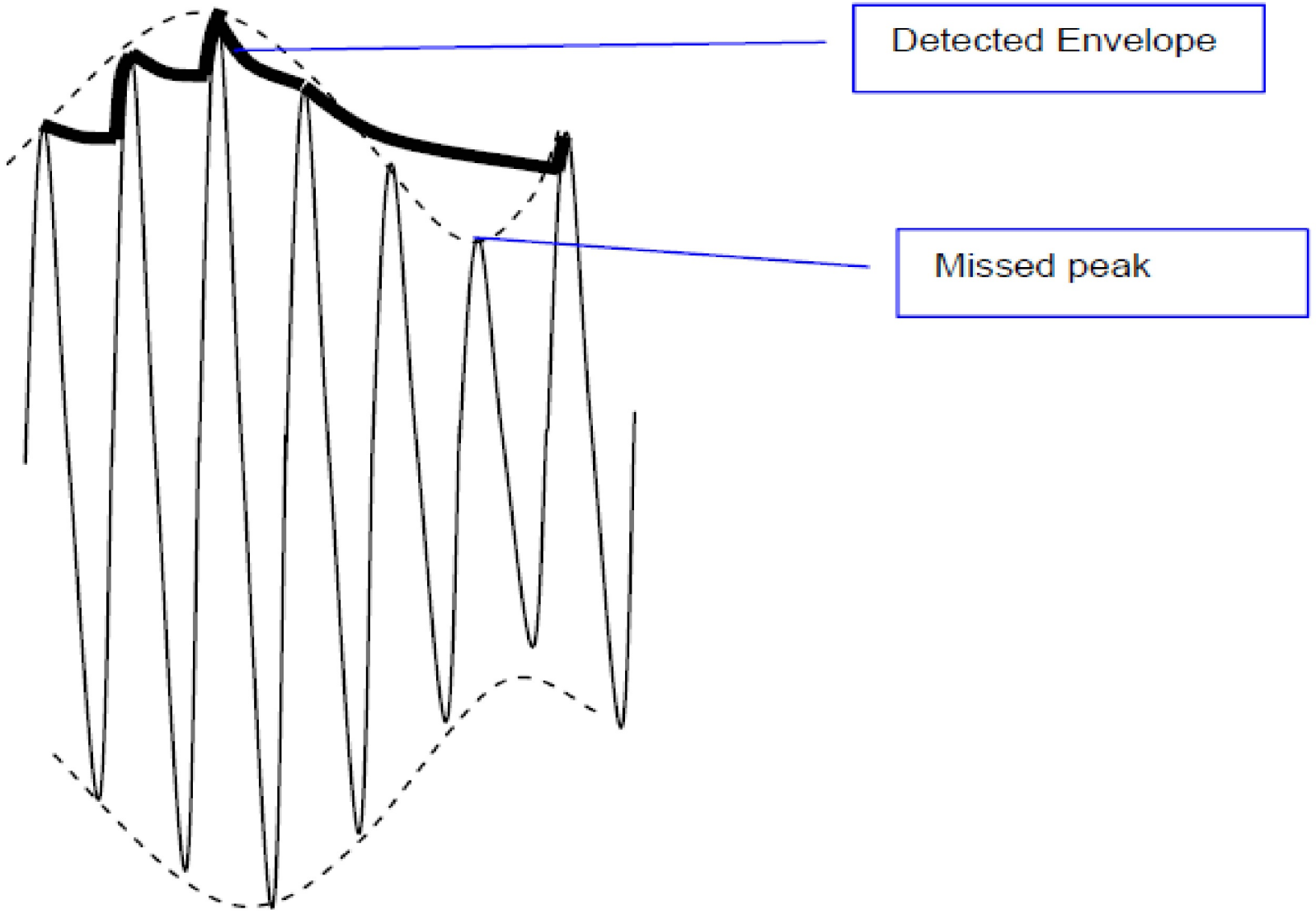
Waveforms



Waveforms (RC time constant is large)



Waveforms (RC time constant is large)



Waveforms (RC time constant is large and too small)

If RC is too small , the carrier wave produced at the output is shown in Fig. 4a.

Fig. 4a.

If RC is too large , the voltages or the signal at the output does not follow the envelope as is Fig. 4b.

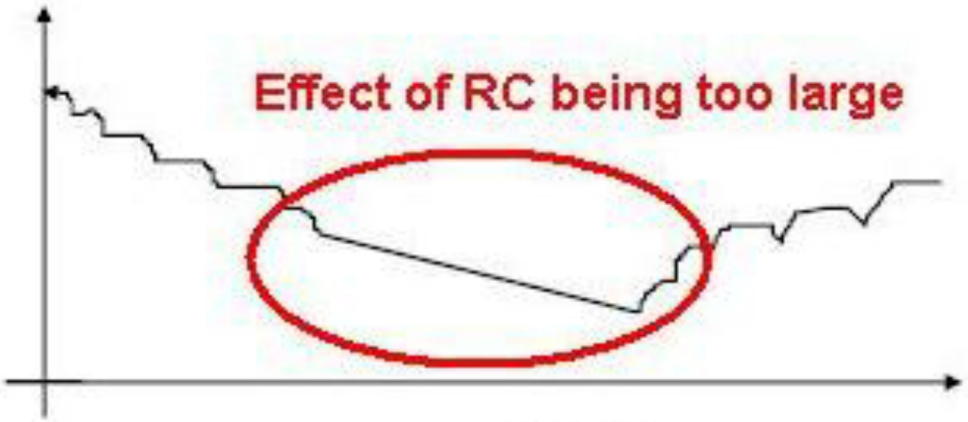
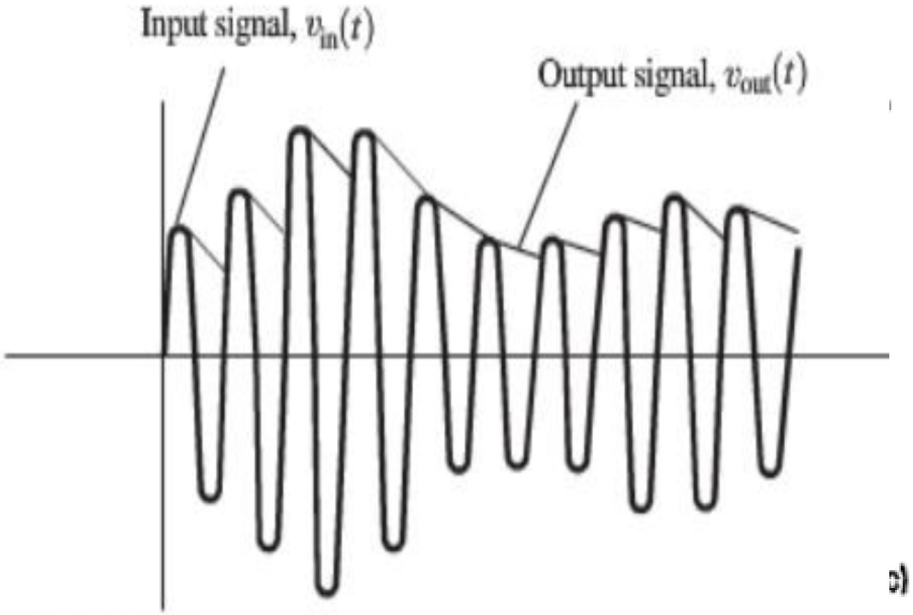
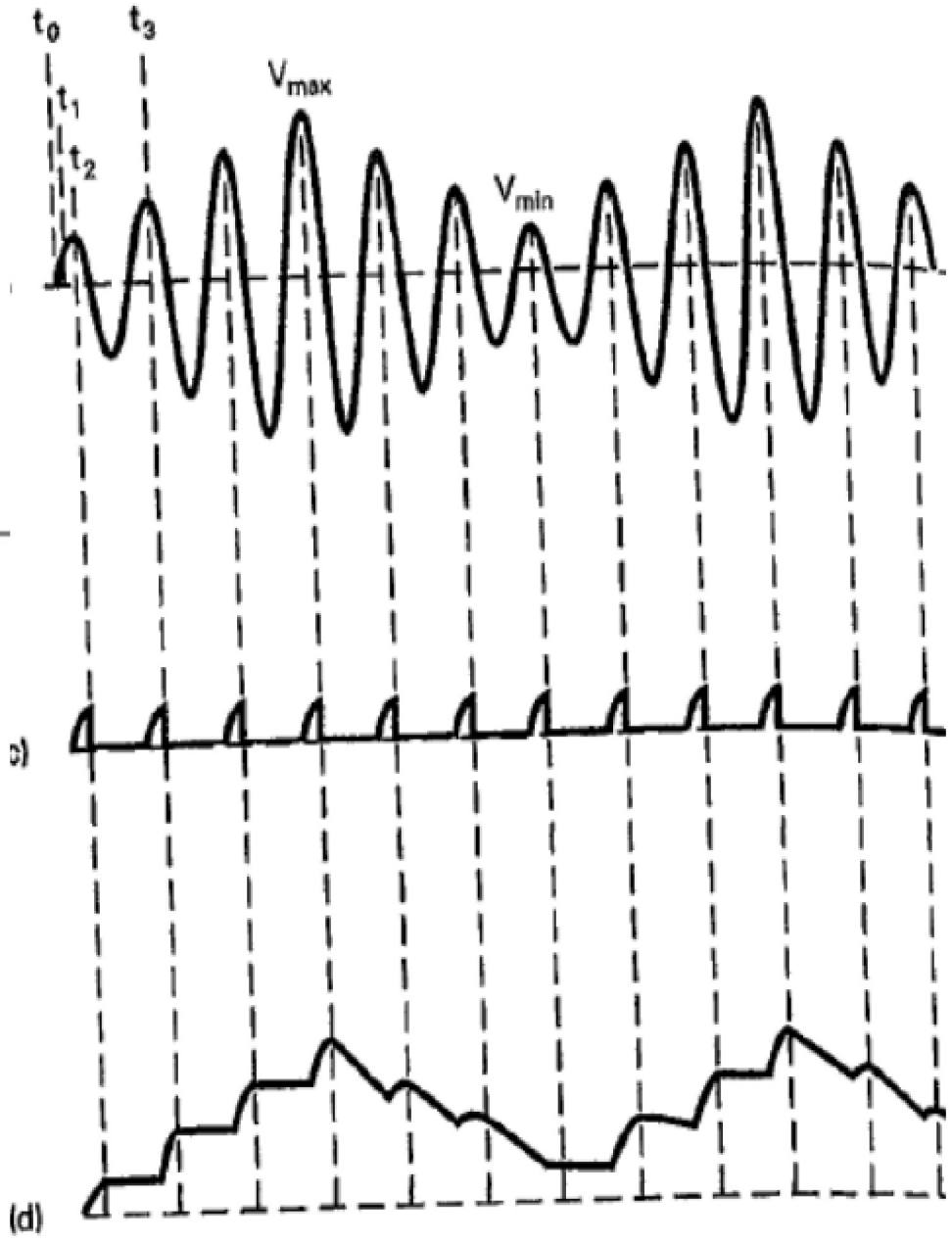


Fig. 4b

Simple Diode Detector Waveforms

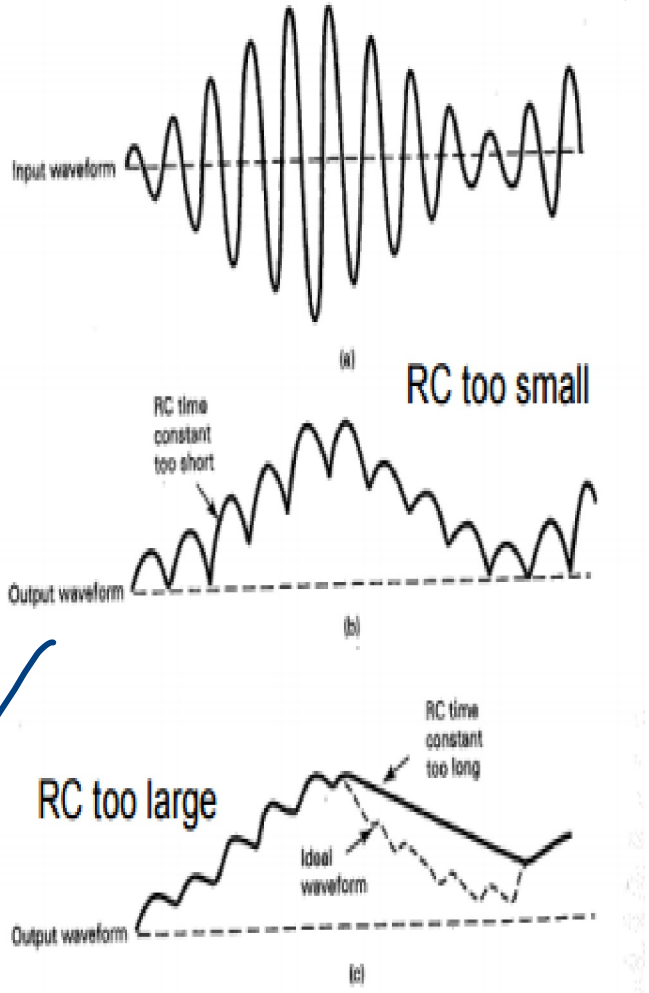




Diode Detector- Distortion

- What should be the value of RC?
  - If too low then discharges too fast
  - If too high the envelope will be distorted
  - The highest modulating signal:

$$f_{m(\max)} = \frac{\sqrt{(1/m^2)-1}}{2\pi RC}$$



Practical Diode Detector