FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEER
Department of Electronics and Computer Science

Expt 1: To study Amplitude Modulation and Demodulation

1. Course, Subject & Experiment Details

Timeline (3)	Understanding (3)	Self Efforts (4)	Total (10)

Student's Name	**Hardik Prajapati**	**Roll No.**	**9152**
Academic Year	**2022 – 23**	**Estimated Time**	**2 Hours**
Course & Semester	**T.E. (ECS) Sem. V**	**Subject Name**	**Communication Engineering Laboratory**
Unit No.	**2**	**Chapter Title**	**Analog modulation Systems**
Experiment Type	**Software Performance**	**Subject Code**	**ECL 501**

2. Aim of the Experiment:

To Study the amplitude modulation and demodulation.

3. Apparatus:

CRO, Trainer Kit ST 2201, connecting probes.

4. Expected Outcome of Experiment

Students will be able to measure the modulation index from the waveform observed on the CRO and identify over modulation and its effect on the demodulated audio frequency signal.

5. Theoretical Description

In amplitude modulation (AM) the amplitude of carrier signal is varied according to the amplitude of the modulating signal, whose frequency is invariably less than that of the carrier. Thus, AM is the system of modulation in which the amplitude of the carrier is made proportional to the instantaneous amplitude of the modulating voltage. The standard form of AM is defined by

$$\square_{\square\square}(\square) = \square_{\square}(1 + \square\square\square\square_{\square}\square)\square\square\square_{\square}\square$$

where $\square_{\square}$ is the amplitude of the carrier, m is modulation index, $\square_{\square}$ is the modulating frequency, and $\square_{\square}$ is the carrier frequency.

The Double sideband Transmitter:
The Transmitter circuit produce the amplitude modulated signals which are used to carry information over the transmission path to the receiver. The main parts of the transmitter are shown in fifure

Information Signal:
Audio Oscillator or we can provide our own input signal.

Carrier Wave:
Carrier oscillator provides the carrier wave

Output Amplifier:
This amplifier is used to increase the strength of the signal before being passed to the antenna for transmission.

DSB receiver:
The 'AM' wave from the transmitting antenna will travel to the receiving antenna carrying the information with it.

The Receiving Antenna:
The electromagnetic wave strikes the antenna and generates a small voltage in it.

Radio Frequency Amplifier :
The RF amplifier is the first stage of amplification. It has to amplify the incoming signal above the level of the internally generated noise and also to start the process of selecting the wanted station and rejecting the unwanted ones.

The Local Oscillator:
The local oscillator is always maintained at a frequency which is higher, by a fixed amount, then the incoming RF signals.

Mixer:
The Mixer in the receiver combines the signal from the RF amplifier and freq. Input from the local oscillator to produce IF.

This frequency difference therefore remains constant regardless of the frequency to which the radio is actually tuned and is called the intermediate frequency (IF) = 455 KHz.

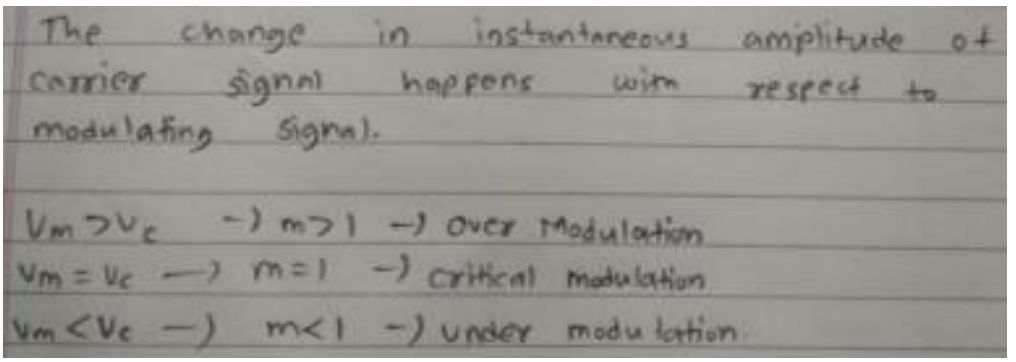
Intermediate Frequency Amplifier:
The IF Amplifier in this receiver consists of two stages of amplification and provides the main signal amplification and selectivity.

Diode Detector:
The function of the diode detector is to extract the audio signal from the signal at the output of the IF Amplifiers.

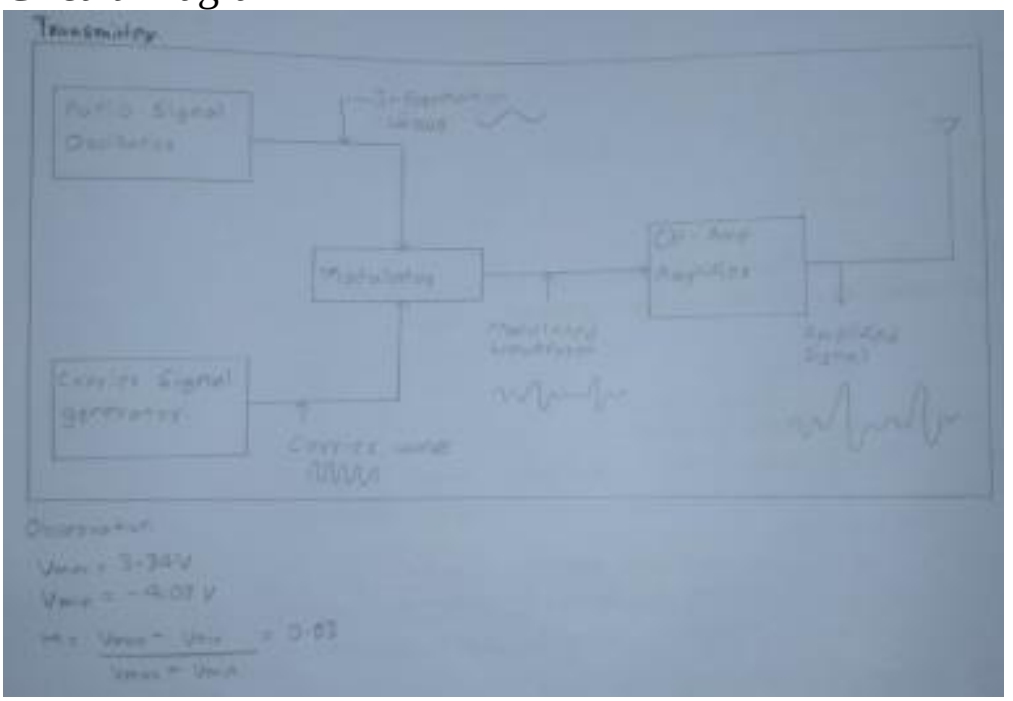
The Result is an output which contains three components.
1. The Wanted audio information signal.
2. Some ripple at the IF frequency.
3. A positive DC voltage level.

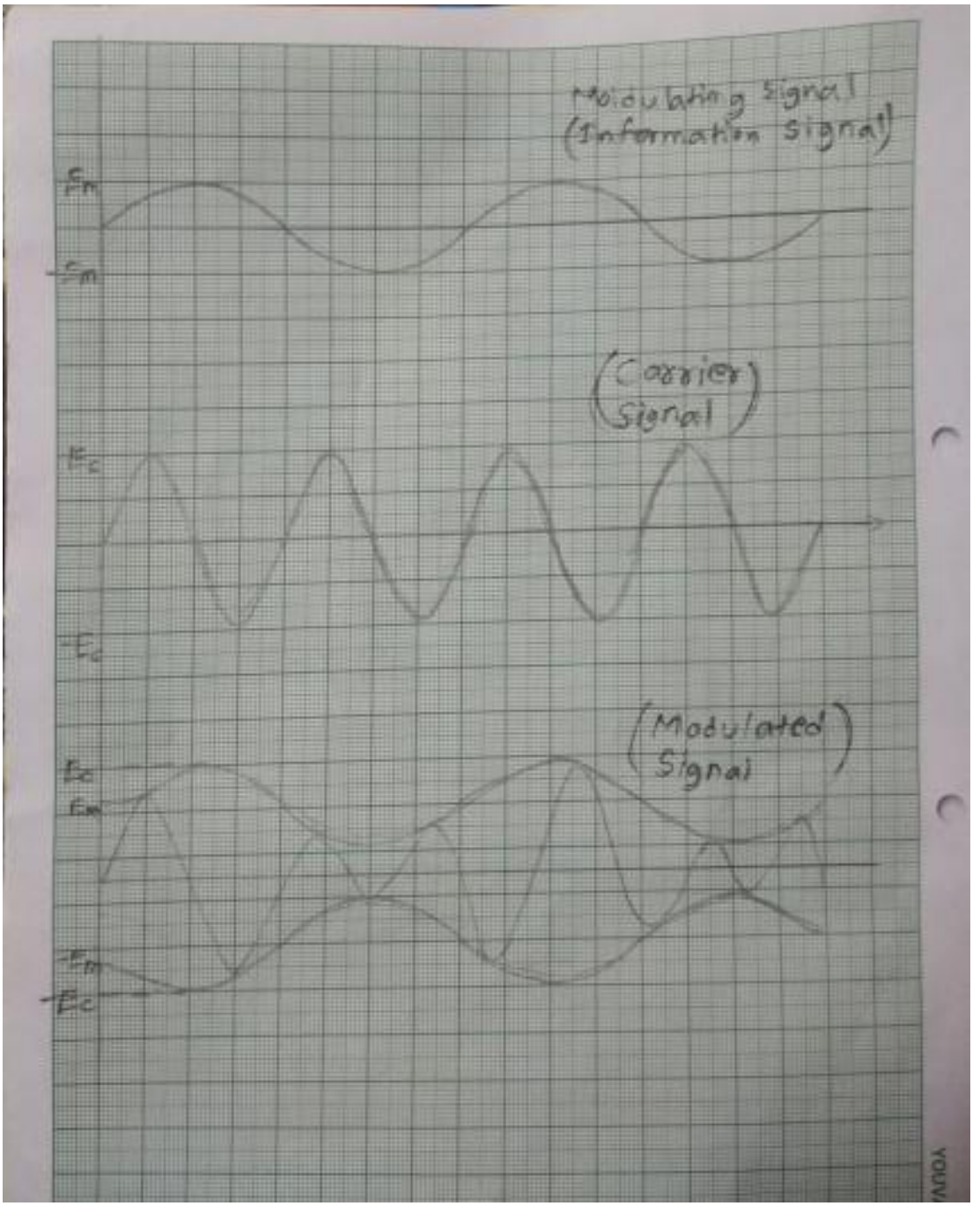
GRAPHS:
1. Waveform at tp.1 of 2201.
2. The Carrier at tp. 9 of 2201.
3. The Amplitude modulated waveform at tp. 3 of 2201.
4. The demodulated waveform at tp.39 of 2202. Plot all the above graphs for m>1, m<1 and m=1.

6.Conclusion



Circuit Diagram




Modulating Signal
(Information Signal)
Em
-Em
(Carrier
Signal)
Ec
-Ec
(Modulated
Signal)
Ec
Em
-Em
-Ec

Roll no: 9152
Hardik Prajapati

Experiment 1

Postlab questions

1) What is the need for modulation?
Ans It is needed on it.
i) Reduce the height of antena
ii) Avoide mixing of signals
iii) Range of communication is increased
iv) Multiplexing is possible
v) Quality of reception is improved.

2) What is flywheel effect?
Ans The flywheel effect is continuation of oscilations in an oscillation circuit the control stimules has been removed. This caused by interacting inductive and capacitive elements in the oscillator.

3) What are high level and low level transmitters?
Ans High level transmitter use high level modulation and low level transmitter use low level modulation. The overall efficiency of low level transmitter is lower than high level transmitter. High level transmitter recieve more power.