Amplitude Demodulation and Automatic Gain Control (AGC) Circuit

INTRODUCTION :- To study Amplitude demodulation circuit and Automatic Gain Control (AGC) System for AM broadcast receivers..

In Amplitude modulation, the carrier amplitude is changed according to the modulating / message signal. For demodulation we are using envelope detector circuit.

ENVELOPE DETECTOR :-

The circuit consists of a diode and an RC parallel combination. The diode will act as a rectifier, clipping the negative portion of the modulated signal. The RC combination is used to reconstruct the modulating signal. The value of R and C is chosen such that it should satisfy the following condition.

\[
\frac{1}{2\pi f_c} < RC < \frac{1}{2\pi f_m}
\]

So the values of R and C chosen are R = 10k, C = 16nF for \( f_m = 1.5\text{kHz} \) and \( f_c = 100\text{kHz} \)

Since the demodulated signal contains dc component, we are using the coupling capacitor to remove it.

AUTOMATIC GAIN CONTROL :-

The AGC circuit is used to control the gain of the detected output. It keeps the receiver in its linear operating range by detecting the overall strength of the signal and automatically adjusting the gain of the receiver to maintain an approximately constant average output level. It generates dc signal based on the input carrier strength. This helps to maintain almost constant gain when tuned for different stations in AM broadcast receivers.
PROCEDURE :-

1. Connect the circuit as shown in the figure.
2. Set the frequency values for $f_m$ and $f_c$.
3. Observe the outputs at point A, B and C.
4. Plot detected output (at point A) vs. input modulating signal.
5. Plot carrier amplitude(Vc) vs. AGC output(at point C).