

## CHAPTER 4

### CONCLUSIONS

One method of developing a PSK modulator is presented in this thesis. Armstrong modulation technique and the derivation of phase modulation is discussed in detail. Maximum difference between the usual and ideal cases of the phase modulation is theoretically computed and graphically shown. It is found that the deviation from perfect phase linearity is not more than  $1.05^\circ$  (degrees) for the range of  $-\frac{1}{2}\pi \leq \phi \leq \frac{1}{2}\pi$  when  $\varepsilon = 42.4^\circ$  (degrees). Although the availability of integrated circuits saved a lot of time in circuit design, finding proper integrated circuits and matching them each other took a considerable time. Many changes are to be made on the relevant circuits before they could be practically employed for this research.

Phase deviation from a perfect linearity could not be measured because of unavailability of a phase meter. Had the pulse-code-modulated (PCM) signal source been available, the response of this modulator to PCM signal could be checked, as many a PSK modulator are found to be used with PCM signal source.

All the circuits operated satisfactorily throughout the experiment, except the two, phase-shifter and carrier frequency (built-in) source,

created some trouble. The phase-shifter needs a considerable long warming up time. The built-in self-oscillating carrier frequency source needs its 2200  $\mu\text{F}$  capacitor be shorted at the beginning to start its oscillation, such a clue was found after days trouble-shooting.

It can now be concluded that the phase modulator is successfully constructed. Its operation is rated to be considerably good. Phase modulated waveforms are obtained as desired. Adjustable inverting and non-inverting voltage amplifiers are deployed to have the signals of required level at different test points.

Although the built-in carrier source is capable of providing frequency at a range of 10 KHz to 100 KHz, phase-shifter is especially designed to operate at 40 KHz. It should, therefore, be borne in mind that the frequency of carrier source be checked before using for experiment or else phase-shifter would not function properly. A sine wave carrier frequency is always preferred for this PSK modulator to a square wave carrier as the process of modulation with the latter carrier encounters many harmonics.