EXPERIMENT No.(8)
TUNED AMPLIFIERS

OBJECT: To study the characteristics of tuned amplifiers.

EQUIPMENTS AND COMPONENTS:
1- Signal generator
2- Oscilloscope
3- Power supply
4- Tuned amplifier circuit

THEORY:
Tuned amplifier provide high constant gain over a specified bandwidth centered at a specified frequency f and 8S much rejection as possible outside this band practical gain and phase characteristics are shown in Fig .(1b) Tuned circuit can be used as a load for class B an class C power amplifier operation. It eliminates the harmonics, and then the output will be a pure sine wave although the collector current is distorted.

A single stage tuned amplifier is seldom used in practice. Generally, double-tuned type as shown in Fig.(2) are preferred, due to using it in cascaded amplification. However, alignment problem is more difficult in double tuned amplifiers, further the bandwidth in multistage tuned amplifiers are less. This shrinking of bandwidth can be avoided by the use of stagger tuning in which the input and the output circuits of each stage is tuned to a slightly different frequencies, e.g. $f_{o1}$ and $f_{o2}$ as shown in Fig (2).
PROCEDURE:

1- Connect the circuit as shown in Fig.(1). Measure $I_c$ and $V_{CE}$. The value of $I_c$ should be about 4.5 mA. (i.e. Adjusted by changing $RB$)

2- Measure the gain of the amplifier and plot frequency response characteristic. Select the frequency of 20, 30, 40, 42, 45, 46, 48, 50, 60, 70 and 80 KHz (take more reading near resonance).

3. Measure phase shift between input and output signal at

4- Connect a resistance (470ohm) in series with inductance and repeat step 2 and 3.

5- Connect $RS=320kohm$, $R=0$. Adjust $Ic=1.6$ mA either by changing $RB$ or by $Vcc$. Plot the wave form of input and output for $Vin =0.5V$ (pp) at resonant frequency and calculate the gain.

DISCUSSION:

1- Calculate $f_o$, $Q$, $BW$ and gain at resonant theoretically and compare your results with experimental data obtained?

2- Comment on the result to obtained in steps 5 and 6.

3- State the applications of tuned amplifiers.

4- Why the value of bandwidth obtained in steps 2 and 4 are different.
Fig.(1) Simple tuned amplifier

Fig.(2): A tuned RF amplifier using a double tuned circuit