

## Experiment No. 9

**Objective:** To plot the frequency response curve of a tuned amplifier and determine its bandwidth.

**Apparatus Used:**

- CRO
- Function generator
- Power supply
- Connecting wires, probes
- Tuned amplifier Circuit.

**Theory:** A tuned circuit is normally made by connecting an inductor L and a capacitor C in parallel. The circuit offers infinite impedance at its resonant frequency  $f_r$  given by  $f_r = \frac{1}{2\pi\sqrt{LC}}$ . The voltage across the tuned circuit at the resonant frequency is maximum and falls off on either side of this frequency. When this circuit is connected as the load to an amplifier, the resulting network is called a tuned amplifier. Fig. 1 shows such an amplifier and it is normally used to select a narrow band of frequencies on either side of the resonant frequency. A plot of amplifier gain vs frequency for a tuned amplifier is shown in Fig. 2. The gain or output voltage  $V_0$  (since input voltage  $V_1$  is fixed) peaks to the maximum  $V_0 \text{ max}$  at the frequency  $f_r$  and declines on either sides of  $f_r$ .

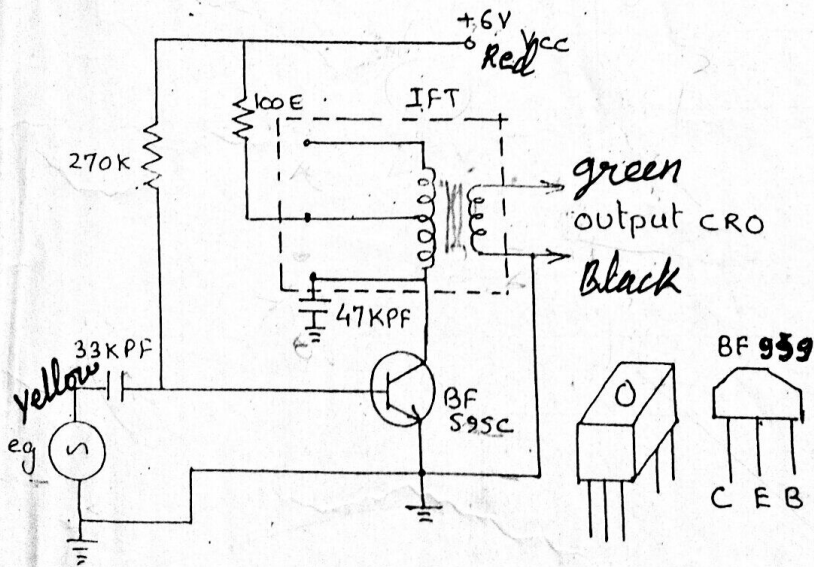


Fig. 1.

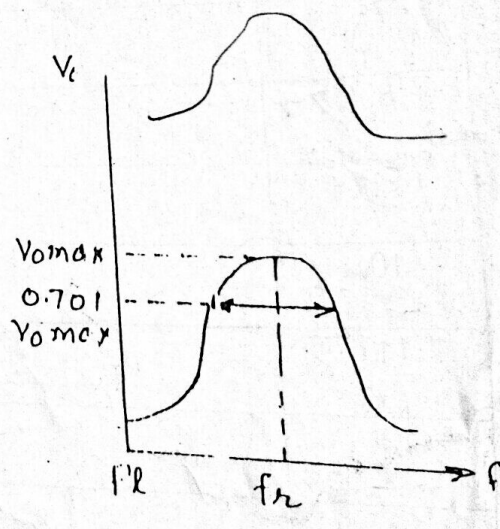


Fig. 2.

**Procedure:**  
 1. Assemble circuit according to diagram on the bread board (Fig. 1). Connect sine wave generator to the input terminal of the circuit through a coupling capacitor.

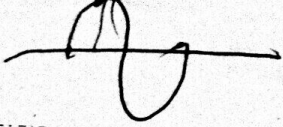
2. Connect 6V D.C. supply to the circuit accordingly.
3. Connect CRO at the output terminals of the circuit.
4. Vary frequency of input signal and note the output voltage from CRO.
5. Plot ( $V_o$  vs  $f$ ) curve and find  $V_{o\max}$ .
6. Find the bandwidth of the amplifier as quoted in the theory above i.e. the difference in the frequencies at which the gain or  $V_{o\max}$  falls to  $0.707 V_{o\max}$  on either sides of  $f_r$ .

**Observations:**

Input Voltage  $V_i = 6$  volts. (fixed)

Sl. No.	Input Signal Frequency $f$ (Hz)	Output Voltage $V_o$ (Volts)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		





15.		
16.		
17.		
18.		
19.		
20.		

Calculations:

1. Maximum Output Voltage  $V_{0max}$  =                      Volts.
2. Resonant Frequency                      =                      Hz.
3. Bandwidth =  $f_{higher} - f_{lower}$  =                      Hz.

Result:

Precautions: