

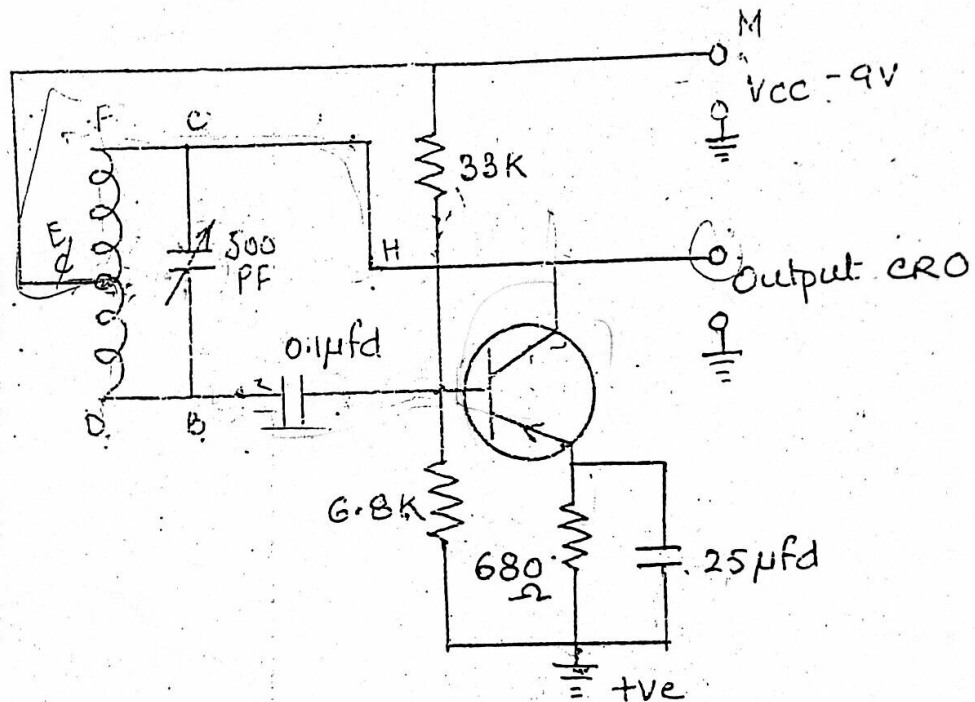
EXPERIMENT NO. 4

OBJECTIVE: Operation of Hartley and Colpitts Oscillator and the effect of variation in amplitude and frequency with C.

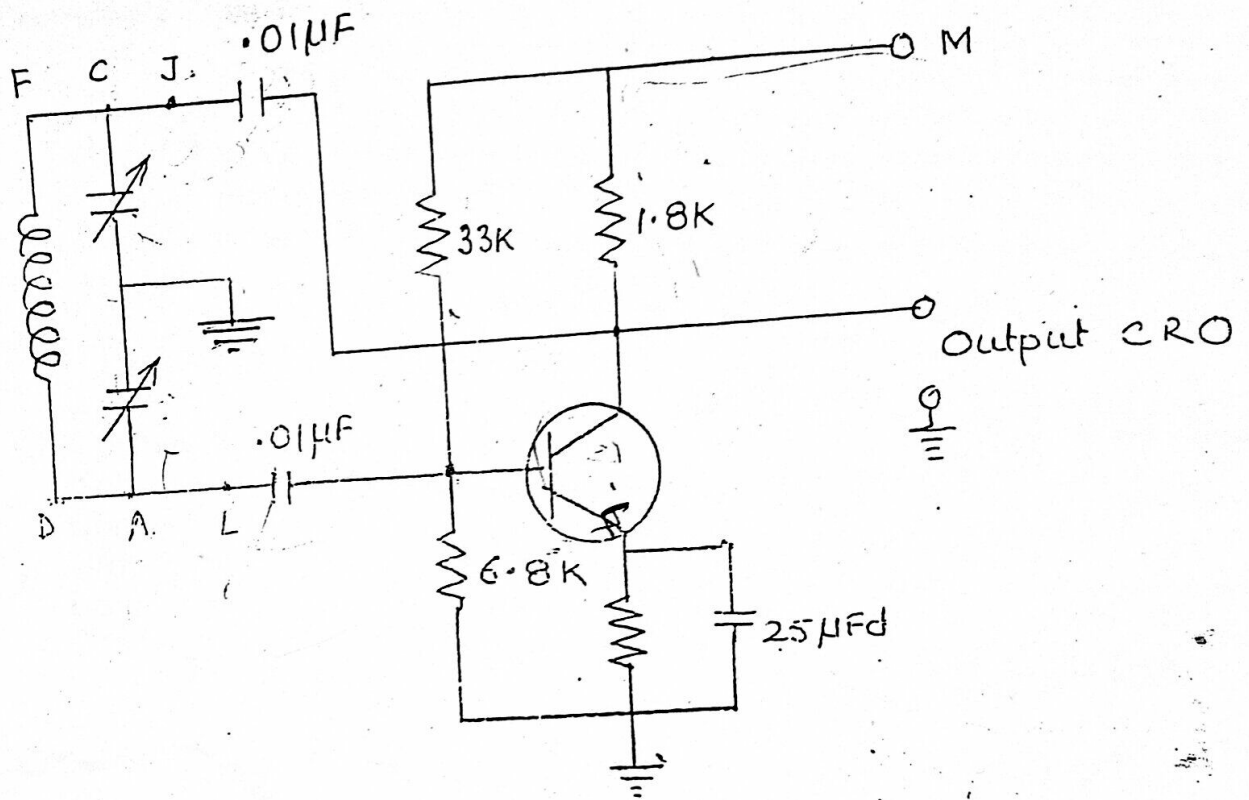
APPARATUS REQUIRED: Experiment Box, C.R.O, Function generator, PVC patch cords, Rheostat.

THEORY: The Hartley and Colpitts oscillator are LC tank circuits for feedback and generation of oscillations in the system. There is a finite range of values of L & C in the circuit upto which the circuits oscillate and beyond this limit the oscillations die down. These oscillators are generally used to generate sine waves.

CIRCUIT DIAGRAM:-



HARTLEY OSCILLATOR



COLPITTS OSCILLATOR

PROCEDURE:-

HARTLEY OSCILLATOR:

1. Connect 9V dc supply at appropriate place of the trainer.
2. Extend M terminal of the trainer -ve polarity to the E terminal of the coil.
3. Connect the F terminal of the coil to C terminal of the variable capacitor.
4. And further extend the same connection to the collector of the transistor.
5. Connect D terminal of coil to B terminal of capacitor and further extend this to L terminal.
6. Connect CRO lead between collector and ground terminal to observe the wave shape of the oscillator.
7. Vary C and see the effect on frequency with capacitor settings at $0^\circ, 40^\circ, 90^\circ, 150^\circ, 180^\circ$.
8. Find the value of the inductance when capacitor is at max value 500 pf; at this stage frequency is minimum.
9. Find the value of C at max frequency by putting the value of inductance (L) already calculated.

COLPITTS OSCILLATOR

1. Connect 9V dc supply (V_{cc}).
2. Connect 1.8 ohm as load resistance.
3. Connect feedback from collector to the tank circuit through C.
4. Ground the center tapping point of the variable capacitor, with jumper wire.
5. Connect F C J and D A L terminals of coil, capacitor and fixed capacitor.
6. Connect CRO lead between collector and emitter, which is oscillator output.
7. Vary C and record frequency at $0^\circ, 20^\circ, 50^\circ, 80^\circ, 110^\circ$.

OBSERVATIONS & CALCULATIONS:-

HARTLEY OSCILLATOR:

1. Output frequency with different C.

Sl. No.	C Setting (θ°)	Frequency (Hz)	Amplitude
1	0		
2	40		
3	90		
4	150		
5	180		

2. $C_{\max} = 500 \text{ pF}$, $f_{\min} =$ _____ Hz, $\therefore L =$ _____ mH

3. $L =$ _____ mH, $f_{\max} =$ _____ Hz, $\therefore C =$ _____ pF

COLPITT OSCILLATOR:

1. Output frequency with different C.

Sl. No.	C Settings (θ°)	Frequency (Hz)	<i>Amplitude</i>
1	0		
2	20		
3	50		
4	80		
5	110		