

## Experiment #3

## Class A amplifiers

### Objective

To understand the working of class A amplifier and to calculate the efficiency of R-C coupled class A amplifier.

### Equipment

Function generator with probes

DMM

Dc supply

oscilloscope with probes

IT-2012 Trainer

### Theory

When an amplifier is biased such that it always operates in the linear region where the output signal is an amplified replica of the input signal. It is a class A amplifier. Class A amplifier are power amplifier that are used to deliver high values of power to low resistance. These amplifiers have an output greater than 1 W and resistance from 4 ohm to 300 ohms.

An ideal amplifier would deliver 100% efficiency, but it is not possible practically. The Q point of class A amplifier is at middle of load line. If the Q point is not centered on load line. The output signal is clipped, and information is lost. A power amplifier delivers power to a load. The power gain of an amplifier is the ratio of the power delivered to load to the input power given as (3.1).

The efficiency of an amplifier is the ratio between the output signal power and input signal power. The maximum efficiency of capacitively coupled class is 25 % but practically it is less than 10%. The efficiency of class A amplifier can be improved by using transformer instead of collector resistance but using transformer in amplifier will raised its cost. We can say that class A amplifier are amplifiers made by keeping the transistor in active region.

$$A_p = P_L / P_{in} \quad (3.1)$$

## Circuit Diagram

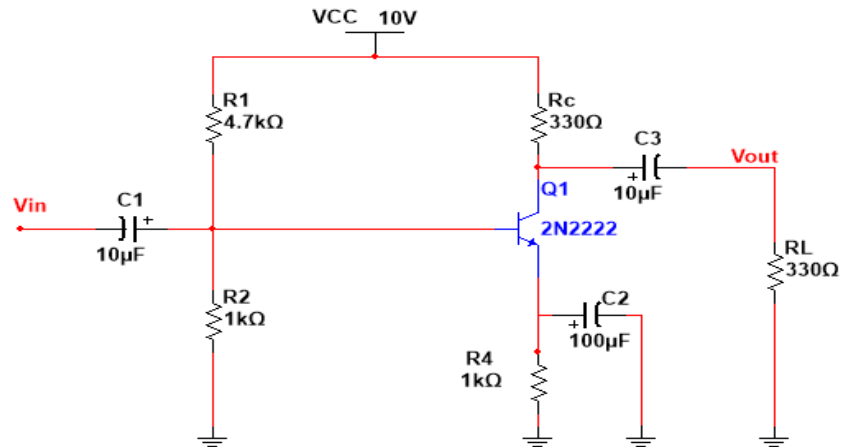


Figure 3.1: Circuit Diagram of Class A Amplifier

## Procedure

1. Set the IT-2012 trainer in the table and connect power cable
2. Locate the class A amplifier block on IT2012 trainer.
3. Connect circuit according to given circuit diagram
4. Apply both AC and DC power supplies using function generator and DC supply respectively
5. By setting DC power ON measure  $V_C$ ,  $V_E$ ,  $V_B$ ,  $I_B$ ,  $I_C$ , and  $I_E$ .
6. Measure the output voltages
7. Calculate the power of class A amplifier using (3.1)
8. Calculate the efficiency of class A amplifier
9. Analyze the transformer coupled class A amplifier.
10. Repeat the above steps to find DC parameter and AC parameters.
11. Calculate the power of transformer coupled class A amplifier using (3.1)
12. Calculate the efficiency of transformer coupled class A amplifier by using (3.2)

$$\eta = \frac{\text{Output Power}}{\text{DC Power}} \% \quad (3.2)$$

## Lab Tasks

1. Analyze the circuit in Figure 3.2 and give practical values.
2. Calculate DC parameters and efficiency of circuit in figure 1.

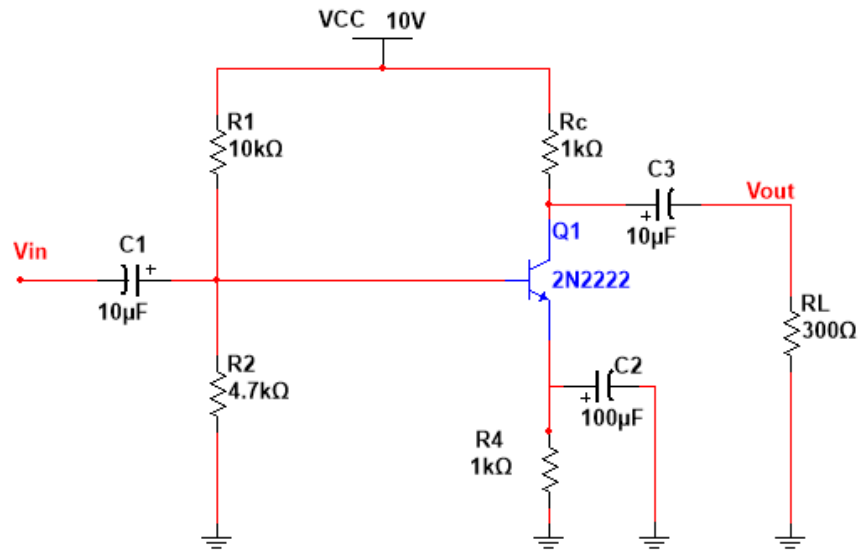


Figure 3.2: Circuit Diagram of Class A Amplifier

### Conclusion

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