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Introduction

The report for lab 5 i.e., Diodes took place on 10 March 2021.Appendix at the end is the prelab Assignment.

Objective

The main goal of this lab is to analyze the characteristics of the common emitter amplifier and learn the experimental procedures to observe the input and output impedance of an amplifier.

Circuit under Test

The circuit in figure 1 is a common emitter amplifier circuit. Vcc = 15V.

Diagram, schematic

Description automatically generated

Figure 1.

The circuit in figure 2 has everything in figure 1 but also has more components compared to figure 1. Rs= 50Ω, Rl = 10KΩ.V in and V out are connected to channel 1 and 2 in the oscilloscope. The impedance can be calculated through this process.

Diagram, schematic

Description automatically generated

Figure 2.

Experimental Result

Table E1 is based on figure 1 of this lab.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| 4.6 | 9.7 | 4.2 | 0.007 | 0.762 | 0.702 |

Table E1. Measured terminal voltages and currents of the Bjt in the circuit of fig 1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| 0.18 | 1.46 | -7.96 | -15 | 4.2 | -16.68 |

Table E2(a). Input and output Ac voltages and gain of the common emitter amplifier with Rl=10kΩ.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| 0.18 | 2.53 | -16.22 | -15 | 7.86 | -5.73 |

Table E2(b). Input and output Ac voltages and gain of the common emitter amplifier with Rl=∞.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 3.4 | 0.162 | 0.02 | 3.6 |

Table E3. Parameters of common emitter amplifier for determining its input resistances.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 8.6 | 1.61 | 1.72 | 8.6 |

Table E4. Parameters of common emitter amplifier for determining its output resistances.

Conclusion Remark

C3.

Ai = io/=0.192/0.04= 4.8(mA/mA).

Ap=AvAi=-8.5\*4.79=-40.7(mAV/mAV).

C4.the max magnitude

Appendix: prelab-Assignment

P1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Vb | Vc | Ve | Ib | Ic | Ie | Gm | Re | Rpi |
| 5.3 | 10.7 | 4.5 | 0.005 | 0.7 | 0.7 | 26 | 0.0365 | 5.6 |

Table p1.

P2.

|  |  |  |  |
| --- | --- | --- | --- |
| Av0 | Av | Ri | Ro |
| -2.6 | -2.6 | 330.23 | 16.25 |

Table p2.

P4.