**Session-11 Assignment**

**Name:-** Aryan DilipbhaiLanghanoja

**Enroll No:-** 92200133030

**AIM**: To analyze the transistor circuits and calculate various voltages and current.

**Apparatus:**

1. DC power Supply
2. Transistor (BC547)
3. Resistor (470kohm, 1kohm)
4. Voltmeter
5. Ammeter

**Task: Up-Down analysis**

Use following circuit for analysis. You need to assume 10% increase in independent variable and based on that you need to check the increase or decrease in dependent variable. Assume second approximation of transistor. If change is very small, you can answer no change.

**Circuit diagram:**

****

Consider βdc = 100

Predict the response of each dependent variable when we increase one independent variable and remaining independent variables are unchanged.

**Up-Down Analysis**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **IndependentVariables** | **Dependent Variables** | | | | | | |
|  | **VB** | **VC** | **IB** | **IC** | **VCE** | **PD** |  |
| **VBB** | **Up** | **Down** | **Up** | **Up** | **Down** | **Down** |  |
| **VCC** | **No Change** | **Up** | **No Change** | **Up** | **Up** | **Up** |  |
| **RB** | **Down** | **Up** | **Down** | **Down** | **Up** | **Up** |  |
| **RC** | **Down** | **Up** | **Down** | **Down** | **Up** | **Up** |  |
| **Bdc** | **No Change** | **Down** | **No Change** | **Up** | **Down** |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

**Calculations:**

**KVL in Input Loop:-**

VBB – IBRB – VBE = 0

**IB =** (VBB – VBE) / RB

Here VBE = VB

Now if VBB increase VB will slightly increase.

And IB Will increase and IC will increase. From that VCE Will Decrease.

Now if VCC increase VBB and IB is not affected. But IC will slightly will Decrease.

And If IC will increase then VCC will decrease.

Now if RB will increase IB Will decrease and IC will decrease and VCE will increase.

Now if RC will increase IC will decrease and VCE will increase.

Now if β will increase then input loop will unaffected. But IC will increase and VCE will decrease.