Electronics and Communications Department

Analog Electronics

Lab 4 Notes

Direct Coupling

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Section	**4**
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- **Part I**

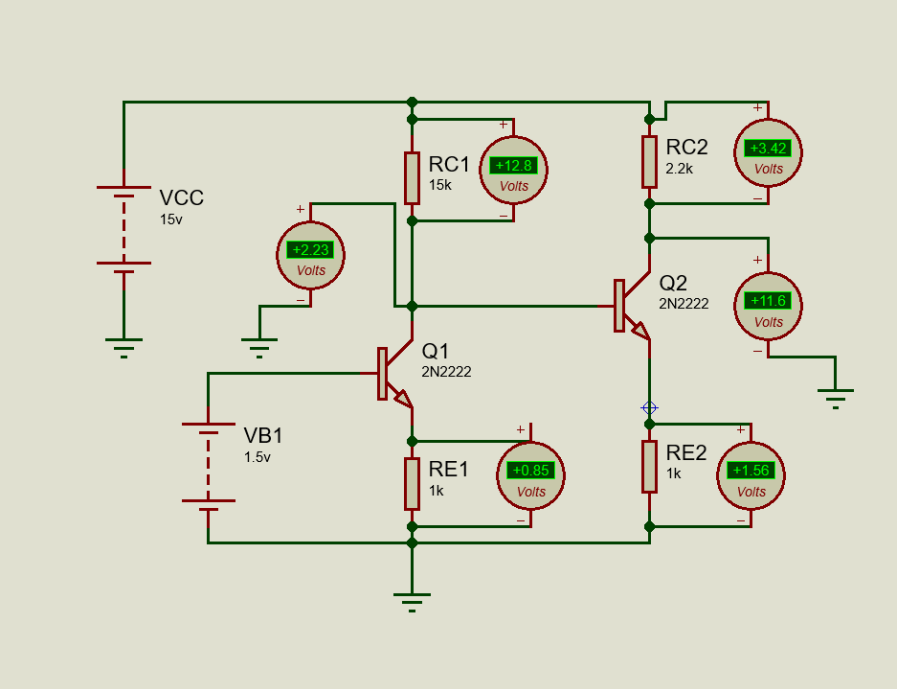
  - **The figure of the circuit below shows that.**

    - **At V_{B1}= 1.5V**

V_{RC1}= 12.8V , V_{RC2}= 3.42V

V_{RE1}= 0.85V , V_{RE2}= 1.56V

V_{C1} = 2.23V , V_{C2} = 11.6V

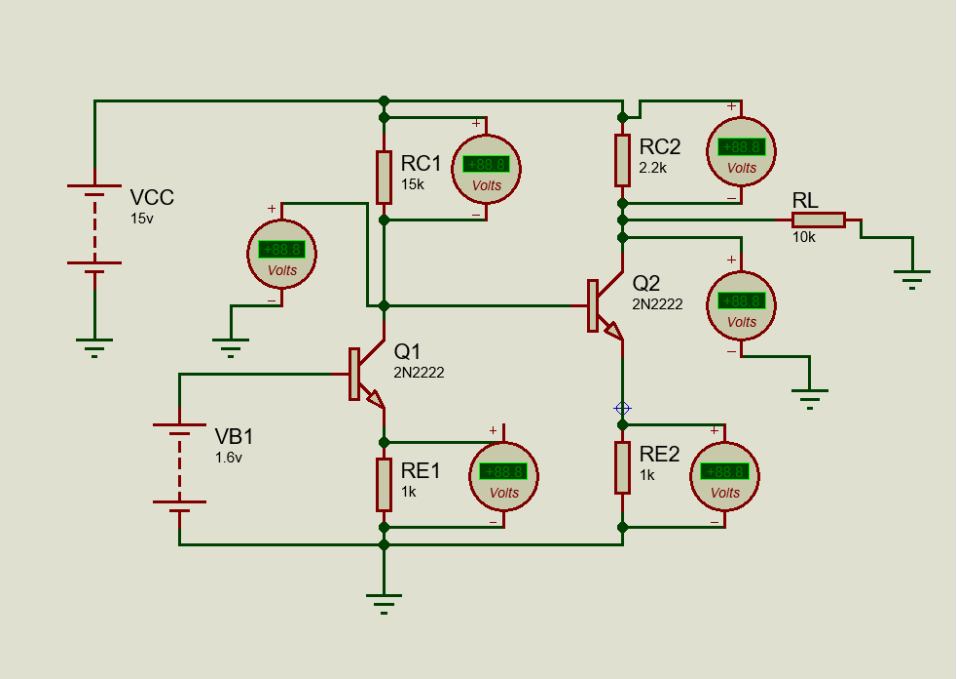


➢ **Calculate the overall voltage gain, $A_v = \frac{\Delta V_{C2}}{\Delta V_{B1}}$**

- **At V_{B1}= 1.4V ⟶ V_{C2} = 8.7V**
- **At V_{B1}= 1.6V ⟶ V_{C2} = 14.1V**

$\therefore A_v = \frac{14.1-8.7}{1.6-1.4}$ = 27 V/V

❖ **The figure below shows the circuit after connecting 10KΩ load.**



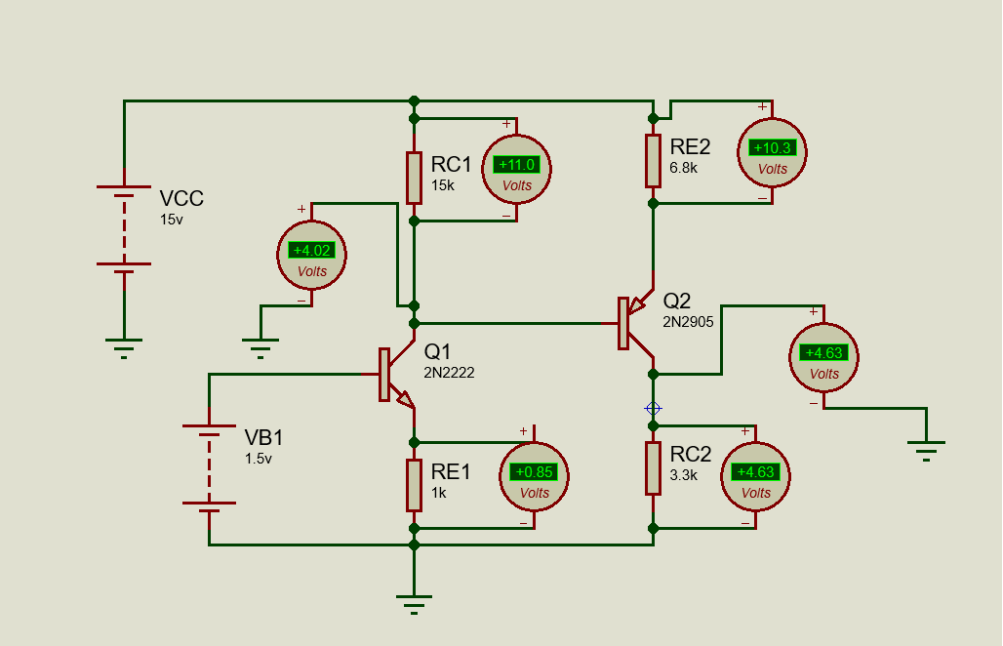
➢ **Calculate the overall voltage gain, $G_v = \frac{\Delta V_{C2}}{\Delta V_{B1}}$**

- **At V_{B1}= 1.4V ⟶ V_{C2} = 7.14V**
- **At V_{B1}= 1.6V ⟶ V_{C2} = 11.5V**

$\therefore G_v = \frac{11.5-7.14}{1.6-1.4}$ = 21.8 V/V

- **part II**

  - **The figure below shows the circuit after changing the NPN transistor (Q_2) to PNP transistor and the DC voltages at each node.**



- **Calculate the overall voltage gain, $A_v = \frac{\Delta V_{C2}}{\Delta V_{B1}}$**

  - **At V_{B1}= 1.4V ⟶ V_{C2} = 4.79V**
  - **At V_{B1}= 1.6V ⟶ V_{C2} = 4.45V**

$\therefore A_v = \frac{4.45-4.49}{1.6-1.4}$ = -0.2 V/V
