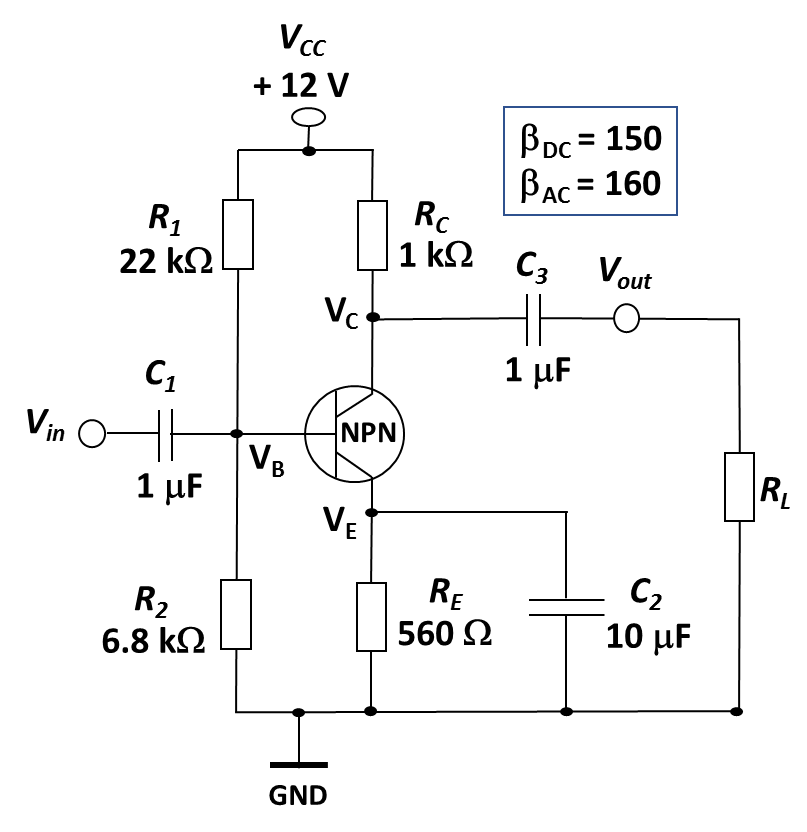
**Problem 1**

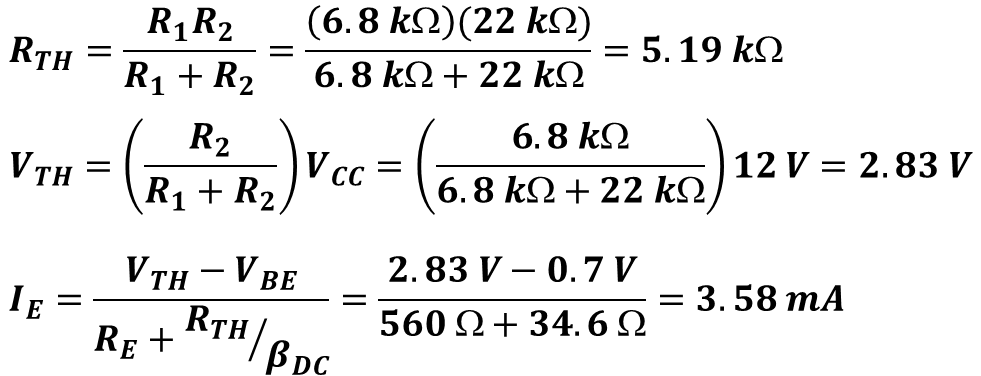
For the common-emitter (CE) amplification circuit below:

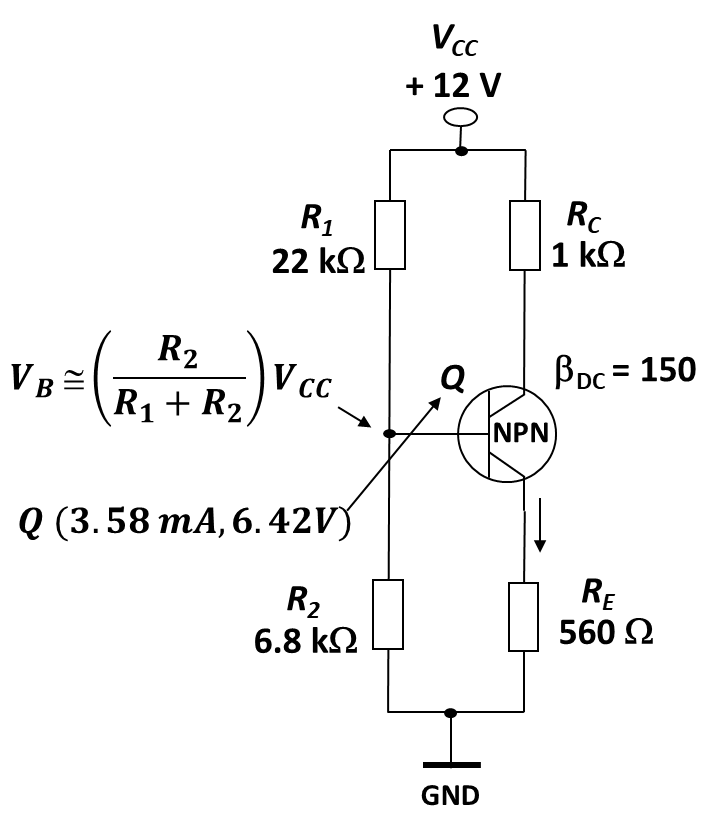


1. Determine the bias current 2 points
2. Determine seen by the source ( 2 points
3. Determine the voltage gain from base to collector without the load (). 2 points
4. Determine the voltage gain from base to collector when a load () is connected to the output. 2 points
5. What will happen to the voltage gain when the bypass capacitor is removed? 1 point
6. Why is a partially bypassed emitter resistor used? 1 point

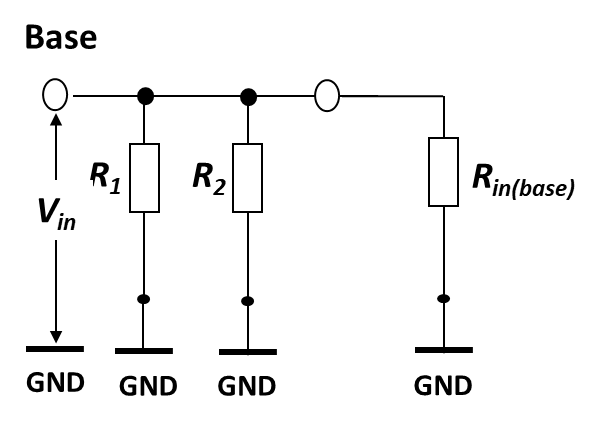
**Note: In AC analysis, use the simplified *T*-model of BJT at room temperature.**

1. **2 points**

****

****

1. **2 points**

**Icon

Description automatically generated with low confidence**

1. **2 points**
2. **2 points**
3. **1 point**

**The voltage gain will be reduced. The effect of *RE* is to decrease the ac voltage gain. The new gain A will be in this case:**

1. **1 point**

**A partially bypassed emitter resistor used (with partially unpassed), the gain is much less dependent on .**

**Problem 2. (4/10)**

The amplifier circuit uses an op-amp with finite gain A of 10. Find Vout for Vin = 1V.

Take R1 = 1 kΩ and R2 = 2 kΩ.



**Shape

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**Problem 3. (3/10)**

The circuit of a noninverting summing amplifier is shown below. The circuit consists of two inputs and . Calculate the output of the amplifier as a function of the two inputs and .

Graphical user interface, application

Description automatically generated

Use superposition principle to find the contribution of V1 to the output voltage (V2= 0).

Use superposition principle to find the contribution of V2 to the output voltage (V1 = 0).

**Problem 4. (3/10)**

Calculate the voltage gain, current gain, power gain, and input resistance.

Graphical user interface, application, Teams

Description automatically generated

Shape

Description automatically generated with medium confidence

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Description automatically generated with medium confidence

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Description automatically generated with medium confidence

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Description automatically generated with medium confidence