

Electronic Circuits II - Assignment 04 **BJT Amplifiers 2**

T & F

| # | | |
|---|---|--|
| 1 | A bypass capacitor in a CE amplifier decreases the voltage gain. | |
| 2 | If RC in a CE amplifier is increased, the voltage gain is reduced. | |
| 3 | The load is the amount of current drawn from the output of an amplifier. | |
| 4 | In a CE amplifier, the gain can be stabilized by using a swamping resistor. | |

Problems

| | |
|----------|--|
| Q1 | <div style="text-align: center;"> </div> <p>Determine the following dc values for the amplifier in Figure</p> <p>(a) I_E (b) V_E (c) V_B (d) I_C (e) V_C (f) V_{CE}</p> |
| Sol 1 | <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> |



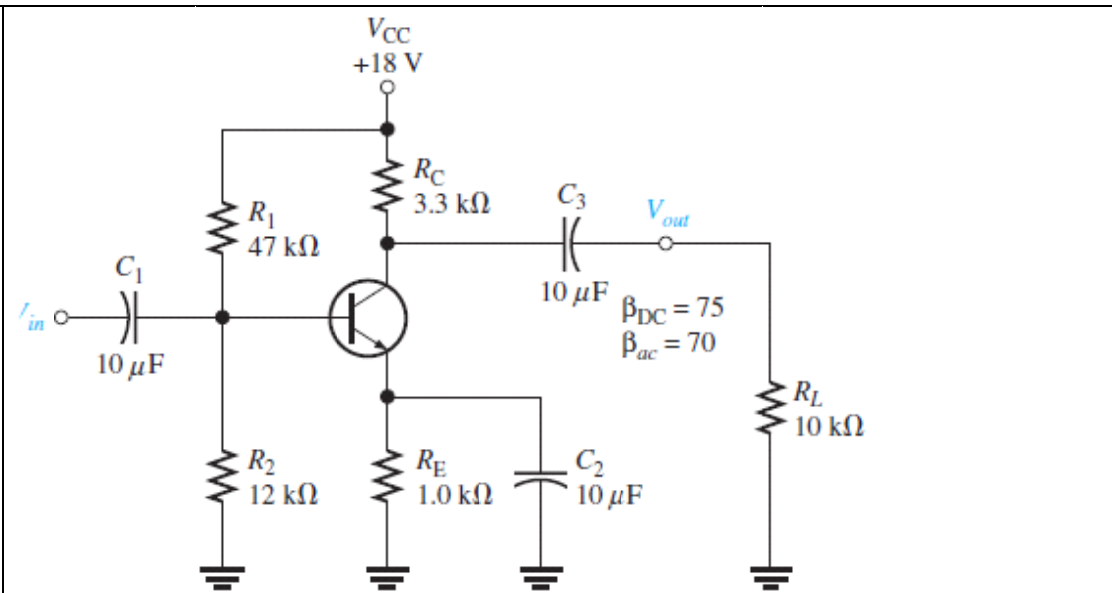
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| <p>Q2</p> |  <p>Determine the following ac values for the amplifier in Figure</p> <p>(a) $R_{in(base)}$ (b) R_{in} (c) A_v (d) A_i (e) A_p</p> |
| <p>Sol 2</p> | <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> |



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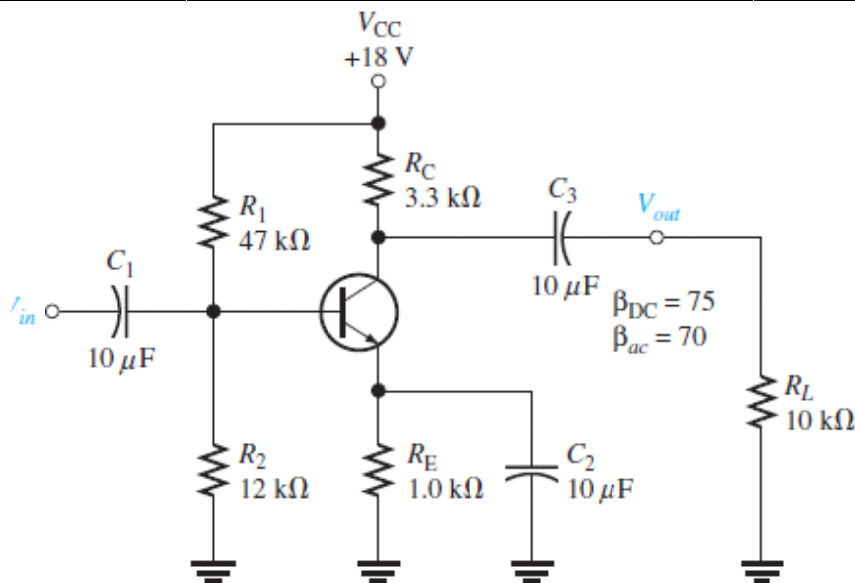
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Q3



Assume that a $600\ \Omega$, $12\ \mu\text{V}$ rms voltage source is driving the amplifier in Figure. Determine the overall voltage gain by taking into account the attenuation in the base circuit, and find the *total* output voltage (ac and dc). What is the phase relationship of the collector signal voltage to the base signal voltage?

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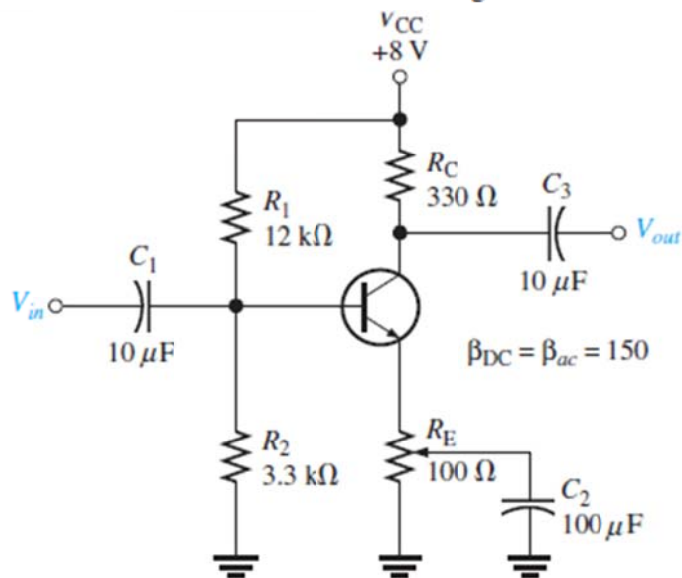
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Q4

The amplifier in Figure has a variable gain control, using a $100\ \Omega$ potentiometer for R_E with the wiper ac-grounded. As the potentiometer is adjusted, more or less of R_E is bypassed to ground, thus varying the gain. The total R_E remains constant to dc, keeping the bias fixed. Determine the maximum and minimum gains for this unloaded amplifier.



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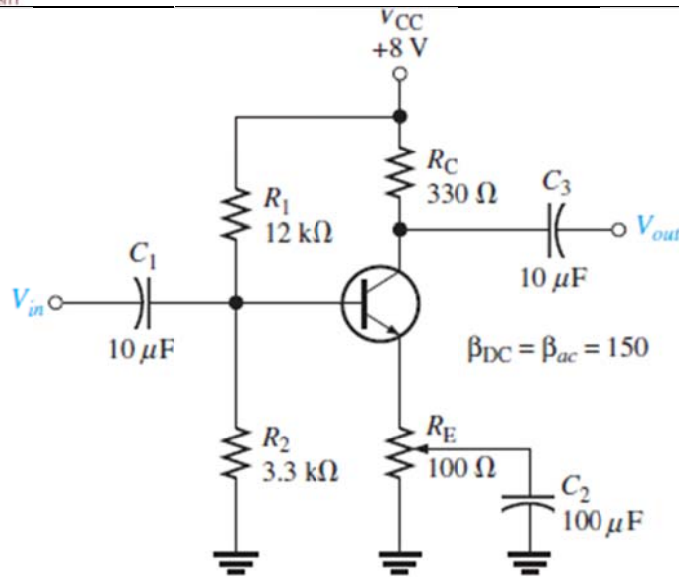
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Q
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If a load resistance of $600\ \Omega$ is placed on the output of the amplifier in Figure , what are the maximum and minimum gains?

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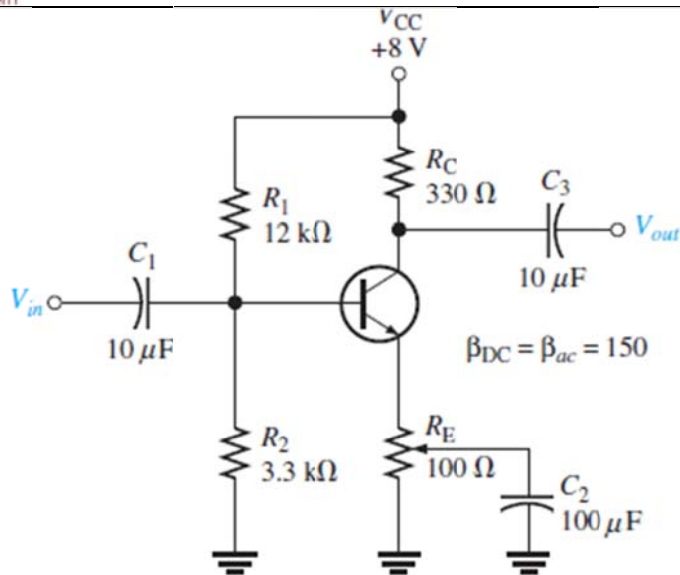
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Find the overall maximum voltage gain for the amplifier in Figure with a $1.0 \text{ k}\Omega$ load if it is being driven by a $300 \text{ k}\Omega$ source.

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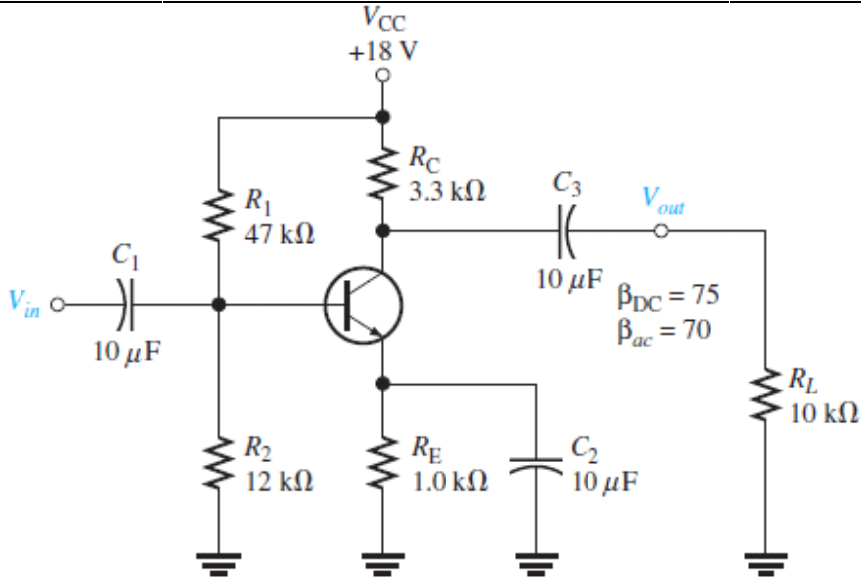
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7



Modify the schematic to show how you would “swamp out” the temperature effects of r_e' in Figure by making R_e at least ten times larger than r_e' . Keep the same total R_E . How does this affect the voltage gain?

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