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**Started on** Thursday, 14 December 2017, 12:27 AM

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**State** Finished

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**Completed on** Thursday, 14 December 2017, 12:35 AM

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**Time taken** 7 mins 45 secs

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**Grade** **0.00** out of 106.00 (0%)

**Question 1**

Not answered

Mark 0.00 out of  
2.00

Which of the following is true for a PNP BJT ?

Select one:

- ☐ a. Current flows when either  $V_{be}$  or  $V_{bc}$  are negative voltages
- ☐ b. The base current consists of mostly electrons
- ☐ c. Current flows primarily because of holes injected into the base
- ☐ d. All of these
- ☐ e. An N-type base is sandwiched between a P-type emitter and a P-type collector

The correct answer is: All of these

**Question 2**

Not answered

Mark 0.00 out of  
2.00

Which of the following is true for a PNP BJT ?

Select one:

- ☐ a. Current flows primarily because of electrons injected into the base
- ☐ b. Current flows when either  $V_{be}$  or  $V_{bc}$  are positive voltages
- ☐ c. A P-type base is sandwiched between an N-type emitter and an N-type collector
- ☐ d. The base current consists of mostly electrons
- ☐ e. None of these

The correct answer is: The base current consists of mostly electrons

**Question 3**

Not answered

Mark 0.00 out of  
2.00

For a BJT operating in saturation, which of the following is true?

Select one:

- ☐ a. The output resistance,  $r_o$ , is much larger than in the forward-active region
- ☐ b. The base-collector junction can be forward biased by about 200mV before the collector current starts to decrease
- ☐ c. None of these
- ☐ d. The collector current increases linearly as the base current is increased
- ☐ e. The common-emitter current gain,  $\beta$ , is much smaller than in the forward-active region

The correct answer is: The common-emitter current gain,  $\beta$ , is much smaller than in the forward-active region

**Question 4**

Not answered

Mark 0.00 out of  
2.00

For a BJT operating in saturation, which of the following is true?

Select one:

- ☐ a. The output resistance,  $r_o$ , is much larger than in the forward-active region
- ☐ b. The common-emitter current gain,  $\beta$ , is much larger than in the forward-active region
- ☐ c. The base-collector junction can be forward biased by about 200mV before the collector current starts to decrease
- ☐ d. The collector current stays nearly constant as the base current is increased
- ☐ e. None of these

The correct answer is: The collector current stays nearly constant as the base current is increased

**Question 5**

Not answered

Mark 0.00 out of  
2.00

As  $|V_{ce}|$  increases for a BJT in the forward active region, “base-width modulation” causes :

Select one:

- ☐ a. The width of the base to decrease
- ☐ b. All of these
- ☐ c. The width of the base-collector depletion region to decrease
- ☐ d. The output resistance,  $r_o$ , to increase
- ☐ e. The collector current for the BJT to decrease

The correct answer is: The width of the base to decrease

**Question 6**

Not answered

Mark 0.00 out of  
2.00

If an NPN BJT at 25°C with a constant collector current of 100μA has a  $V_{be}$  voltage of 760mV, then what will  $V_{be}$  be for this same BJT at 100°C ?

Select one:

- ☐ a. 700mV
- ☐ b. 910mV
- ☐ c. None of these
- ☐ d. 610mV
- ☐ e. 820mV

The correct answer is: 610mV

**Question 7**

Not answered

Mark 0.00 out of  
2.00

Which of the following BJT amplifier types is most similar to a MOS common-gate amplifier ?

Select one:

- ☐ a. Common-emitter
- ☐ b. None of these
- ☐ c. Common-collector
- ☐ d. Common-base
- ☐ e. All of these

The correct answer is: Common-base

**Question 8**

Not answered

Mark 0.00 out of  
2.00

For a BJT common-base amplifier, which of the following is true ?

Select one:

- ☐ a. All of these
- ☐ b. The input signal is applied to the collector
- ☐ c. NPNs and PNPs use different circuit topologies
- ☐ d. The output signal is measured at the emitter
- ☐ e. The base is used by both the input and output ports

The correct answer is: The base is used by both the input and output ports

**Question 9**

Not answered

Mark 0.00 out of  
2.00

Considering the typical input and output resistances, a MOS source-follower is well suited to be which of the following types of amplifiers ?

Select one:

- ☐ a. Current amplifier
- ☐ b. Voltage amplifier
- ☐ c. Transconductance amplifier
- ☐ d. All of these
- ☐ e. Transresistance amplifier

The correct answer is: Voltage amplifier

**Question 10**

Not answered

Mark 0.00 out of  
2.00

Considering the typical input and output resistances, a MOS common-gate is well suited to be which of the following types of amplifiers ?

Select one:

- ☐ a. Transresistance amplifier
- ☐ b. All of these
- ☐ c. Transconductance amplifier
- ☐ d. Voltage amplifier
- ☐ e. Current amplifier

The correct answer is: Current amplifier

**Question 11**

Not answered

Mark 0.00 out of  
2.00

The forward-active region of operation for bipolar transistors is similar to the triode region of operation for MOSFETs.

Select one:

- ☐ True
- ☐ False

The correct answer is 'False'.

**Question 12**

Not answered

Mark 0.00 out of  
2.00

An NPN BJT with  $V_{be} > 0$  and  $V_{bc} > 0$  is operating in saturation.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 13**

Not answered

Mark 0.00 out of  
2.00

If two bipolar transistors have the same bias voltages, then the BJT with the larger emitter area will have a larger collector current.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 14**

Not answered

Mark 0.00 out of  
2.00

Just like any PN junction, the reverse bias leakage currents for a BJT will increase as temperature increases.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 15**

Not answered

Mark 0.00 out of  
2.00

The input resistance in a transresistance amplifier model is used to determine the signal lost due to the current division between the source resistance and the input resistance of the amplifier.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 16**

Not answered

Mark 0.00 out of  
2.00

Transconductance amplifiers need to have high input resistance and high output resistance.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 17**

Not answered

Mark 0.00 out of  
2.00

The input resistance for a common-emitter amplifier is the same as the input resistance for a common-base amplifier.

Select one:

- ☐ True
- ☐ False

The correct answer is 'False'.

**Question 18**

Not answered

Mark 0.00 out of  
2.00

For a common-base BJT amplifier, the input is applied to the base and the output is measured at the collector.

Select one:

- ☐ True
- ☐ False

The correct answer is 'False'.



**Question 19**

Not answered

Mark 0.00 out of  
2.00

The output resistance for a common-drain amplifier is the same as the input resistance for a common-gate amplifier.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 20**

Not answered

Mark 0.00 out of  
2.00

For a common-drain MOS amplifier, the input is applied to the gate and the output is measured at the source.

Select one:

- ☐ True
- ☐ False

The correct answer is 'True'.

**Question 21**

Not answered

Mark 0.00 out of  
6.00

What is the base-to-emitter resistance,  $r_{\pi}$ , in  $k\Omega$  for an NPN BJT operating in the forward-active region at  $27^{\circ}\text{C}$  with  $I_c = 708\mu\text{A}$ ? Use:  $\beta = 50$  and  $V_t = kT/q = 26\text{mV}$ .

Answer:  

The correct answer is: 1.84

**Question 22**

Not answered

Mark 0.00 out of  
6.00

What is the open-circuit voltage gain,  $\mu_f$ , in V/V for an PMOS FET operating in saturation with  $I_d = 923\mu\text{A}$  and  $V_{on} = |V_{gs} - V_t| = 734\text{mV}$  ? Use:  $\lambda = 0.49$

Answer:  ✗

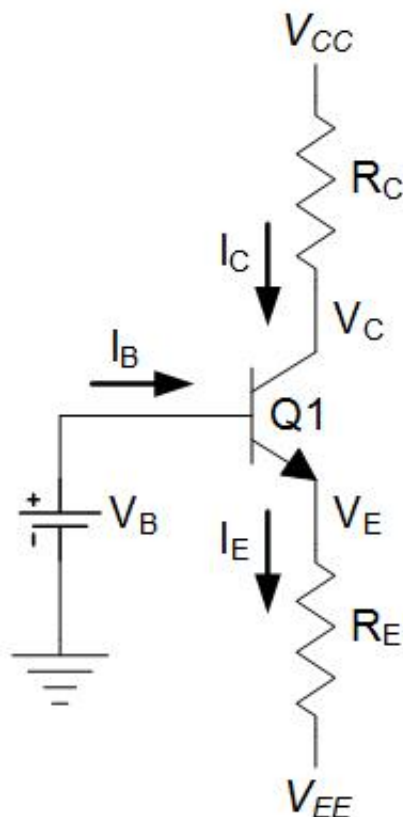
The correct answer is: 5.56

**Question 23**

Not answered

Mark 0.00 out of  
6.00

For the BJT bias circuit shown, what is the collector voltage,  $V_C$ , in volts? Use  $V_{CC} = 5\text{V}$ ,  $V_{EE} = -8\text{V}$ ,  $V_B = 1.4\text{V}$ ,  $R_C = 4.5\text{k}\Omega$ , and  $R_E = 4.9\text{k}\Omega$ . Assume that the transistor is in the forward-active region, with  $\beta = 91$  and  $|V_{be(on)}| = 0.7\text{V}$ . Neglect the effects of base-width modulation.

Answer:  ✗

The correct answer is: -2.903

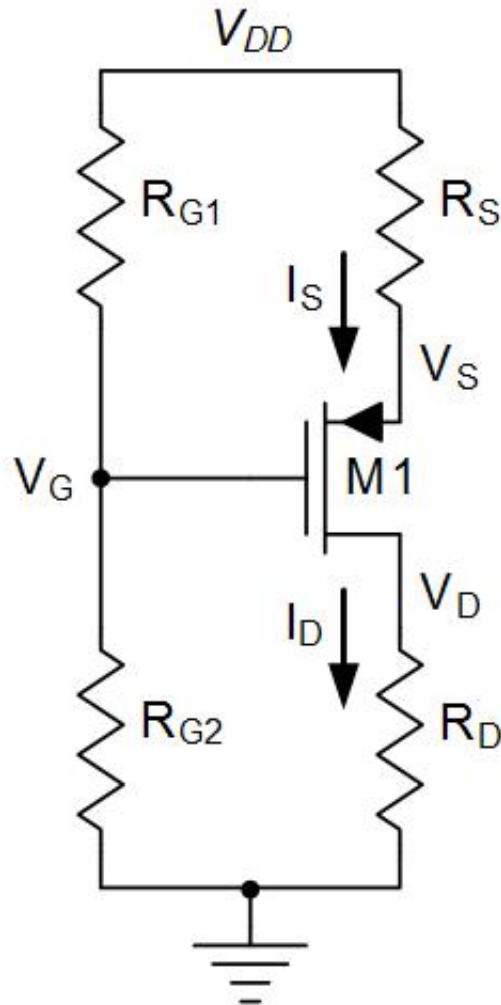
**Question 24**

Not answered

Mark 0.00 out of

6.00

For the MOSFET bias circuit shown, what value of  $R_D$  in kilohms is needed to allow the maximum possible peak-to-peak signal swing on the drain without clipping? Use:  $V_{DD} = 14V$ ,  $R_{G1} = 51.6k\Omega$ ,  $R_{G2} = 50.7k\Omega$ ,  $R_S = 6.1k\Omega$ ,  $V_t = -0.4V$ , and  $|V_{on}| = 0.12$ . (Remember that  $|V_{on}| = |V_{ov}| = |V_{gs}| - |V_t|$ ) Neglect the effect of channel-length modulation and body effect. (Hint: Be sure to keep the MOSFET in saturation!)



Answer:



The correct answer is: 3.42

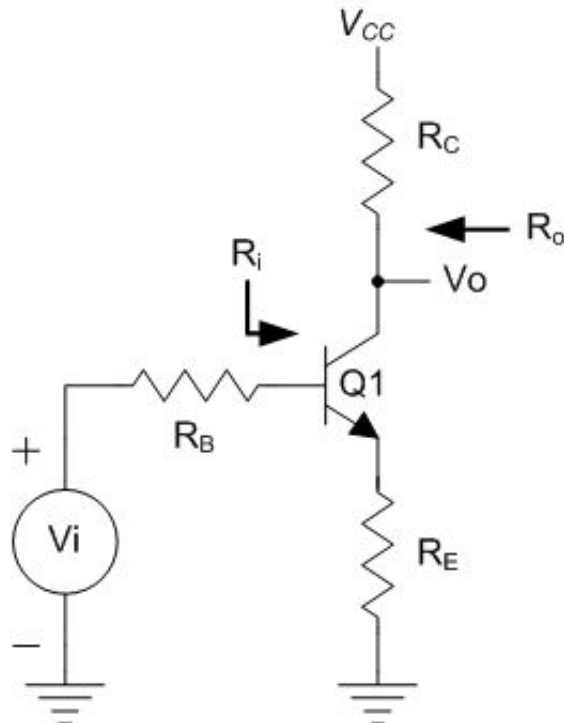
**Question 25**

Not answered

Mark 0.00 out of

6.00

What is the low frequency voltage gain for the amplifier shown at  $27^\circ\text{C}$  with  $R_C = 19.3\text{k}\Omega$ ,  $R_E = 0.1\text{k}\Omega$  and  $R_B = 0.9\text{k}\Omega$ ? Use:  $I_C = 26\mu\text{A}$ ,  $\beta = 187$ , and  $V_T = kT/q = 26\text{mV}$ . Neglect the effect of base-width modulation.

Answer:  ✗

The correct answer is: -17.46

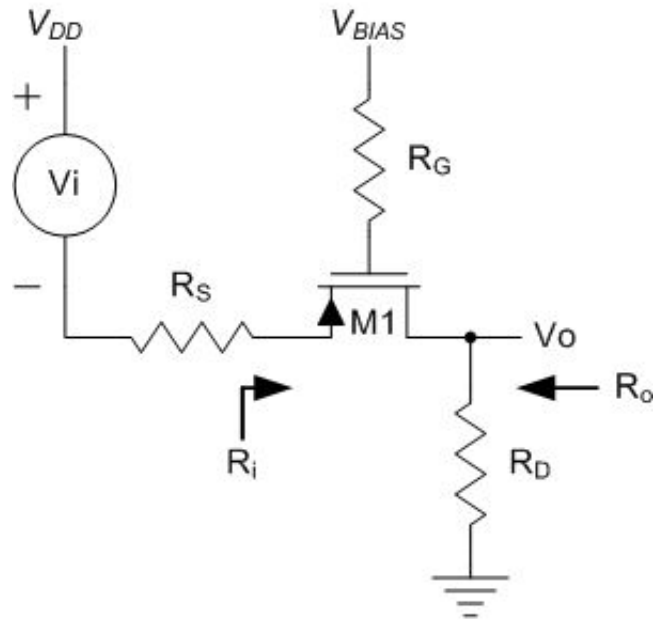
**Question 26**

Not answered

Mark 0.00 out of

6.00

What is the low frequency voltage gain for the amplifier shown at 27° C with  $R_d = 34.6\text{k}\Omega$ ,  $R_s = 1.1\text{k}\Omega$  and  $R_g = 1.5\text{k}\Omega$  ? Use:  $W/L = 17$ ,  $I_d = 697\mu\text{A}$ ,  $V_{TP} = -0.5\text{V}$ ,  $k'_p = 40\mu\text{A/V}^2$ . Neglect the effect of channel-length modulation and body effect.

Answer:  ✗

The correct answer is: 16.27

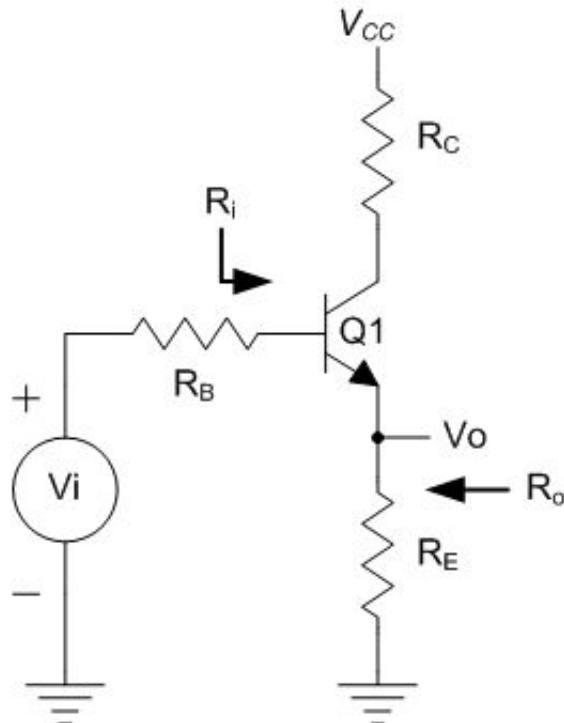
**Question 27**

Not answered

Mark 0.00 out of

6.00

What is the low frequency input resistance,  $R_i$ , in  $k\Omega$  for the amplifier shown at  $27^\circ\text{C}$  with  $R_C = 33.7k\Omega$ ,  $R_E = 0.4k\Omega$  and  $R_B = 0.3k\Omega$ ? Use:  $I_C = 129\mu\text{A}$ ,  $\beta = 189$ , and  $V_T = kT/q = 26\text{mV}$ . Neglect the effect of base-width modulation.

Answer:  ✗

The correct answer is: 114.1

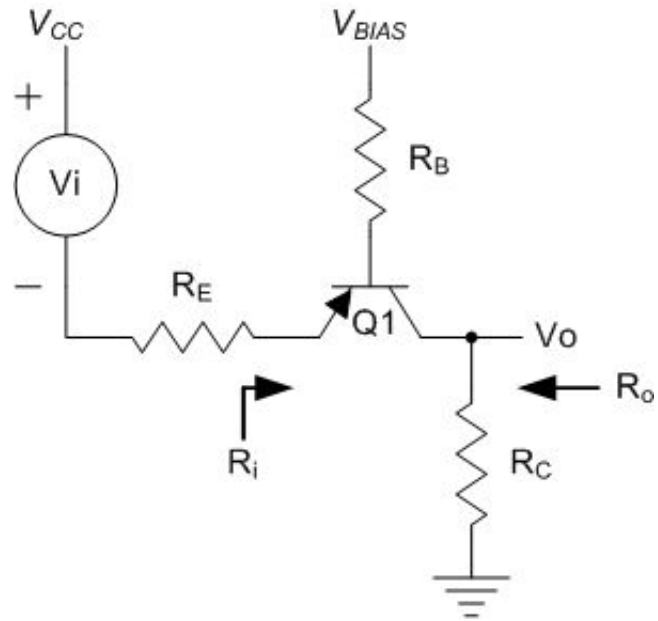
**Question 28**

Not answered

Mark 0.00 out of

6.00

What is the low frequency input resistance,  $R_i$ , in  $\Omega$  for the amplifier shown at  $27^\circ\text{C}$  with  $R_c = 40.3\text{k}\Omega$ ,  $R_e = 0.1\text{k}\Omega$  and  $R_b = 0.2\text{k}\Omega$ ? Use:  $I_c = 281\mu\text{A}$ ,  $\beta = 37$ , and  $V_t = kT/q = 26\text{mV}$ . Neglect the effect of base-width modulation.

Answer:  ✗

The correct answer is: 95.4

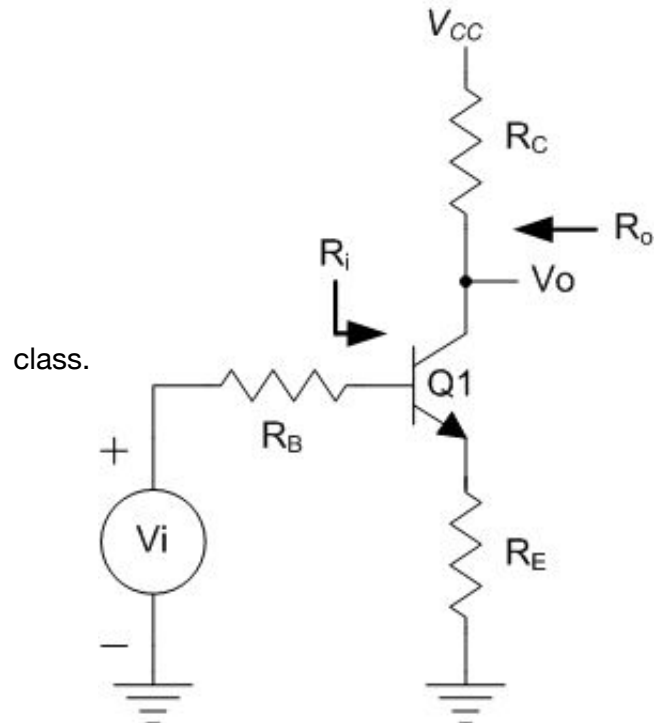
**Question 29**

Not answered

Mark 0.00 out of

6.00

What is the low frequency output resistance,  $R_o$ , in  $k\Omega$  for the amplifier shown at  $27^\circ\text{C}$  with  $R_C = 76.4k\Omega$ ,  $R_E = 0.5k\Omega$  and  $R_B = 0.6k\Omega$ ? Use:  $I_C = 876\mu\text{A}$ ,  $\beta = 193$ ,  $V_A = 50\text{V}$ , and  $V_T = kT/q = 26\text{mV}$ . Use the "short-cut approach" discussed in

Answer:  ✖

The correct answer is: 71.1

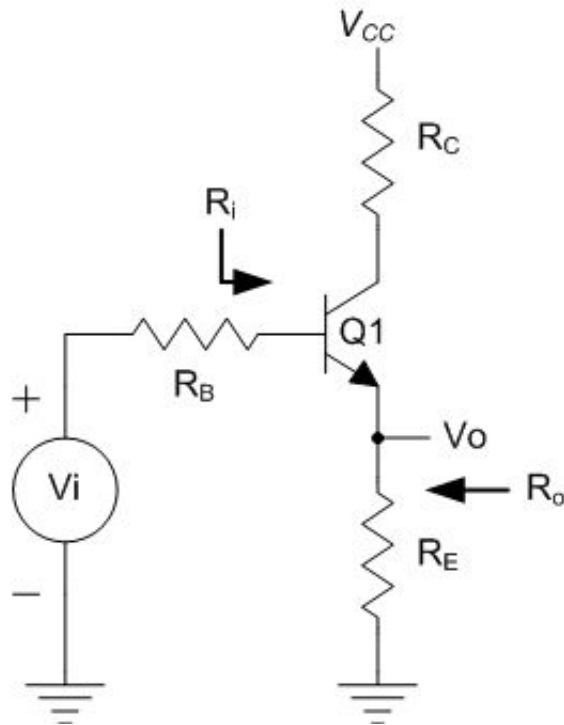


**Question 30**

Not answered

Mark 0.00 out of  
6.00

What is the low frequency output resistance,  $R_o$ , in  $\Omega$  for the amplifier shown at  $27^\circ\text{C}$  with  $R_C = 33.7\text{k}\Omega$ ,  $R_E = 0.2\text{k}\Omega$  and  $R_B = 0.1\text{k}\Omega$ ? Use:  $I_C = 227\mu\text{A}$ ,  $\beta = 84$ ,  $V_A = 50\text{V}$ , and  $V_T = kT/q = 26\text{mV}$ . Use the "short-cut approach" discussed in class, and neglect the effect of base-width modulation.

Answer:  ✗

The correct answer is: 72.8

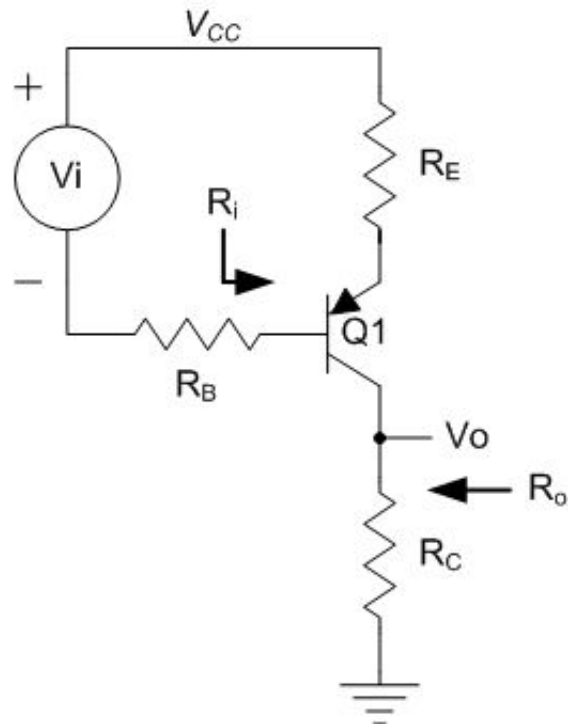
**Question 31**

Not answered

Mark 0.00 out of

6.00

Estimate the maximum low frequency voltage gain for the amplifier shown if the bias voltage across  $R_C$  is 1849mV and the bias voltage across  $R_E$  is 202mV.

Answer:  ✖

The correct answer is: -9.15