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Electronic Circuits II - Tutorial 05

BJT Amplifiers 2

T & F

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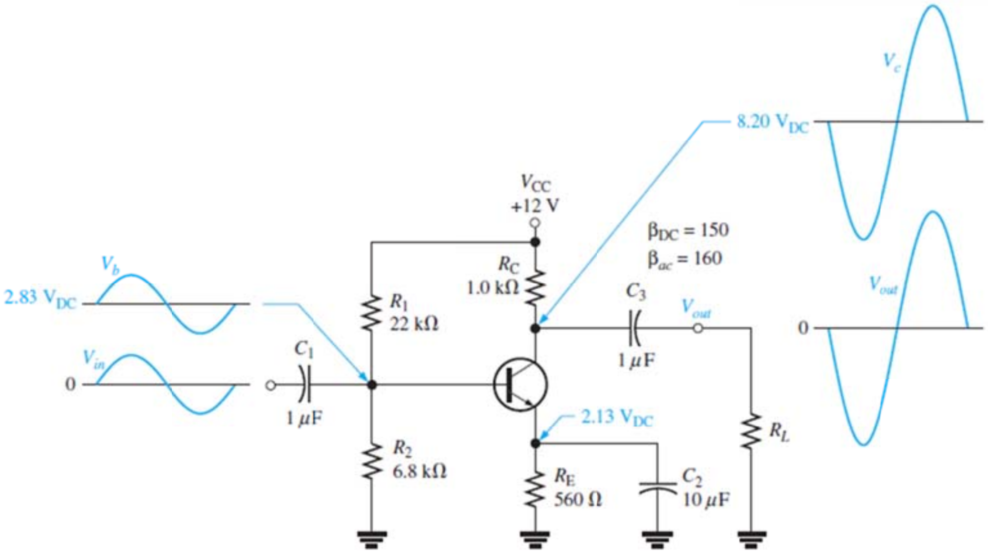
1	In an amplifier, a coupling capacitor should appear ideally as a short to the signal.	T
2	r parameters include	T
3	h parameters are never specified on a datasheet.	F
4	The r parameter is the same as the h parameter hfe.	T
5	A bypass capacitor in a CE amplifier decreases the voltage gain.	F
6	If RC in a CE amplifier is increased, the voltage gain is reduced.	F
7	The load is the amount of current drawn from the output of an amplifier.	T
8	In a CE amplifier, the gain can be stabilized by using a swamping resistor.	T

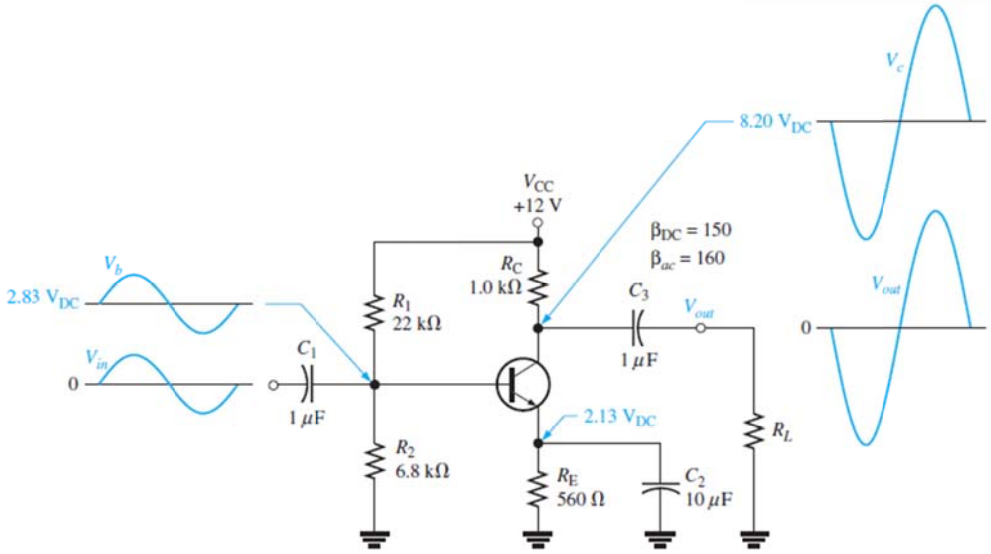
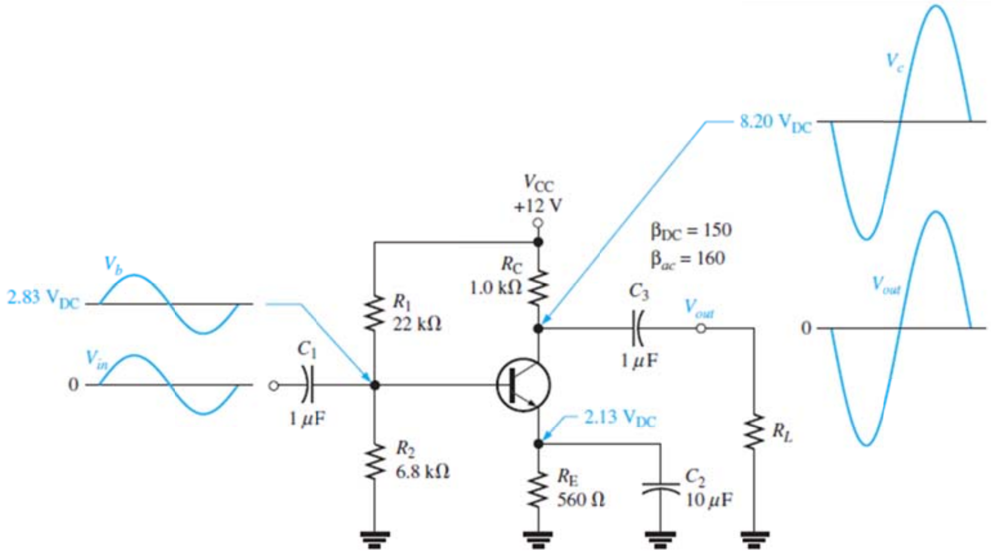
MCQ

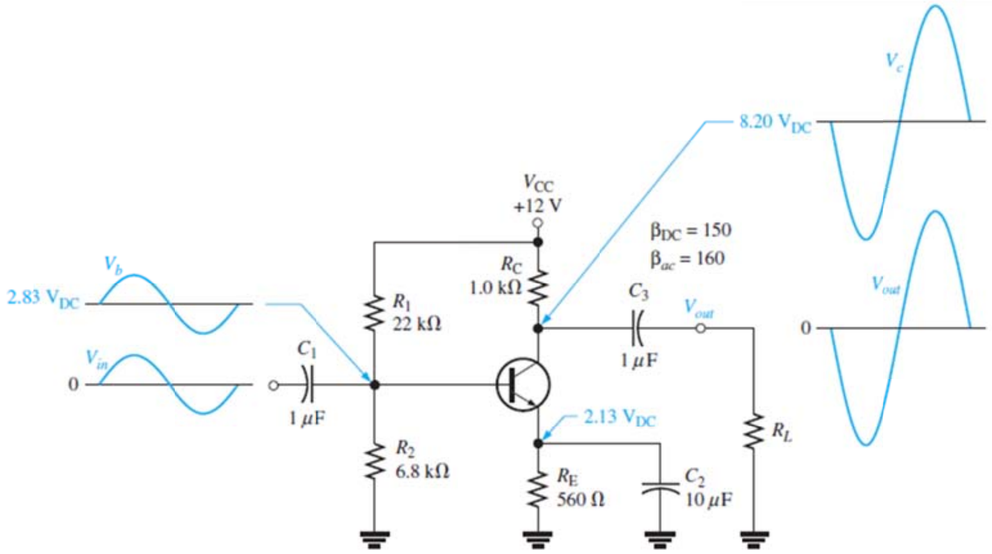
<table>
<tr><td>#</td><td>Question</td><td>Answer</td></tr>
<tr><td>1</td><td>



If the transistor in Figure is exchanged for one with higher betas, Vout will
(a) increase (b) decrease (c) not change

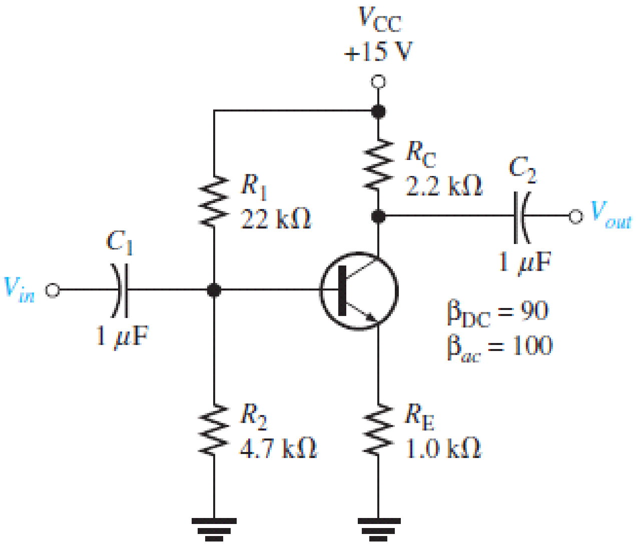
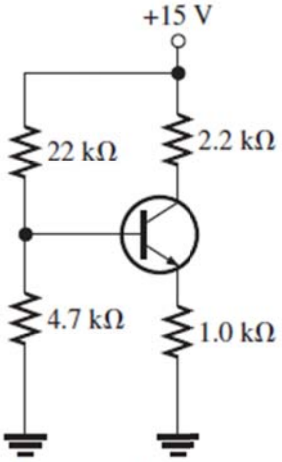
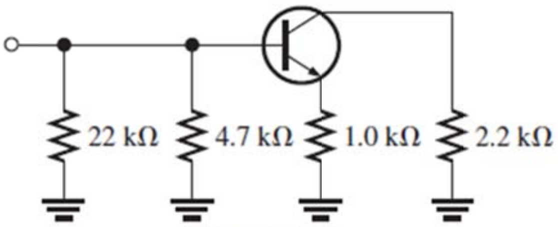
</td><td>a</td></tr>
</table>

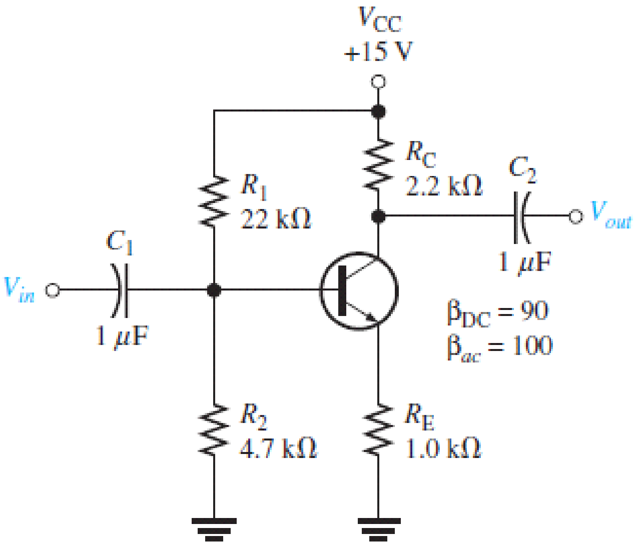
2	 If C2 is removed from the circuit in Figure, Vout will (a) increase (b) decrease (c) not change	b
3	 If the value of RC in Figure is increased, Vout will (a) increase (b) decrease (c) not change	a

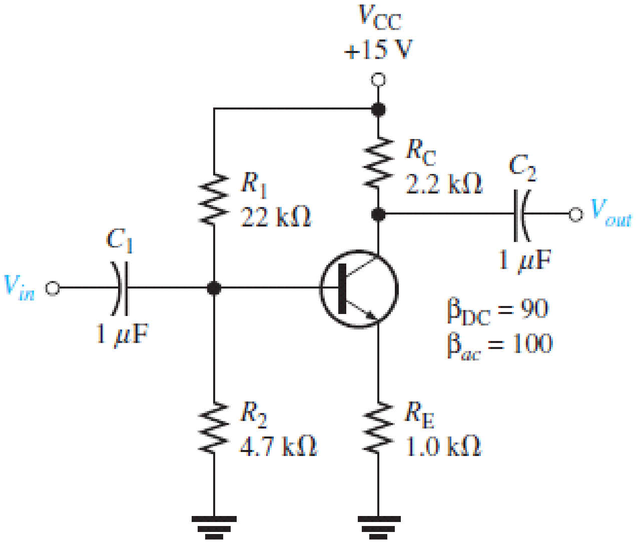
4	 If the amplitude of Vin in Figure is decreased, Vout will (a) increase (b) decrease (c) not change	b

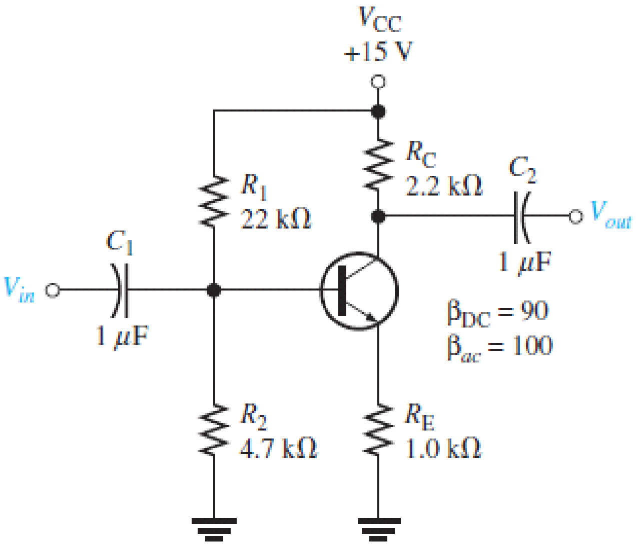
Problems

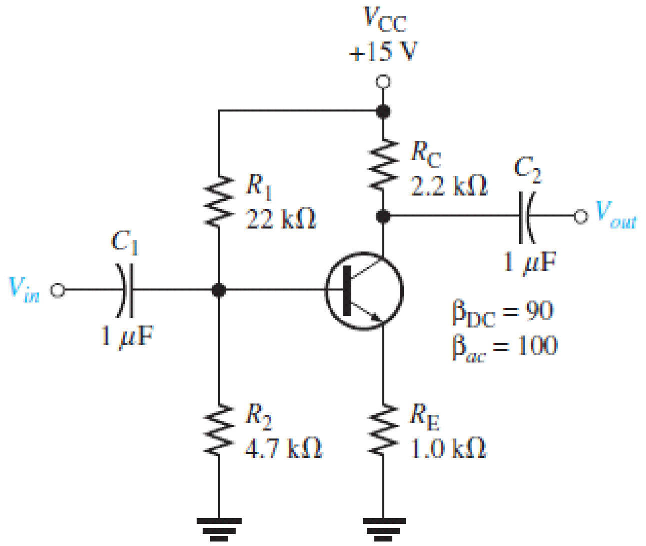
Q1	At the dc bias point of a certain transistor circuit, $I_B = 15\ \mu A$ and $I_C = 2$ mA. Also, a variation in I_B of $3\ \mu A$ about the Q-point produces a variation in I_C of 0.35 mA about the Q-point. Determine β_{DC} and β_{ac}.
Sol 1	....

Q2	 Draw the dc equivalent circuit and the ac equivalent circuit for the unloaded amplifier in Figure
Sol 2	 DC equivalent  AC equivalent

Q3	 Determine the following dc values for the amplifier in Figure **(a)** V_B **(b)** V_E **(c)** I_E **(d)** I_C **(e)** V_C
Sol 3	

Q4	 Calculate the quiescent power dissipation in Figure
Sol 4	37.5 mW

Q5	 Determine the following dc values for the amplifier in Figure (a) V_B (b) V_E (c) I_E (d) I_C (e) V_C
Sol 5	…………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… …………………………………………………………………… ……………………………………………………………………

Q6	 Connect a bypass capacitor across R_E in Figure , and repeat (a) $R_{in(base)}$ (b) $R_{in(tot)}$ (c) A_v
Sol 6	…(a) 1.29 kΩ (b) 968 Ω (c) 171 …

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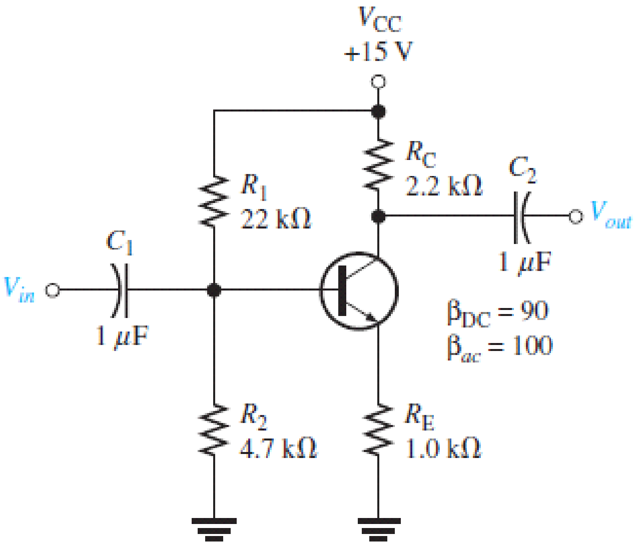
Q7	 Connect a 10 kΩ load resistor to the output in Figure Connect a bypass capacitor across R_E in Figure , and repeat **(a)** $R_{in(base)}$ **(b)** $R_{in(tot)}$ **(c)** A_v
Sol 7	....

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