Mansoura University.
Faculty of Engineering. Electrical Engineering Dept.
1st year Subject : Basic Electronic - Final Exam.
Time : 3- Hours. Date : 5/6/2012

Answer as you can from the following Questions :-

Q1) a- The Bipolar junction transistor is a three-terminal device. Name the three terminals.

b- Which is the Largest of the three transistor currents.

c- Define β_{dc} and α_{dc}.

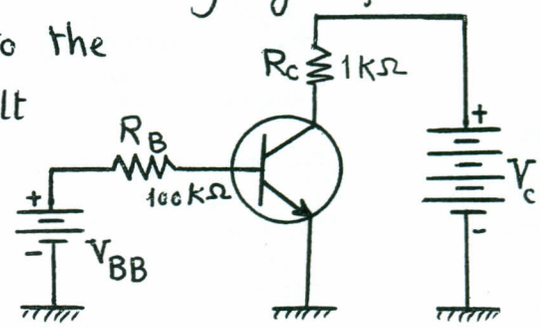
d- Determine β_{dc} and α_{dc} for a transistor where $I_B = 100\mu A$ & $I_C = 5mA$.

e- What is the voltage gain of a transistor amplifier that has an output of 10 volt rms and an input of 250 mV rms?

f- A transistor connected as an a transistor Amplifier that has an $r_e = 25\Omega$. If R_c is 1500Ω, what is the voltage gain?

g- A base current of $50\mu A$ is applied to the transistor in Fig(1), and a voltage of 5 volt is dropped across R_c. Determine the β_{dc} of the transistor.

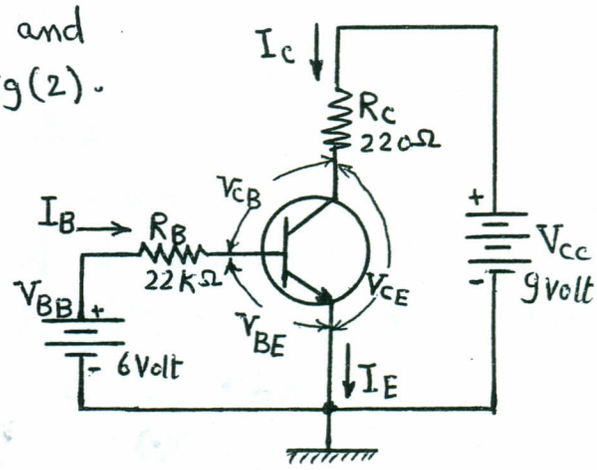
h- Calculate α_{dc} for the transistor in Fig(1).



Fig(1)

Q2) i- What is the relationship of α_{dc} and β_{dc}.

ii- Determine I_B, I_C, I_E, α_{dc}, V_{CE} and V_{CB} in the circuit shown in Fig(2). The transistor has a $\beta_{dc} = 100$.



Fig(2)

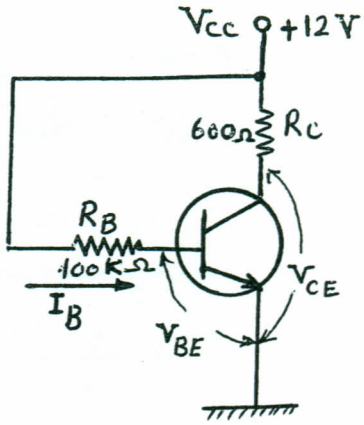
Q3) a- Define Q point.

b- What is the main advantage and disadvantage of the base bias method?

c- The base-biased circuit in Fig(3) is subjected to an increase

See page (2)

in junction temperature from 25°C to 75°C. If $\beta_{dc} = 100$ at 25°C and equal 150 at 75°C, determine the percent change in Q-point values (I_C and V_{CE}) over the temperature range. Neglect any change in V_{BE} and the effects of any Leakage current. The transistor is Silicon.



Fig(3)

Q4) a- What is the main disadvantage of emitter bias?

b- What are two advantages of voltage-divider bias?

c- If a transistor has a dc beta of 190 and its emitter resistor is 1KΩ, What is the dc input resistance at the base?

d- Find I_C and V_{CE} in Fig(4), where $\beta_{dc} = 100$ for the silicon transistor.

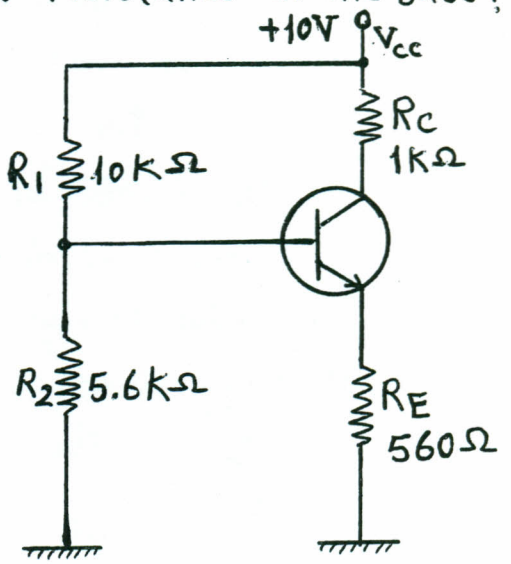
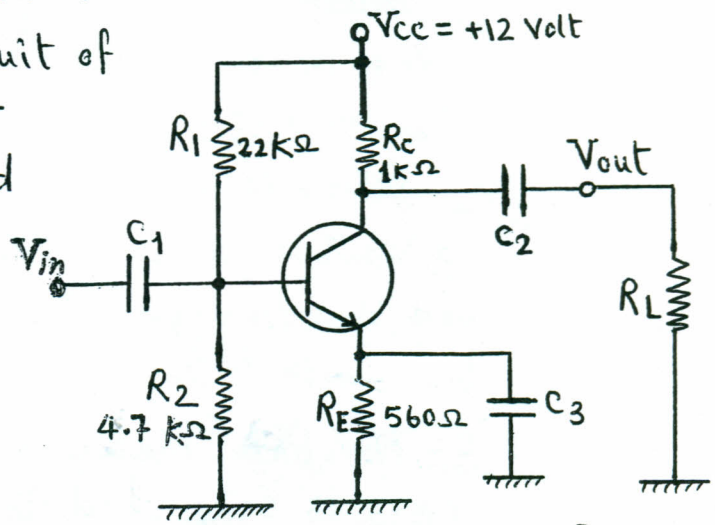


Fig (4)

Q5) a- Determine the r_e of a transistor that is operating with a dc emitter current of 2mA.

b- Fig(5) shows a common-emitter amplifier with voltage-divider bias and coupling capacitors, C_1 and C_2, on the input and output and a bypass capacitor C_3 from emitter to ground. Draw the DC-equivalent circuit of this common-emitter Amplifier which is shown in Fig(5) and then analyze it to Find $R_{IN(base)}$, V_B, V_E, I_E, V_C and V_{CE}.



Fig(5)

$\beta_{dc} = 150$
$\beta_{ac} = 160$

Good Luck!

prof. Dr. Rasheed EL-Awady