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جامعة الإسكندرية
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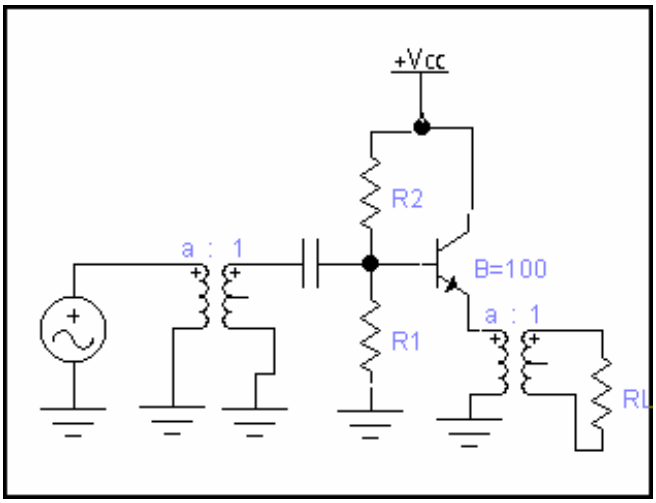
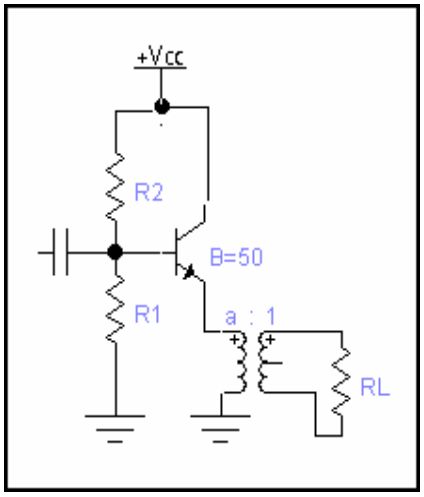
Sheet 2
Power Amplifiers

1- Determine the overall current and voltage gains and the input resistance for the transformer coupled amplifier shown in figure. Use an npn transistor with a=4, R_1=2kΩ , R_2=4kΩ , V_{cc}=15V, β=100, R_L=500, neglect h_{ie} .



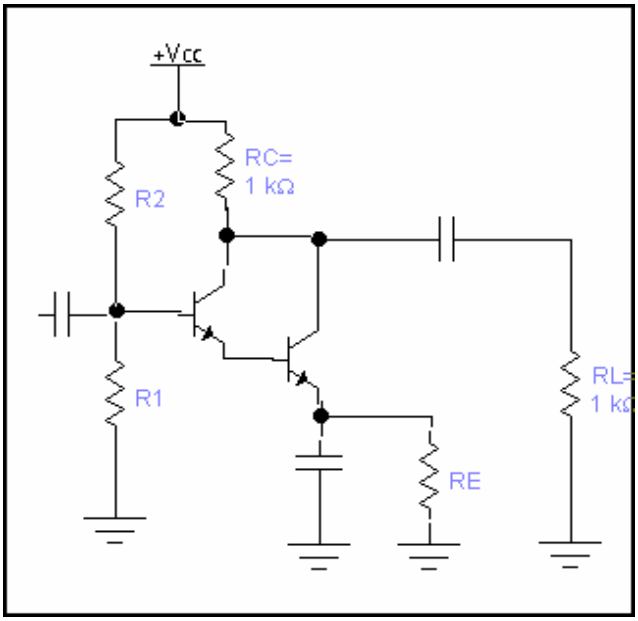
2- Design a transformer-coupled EF amplifier to drive a 10Ω load with A_I=100 if V_{cc}=12V, V_{BE}=0.7V, the step down transformer turns ratio is 10 and β=50. Determine R_1 ,R_2 ,the power rating of the transistor, and the power dissipated in the load. Refer to the circuit shown in figure.



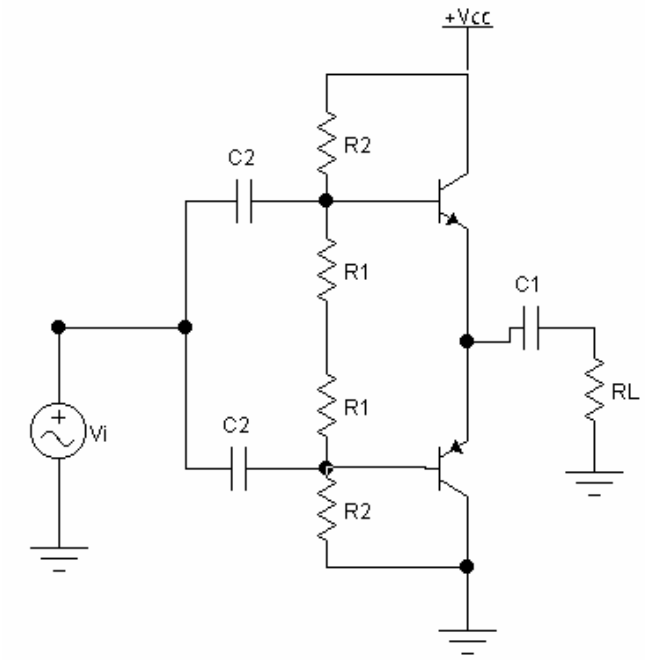
3- A class A transformer-coupled EF power amplifier must deliver an output of 0.5w to an 8Ω speaker. What transformer's ratio is needed to provide this power if V_{cc}=18V ?.The transistor has β=100 and V_{BE}=0.7V.Assume

zero resistance in the transformer. What transistor power rating is needed?.

4- Design a Darlington pair CE amplifier as shown in figure to provide an A_I of –4000 to a 1kΩ load. Design the amplifier for maximum output voltage swing and determine the value of the required maximum input voltage. Take β_1=100, β_2=200, V_{BE} for both transistors is 0.6V, V_{cc}=12V, R_c=1kΩ .



5- Design a complementary symmetry class B power amplifier to drive a 12 Ω load. Refer to the circuit below. Use V_{CC} = 18 V, V_{BE} = 0.7 V and β = 60. Calculate the total power dissipated in the load, the input resistance, and the power rating of the transistor. Select values of R_1 and R_2 and C_1 for a 20 Hz to 20 kHz frequency response and for a current gain of A_i = 20.



6- Design a complementary symmetry class B power amplifier to drive an 8 Ω load. Using $V_{CC} = 12$ V, $V_{BE} = \pm 0.7$ V, $\beta = 60$ and a frequency range of 100 Hz to 15 kHz. Use the circuit of the previous problem with a required current gain of $A_1 = 20$. frequency response and for a current gain of $A_i = 20$.

a- Find the quiescent voltages and currents.
b- Find the maximum power delivered to the load.
c- Select values for R_1,R_1, and $C_{1.}$
d- Determine R_{in}.

Use the above circuit diagram, problem (5).