

EE210: HW-11

Date: 28/03/2019

Unless stated otherwise, the BJT in the problems given below has the following characteristics:

$$I_S = 2.03 \times 10^{-15} A; \beta_F = 100; \beta_R = 1; V_A = \infty; r_{bb} = 200\Omega; V_T = 26mV$$

$$C_{je0} = 1pF; C_{jco} = 0.5pF; C_{jso} = 3pF; m = 0.5; V_{bi} = 0.85; \tau_F = 1ns$$

(For simplicity, include r_{bb} only in high frequency analysis and ignore C_{js})

Q.1 Determine the efficiency of the amplifier shown in Fig. 1, when the input is a sinusoid of magnitude 1V.

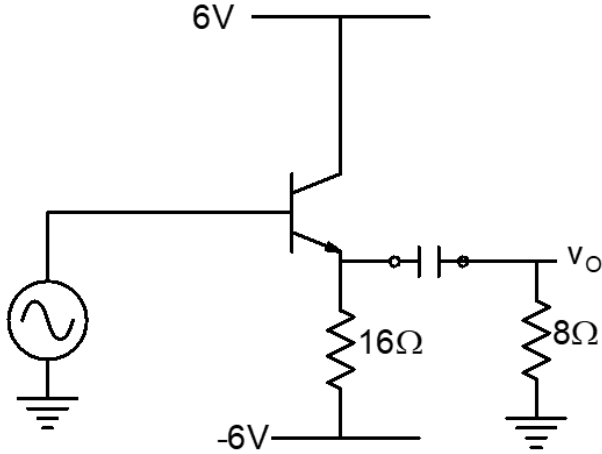


Fig. 1

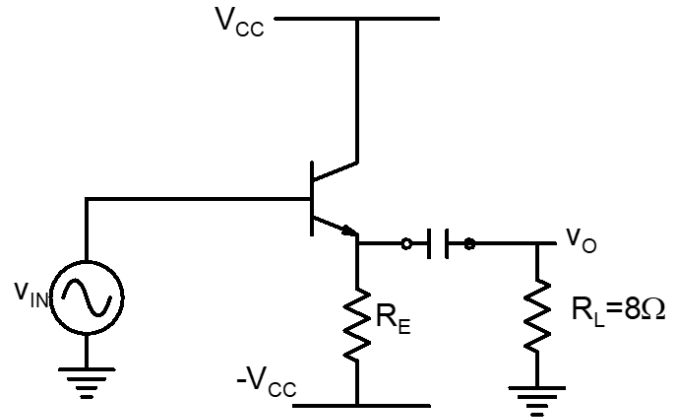


Fig. 2

Q.2 Design the amplifier shown in Fig. 2 to deliver a maximum power of 0.5W to the load. As part of the design, determine V_{CC} , R_E and maximum values of collector current, collector emitter voltage and power dissipated in the transistor.

Q.3 Design the amplifier shown below in Fig. 3 to deliver a maximum power of 2W to the load. As part of the design, determine V_{CC} and maximum values of collector current, collector emitter voltage and power dissipated in the transistor.

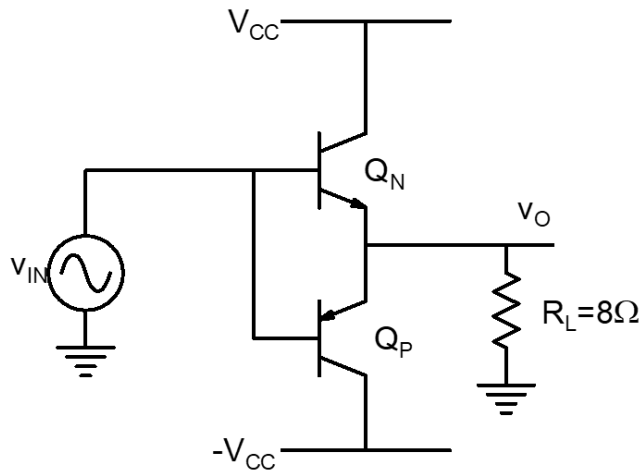


Fig. 3

Q.4 Draw the complete schematic of class AB amplifier.