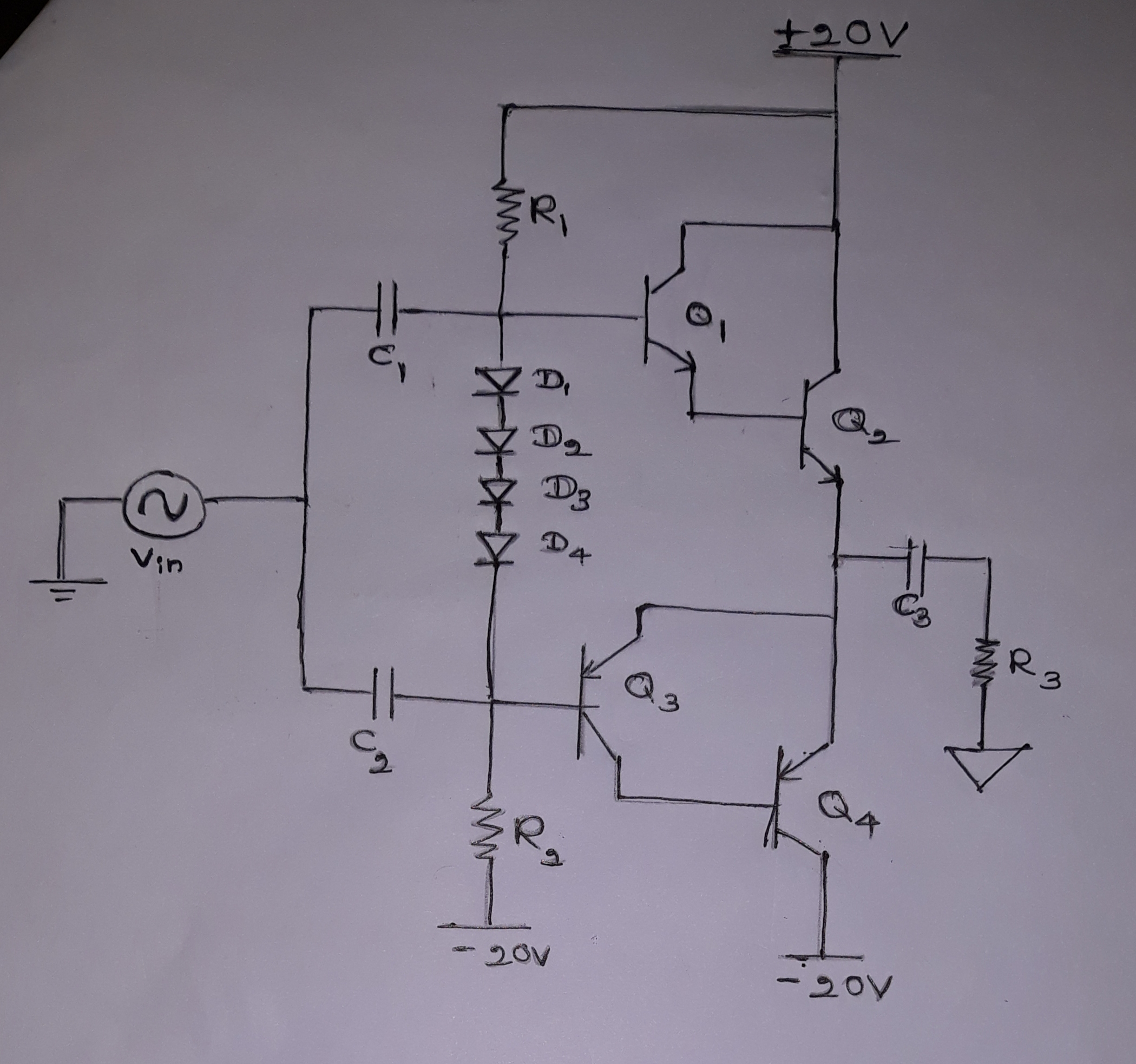
**Q1.**



Base Emitter Voltage of a Transistor – 0.7V

Maximum Output Current Imax  - 3A

Current Gain – 50

Supply Voltage - +20V, -20V

Output Power – 22.5W

Signal Diodes – D1, D2, D3, D4

* 1N4148

Capacitors –

* C1 – 1uF
* C2 – 1uF
* C3 – 1uF

Transistors –

* Q1 – 2N3904 (NPN)
* Q2 – 2N3904 (NPN)
* Q3 – 2N3906 (PNP)
* Q3 – 2N3906 (PNP)

Resistors –

* R1 – 1K
* R2 – 1K

\*Complementary Symmetry is used.

Total Current Gain – h1xh2 = 50 x 50 = 2500

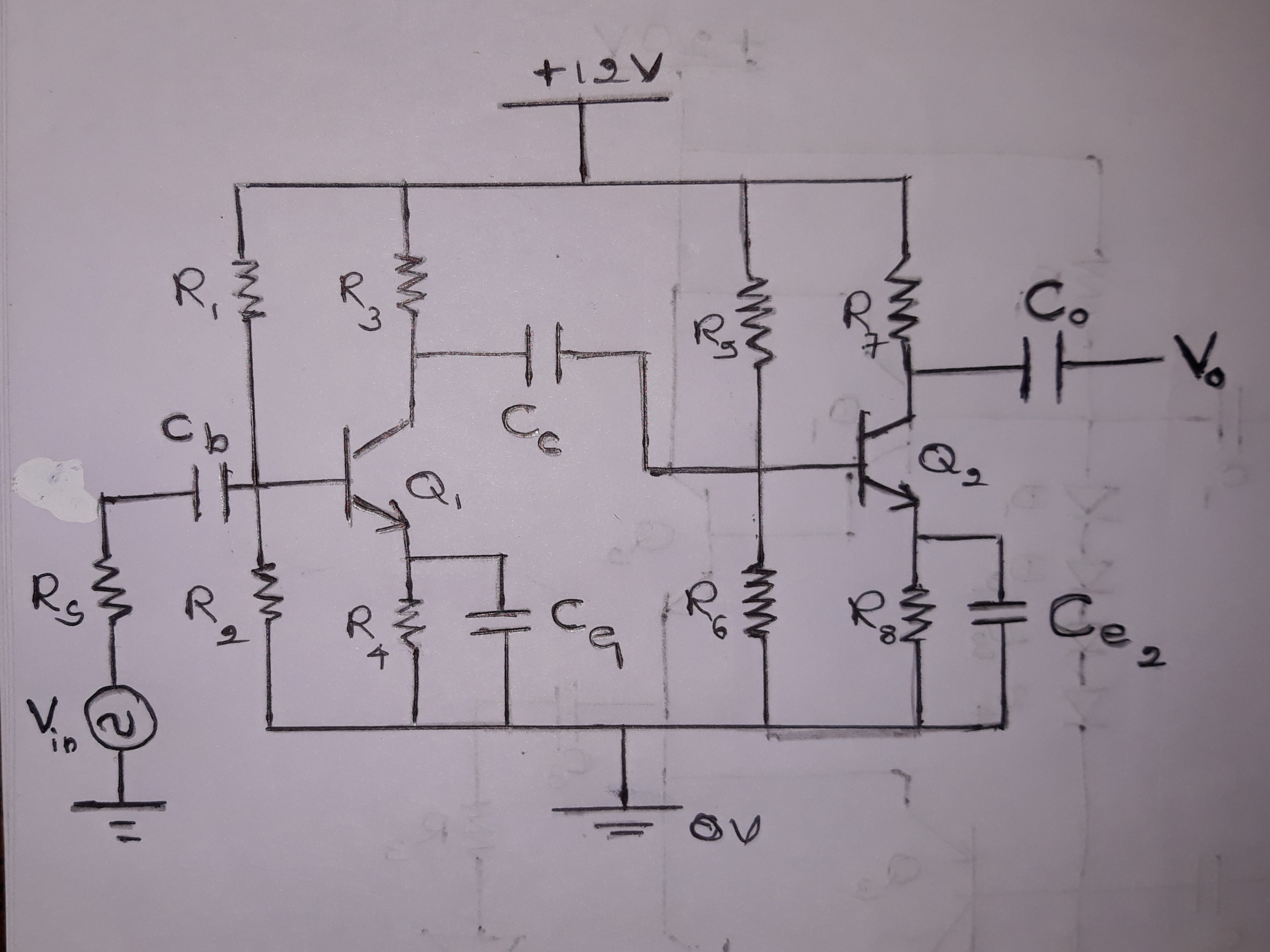
Ibase = 3A/2500 = 1.2mA

Ibias = 1.2mA x 50 = 60mA

Vbias per Darlington pair= 0.7V x 2 = 1.4V

Vbias Total = 1.4V x 2 = 2.8V

**Q2.**



**Given**  **Take**

Xi = 10kΩ

Xo = 6kΩ

fL = 15kHz

VBE = 0.5V

RL = 15kΩ

R1 = 150 kΩ

R2 = 150 kΩ

CC = 2nF

A = 200

CBC  = 2pF

CBE  = 6pF

RS = 500Ω

VBE = 0.5V

fL =

Cb = 1.01x10-9F

Cb = 1Nf

**In Q1**

Ib~ 0A

Vb=12V/2 = 6V

Ve = Vb – 0.5V = 6V – 0.5V = 5.5V

Ie = 5.5/R4 ~ Ic

A = 200 = Ie / Vt x R3

R3 / R4 = 0.9091

Take R4 = 10 kΩ R3 =~ 9 kΩ

Vc = 12V – Ic x R3 = 12V – 5.5/R4 x R3

= 12V – 7 x 0.9091V = 5.636V

R6 / R5 = 5.636 / (12-5.636) = 0.8856

Take R5 = 10 kΩ R5 ~ 9 kΩ

**In Q2**

Ib~ 0A

Vb=5.636V

Ve = Vb – 0.5V = 5.636V – 0.5V = 5.136V

Ie = 5.136/R8 ~ Ic

A = 200 = Ie / Vt x R7

R7 / R8 = 0.9735

Take R8 = 10 kΩ R7 ~ 10 kΩ

Vc = 12V – Ic x R7 = 12V – 5.136/R8 x R7

= 12V – 5.136 x 0.9735V = 7V

fL =

Co = 500pF