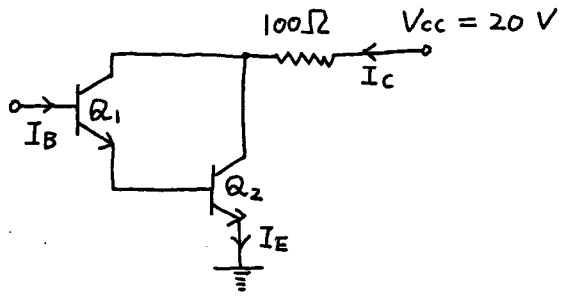
國立臺灣科技大學
九十三學年度碩士班考試試題

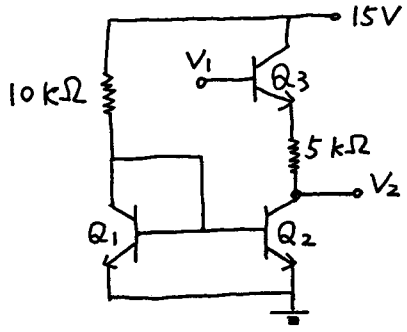
系所組別：電子工程系丙組
科　　目：電子學

總分 100 分

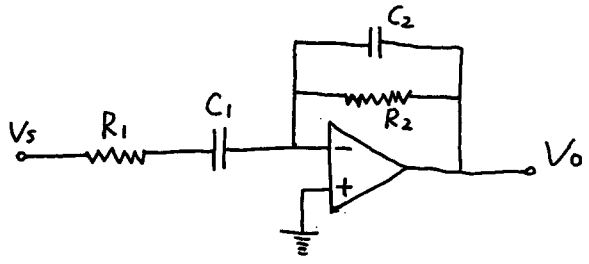
(1) 10%　For the circuit shown, α_1(common base current gain)=0.99, α_2=0.98, I_E=120 mA. Please calculate I_C/I_B.



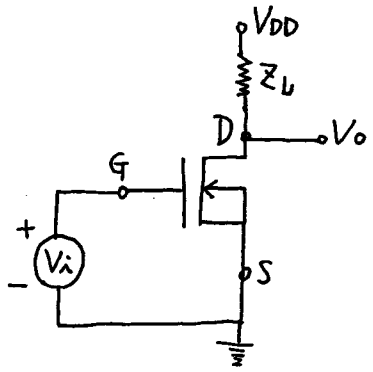
(2) 10%　For the level-shift network shown, calculate V_2-V_1. Assume identical transistors with very large β values.



(3) 15%　Find the transfer function for the OP AMP configuration shown.



(4) 15%　Please plot the small-signal equivalent circuit at high frequency, for the common source amplifier circuit.



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(5) 10% Please sketch I_{DS} as a function of V_{DS}, for a typical n-MOSFET at a proper gate bias, and explain why.

(6) 10% Please qualitatively explain the "Compton effect".

(7) 15% Please sketch the typical forward current-voltage characteristics (current shown in Log scale) for a Si pn junction diode, and explain why. (at low, medium, high current level)

(8) 15% Please sketch the electrical resistivity as a function of temperature for metal, superconductor, and intrinsic semiconductor, respectively, and explain why.