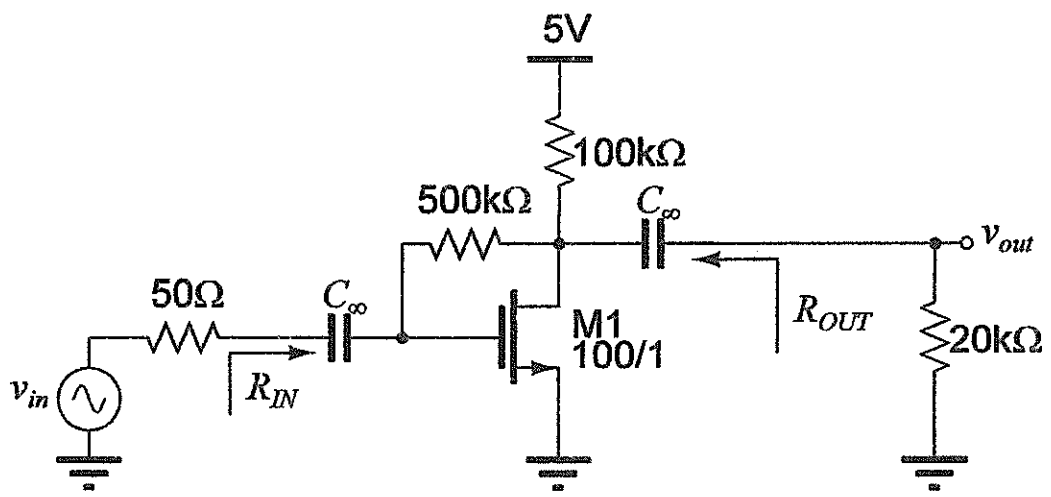
題號： 256　　國立臺灣大學 107 學年度碩士班招生考試試題

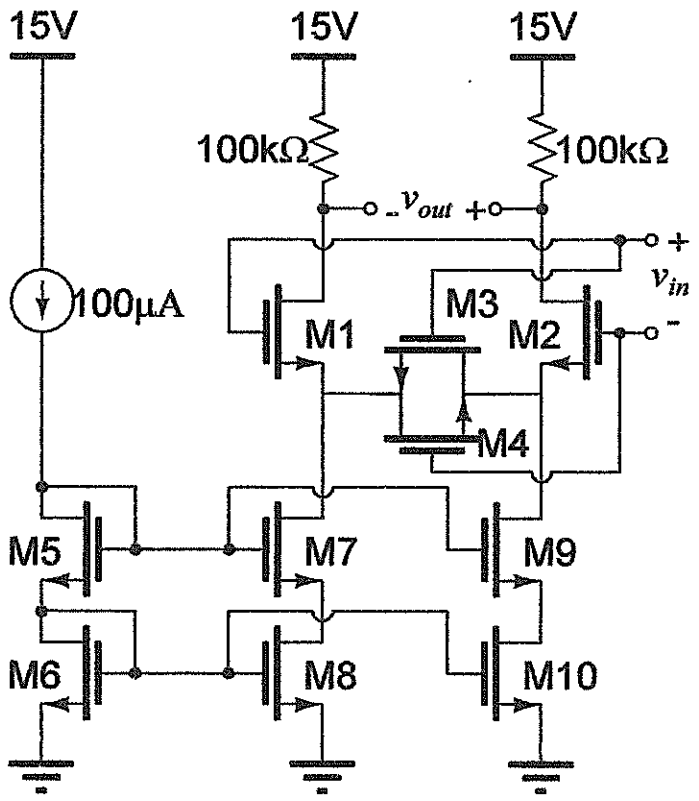
科目： 電子學(A)

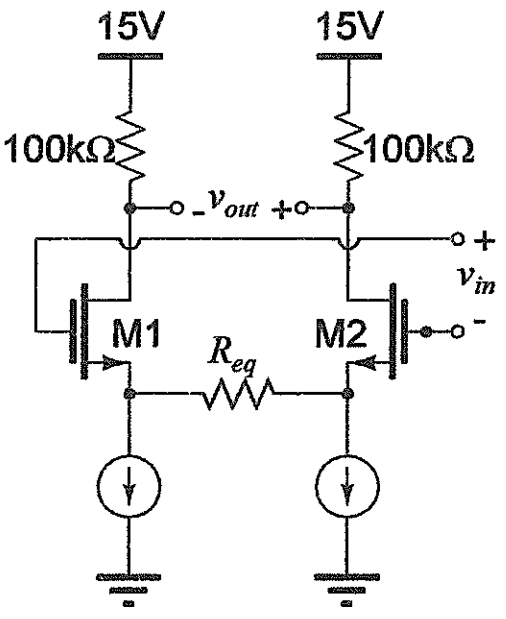
節次： 2

1. For the following amplifier circuit, please find
   (a) (20%) the dc operating point of the transistor (I_{DS} & V_{GS}, neglect λ for dc),
   (b) (10%) the small-signal gain (v_{OUT}/v_{IN}),
   (c) (10%) the input resistance R_{IN},
   (d) (10%) the output resistance R_{OUT},
   (e) (10%) the quiescent power dissipation P_{diss}.
   [note: $\mu_n C_{ox} = 120\ \mu\text{A/V}^2$, $V_{tn} = 0.7$ V, and $\lambda_n = 0.04\ \text{V}^{-1}$]



2. For the lower-left source-degenerated differential amplifier, all transistors have W/L of 100/1, $\mu_n C_{ox} = 120\ \mu\text{A/V}^2$, $V_{tn} = 0.7$ V, and $\lambda_n = 0.04\ \text{V}^{-1}$. Please find
   (a) (10%) the equivalent resistance R_{eq} of M3 and M4 in parallel (hint: M3&M4 are in the triode region),
   (b) (10%) the differential small-signal gain ($A_d = v_{od}/v_{id}$) if M1,M2,M5~M10 are in the saturation region,
   (c) (10%) the quiescent power dissipation P_{diss},
   (d) (10%) the input common-mode range (ICMR).
   (Hint: the lower-right circuit is the equivalent circuit of the lower-left one)





試題隨卷繳回