

國立高雄第一科技大學 101 學年度 碩士班 招生考試 試題紙

系 所 別：電腦與通訊工程系

組 別：晶片設計組

考科代碼：2216

考 科：電子學

注意事項：

- 1、本科目得使用本校提供之電子計算器。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

1. Please define or explain the following terms: (20%)
 - (a) Active load
 - (b) Channel-length modulation
2. Please explain the properties of a negative feedback. (20%)
3. The parameters of the transistors in the circuit in Figure 1 are $V_{TND} = -1$ V, $K_{nD} = 0.5$ mA/V² for transistor M_D , and $V_{TNL} = 1$ V, $K_{nL} = 30$ uA/V² for transistor M_L . Assume $\lambda = 0$ for both transistors. (a) Calculate the quiescent drain current I_{DQ} and the dc value of the output voltage. (b) Determine the small-signal voltage gain about the Q-point. (20%)
4. The circuit in Figure 2 is a simple output stage of an audio amplifier. The transistor parameters are $\beta = 200$, $V_{BE(on)} = 0.7$ V, and $V_A = \infty$. Determine C_C such that the lower -3 dB frequency is 15 kHz. (20%)
5. For the circuit shown in Figure 3, the transistor parameters are $\beta = 100$, $V_A = 100$ V, and the source resistor is $R_s = 0$. Determine the maximum undistorted signal power that can be delivered to R_L if $R_L = 1$ k Ω . (20%)

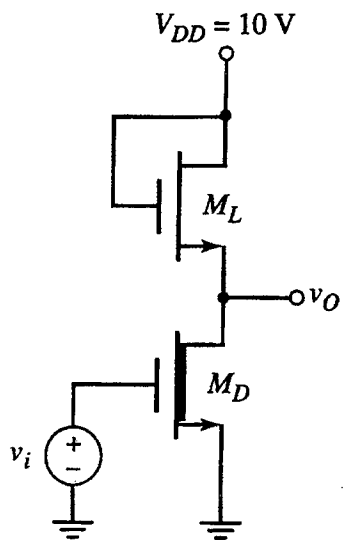


Figure 1

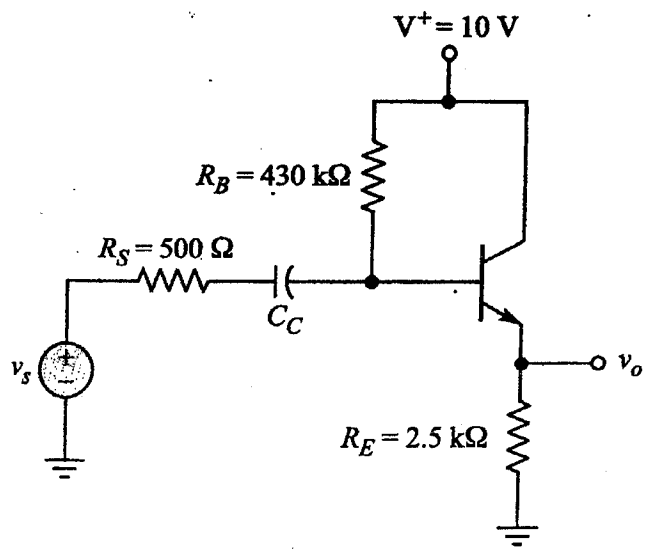


Figure 2

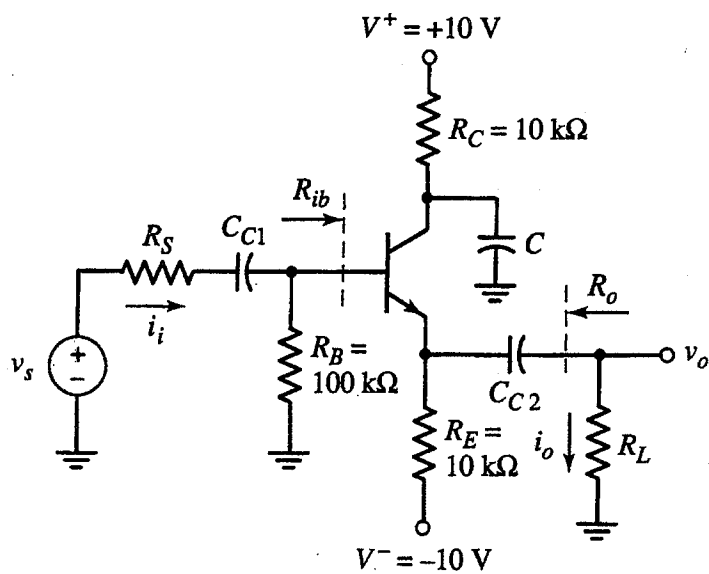


Figure 3