

國立彰化師範大學 98 學年度碩士班招生考試試題

系所：機電工程學系

組別：乙組

科目：(甲)電子學

☆☆請在答案紙上作答☆☆

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1. A series string of 4 diodes is connected through a resistor R to a 10-V voltage supply. For diodes having 0.7 V drop at 1 mA and a 0.1 V/decade characteristic, find R required to establish a total diode-string voltage of 3.2 V. (10%)
2. For the circuit as shown in Figure 1, find the voltage gain and input resistance. (20%)

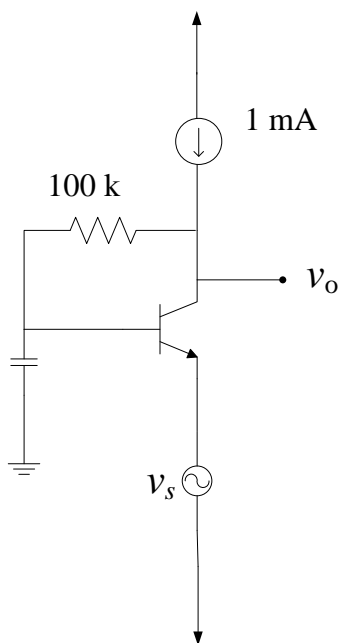


Figure 1

3. A feedback amplifier is to be designed using a feedback loop connected around a two-stage amplifier. The first stage is a direct-coupled small-signal amplifier with a high upper 3-dB frequency. The second stage is a power-output stage with a midband gain of 10 V/V and upper- and lower 3-dB frequencies of 8 kHz and 80 Hz, respectively. The feedback amplifier should have a midband gain of 100 V/V and an upper 3-dB frequency of 40 kHz. What is the required gain of the small-signal amplifier? What value of β should be used? What does the lower 3-dB frequency of the overall amplifier become? (30%)

Ω

4. Explain the DC load line and AC load line. (15%)
5. Explain the Darlington pair. (10%)
6. Design a NOR logic gate using CMOS circuits. (15%)