

國立彰化師範大學 99 學年度碩士班招生考試試題

系所：車輛科技研究所

選考丙

科目：電子學

☆☆請在答案紙上作答☆☆

共 2 頁，第 1 頁

1. Find the input resistance between terminals B and G in the circuit shown in Figure 1. The voltage v_x is a test voltage with the input resistance R_{in} defined as $R_{in} \equiv v_x/i_x$. (20%)

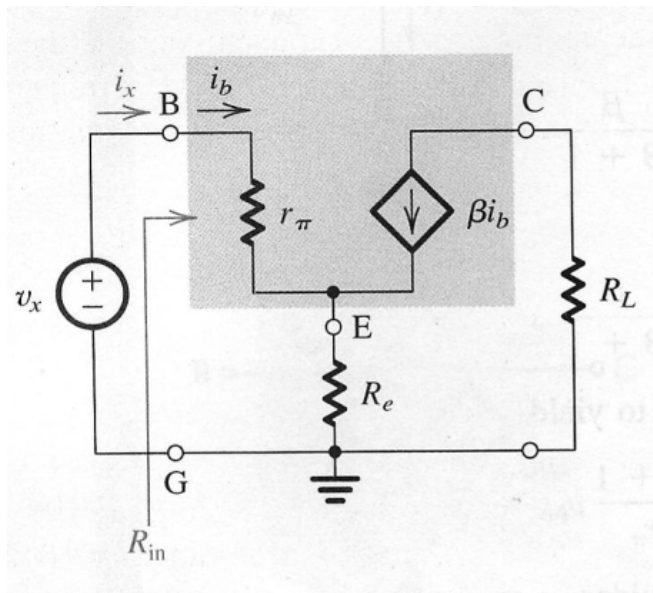


Figure 1.

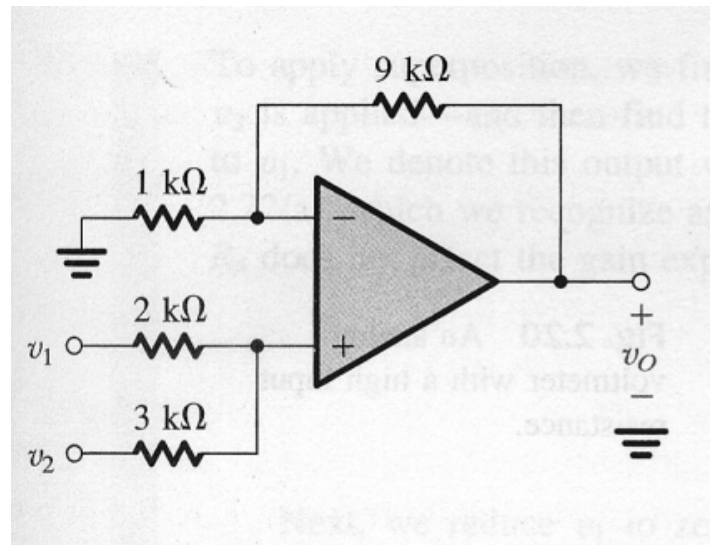


Figure 2.

2. Find the output voltage of the circuit shown in Figure 2. (20%)
3. Consider the circuit shown in Figure 3. for the case $R=100\text{k}\Omega$. The power supply V^+ has a dc value of 10V on which is superimposed a 60Hz of 1v peak amplitude. Calculate both the dc voltage of the diode and the amplitude of the sine-wave signal appearing across it. Assume the diode to have a 0.7v drop at 1mA current and $n=2$. (20%)

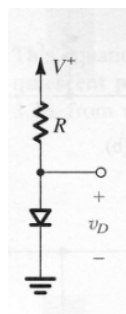


Figure 3.

Hint:

$$r_d = \frac{nV_T}{I_D}$$

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4. For the circuit in Figure 4., find the total current drawn from the power supply. Hence find the power dissipated in the circuit. (20%)

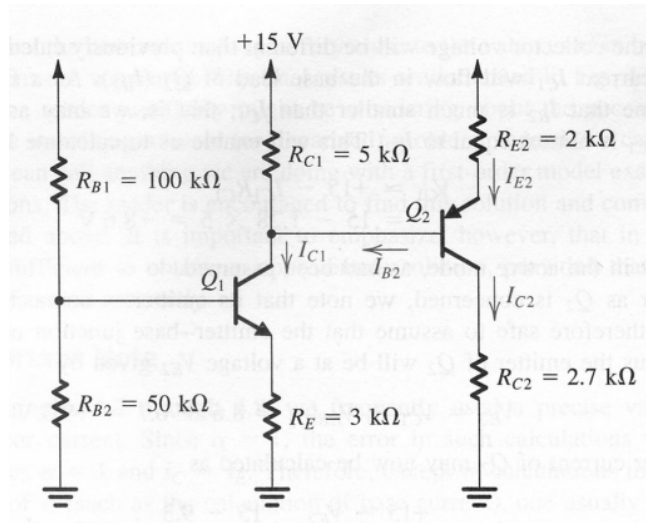


Figure 4.

5. The noninverting op amp configuration shown in figure 5. provides a direct implementation of the feed-back loop. (a) Assume that the op amp has infinite input resistance and zero output resistance. Find an expression for the feedback factor β . (b) If the open-loop voltage gain $A=10^4$, find R_2/R_1 to obtain a closed-loop voltage gain A_f of 10. (c) What is the amount of feedback in decibels? (d) If $V_s=1V$, find V_o . (20%)

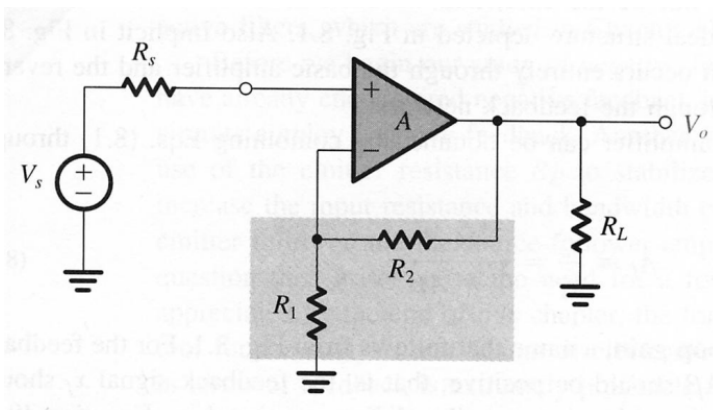


Figure 5.