

朝陽科技大學 97 學年度碩士班招生考試試題

系(所)別：資訊工程系
 組別：一般生乙組
 科目：電子學

總分：100分

第 1 頁共 3 頁

I. Application Questions:

1. For the source-follower in Figure 1, determine the voltage gain $A_v = V_{out} / V_{in}$ and input resistance R_i .
 $I_{GSS} = 50 \text{ pA}$ at $V_{GS} = -15 \text{ V}$ and $g_m = 5500 \text{ } \mu\text{S}$. (20%)

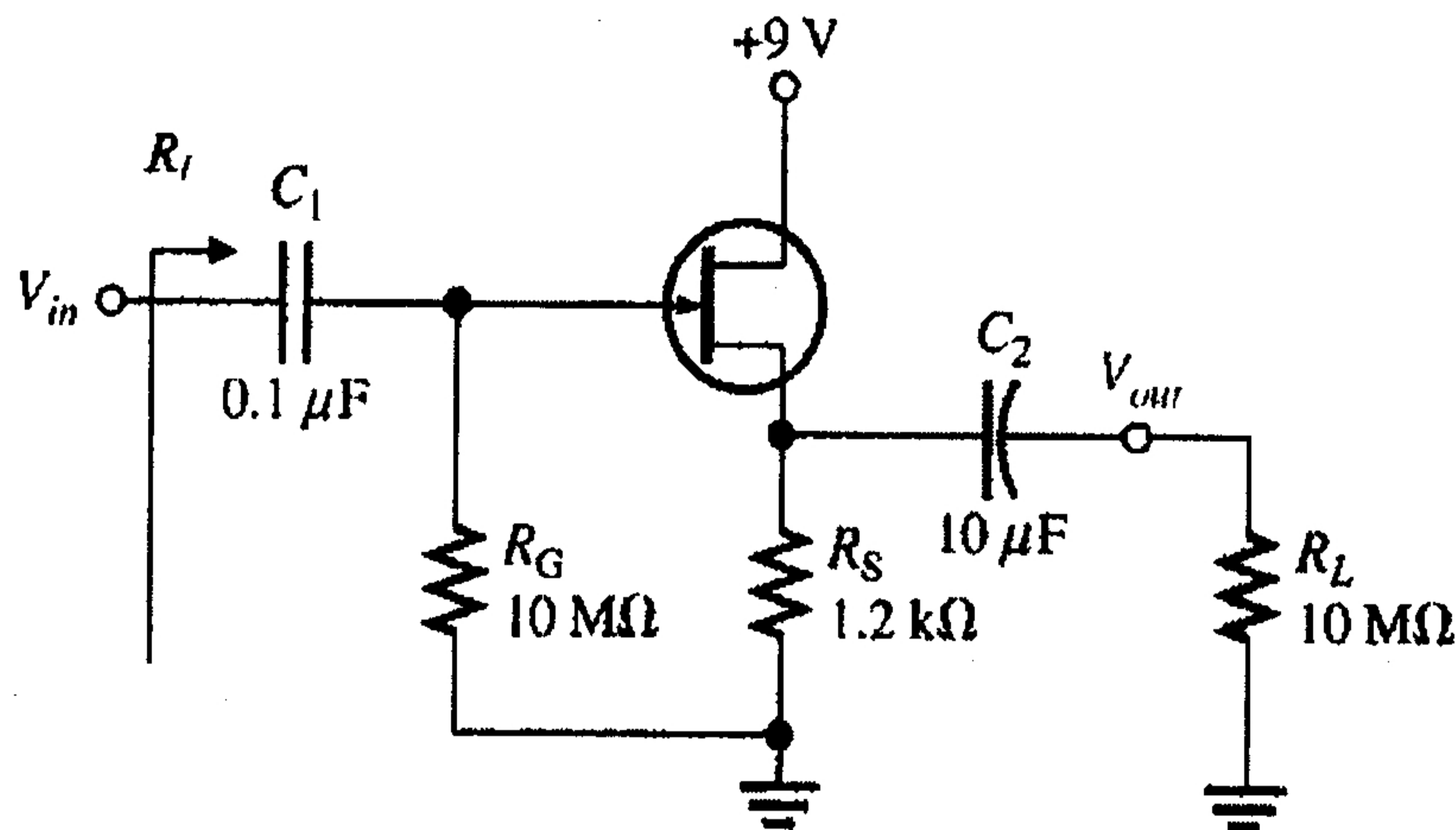


Figure 1

2. Find the overall current gain $A_i = I_o / I_i$, voltage gain $A_v = V_{out} / V_{in}$, input resistance R_i , and input resistance R'_i in Figure 2. (20%)

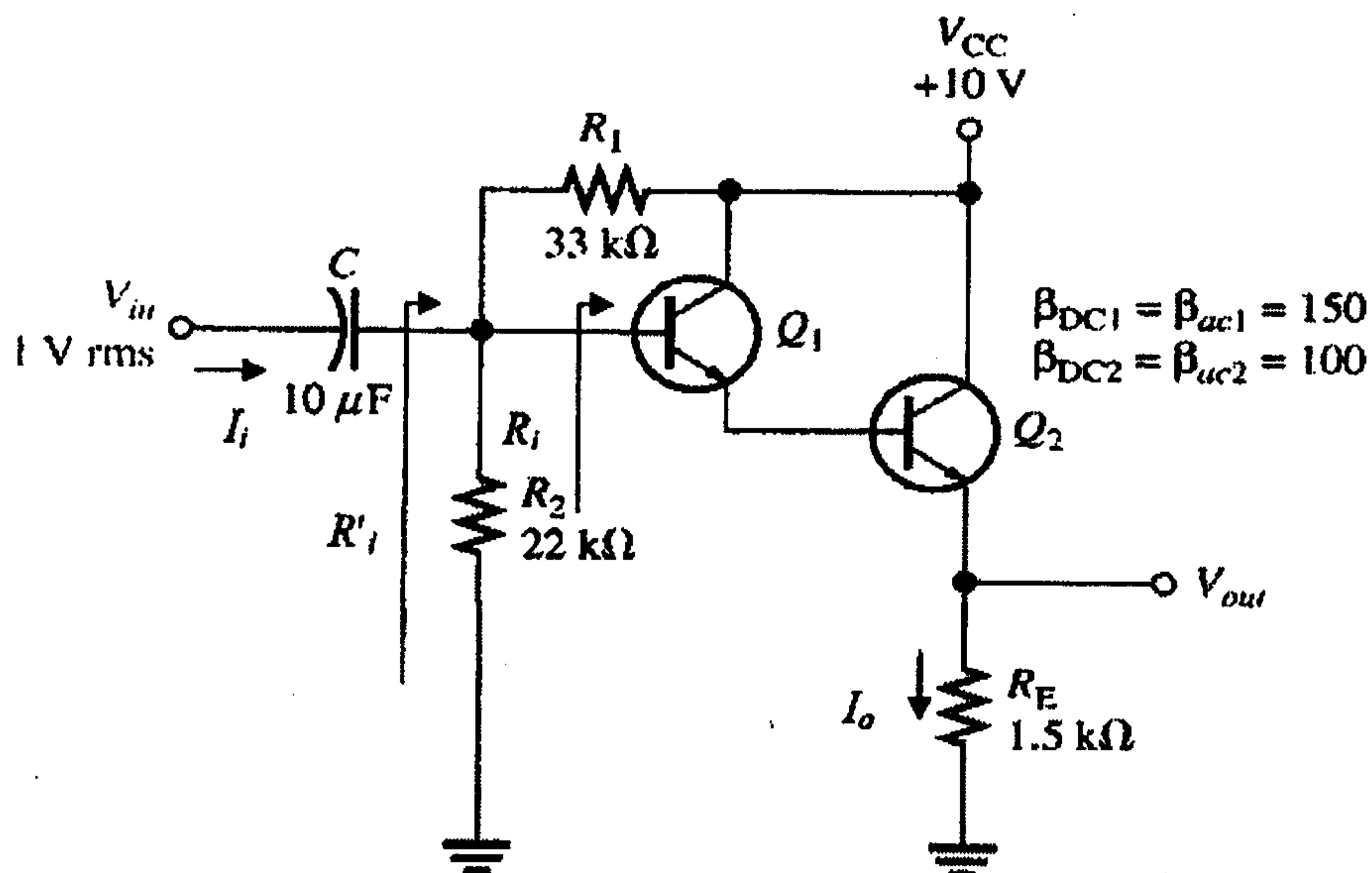


Figure 2

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第 2 頁共 3 頁

3. Find the hysteresis voltage in Figure 3. (10%)

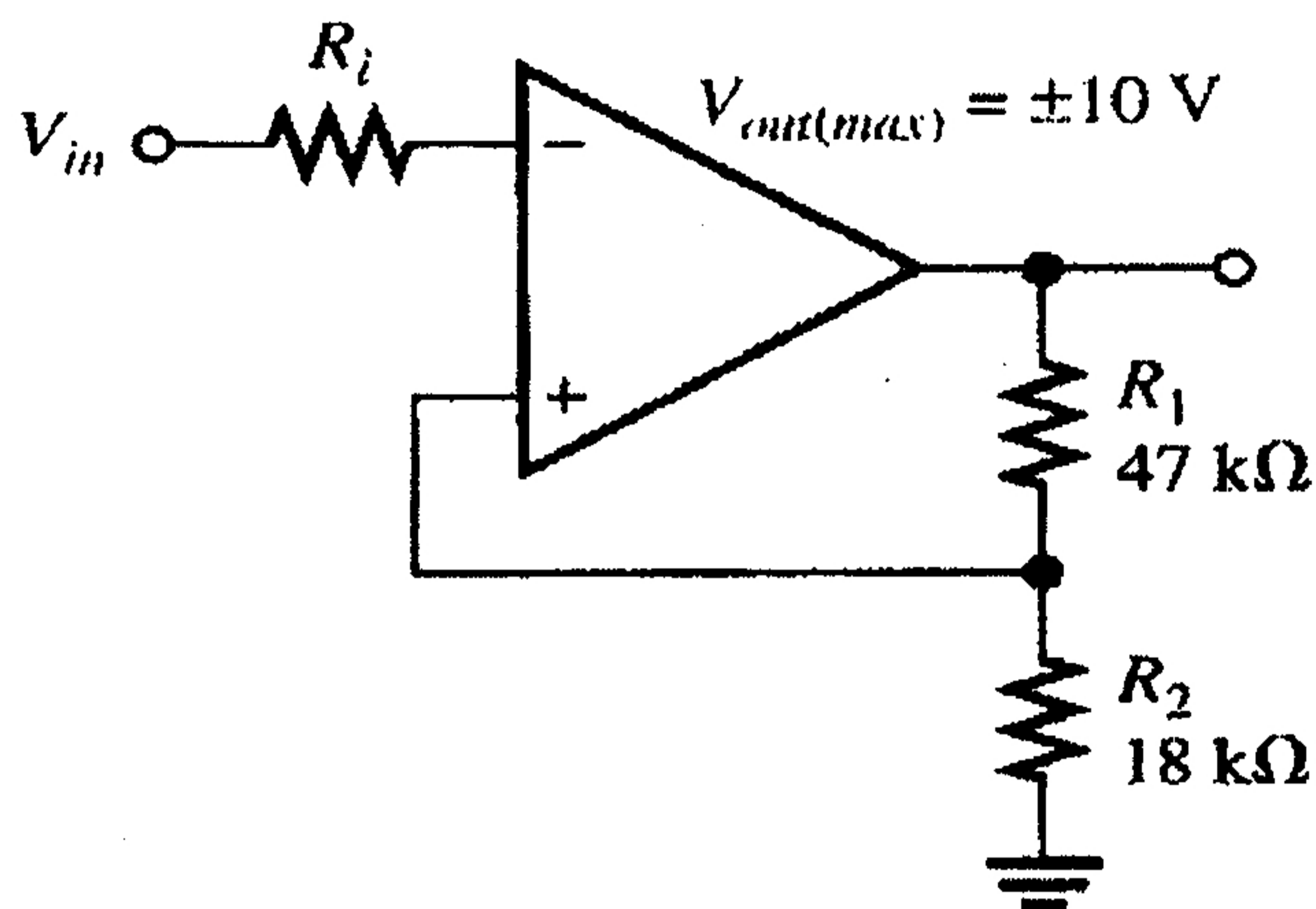


Figure 3

4. What is the output voltage when the input voltages shown in Figure 4 are applied to the scaling adder?
 What is the current I_{R_f} through R_f ? (20%)

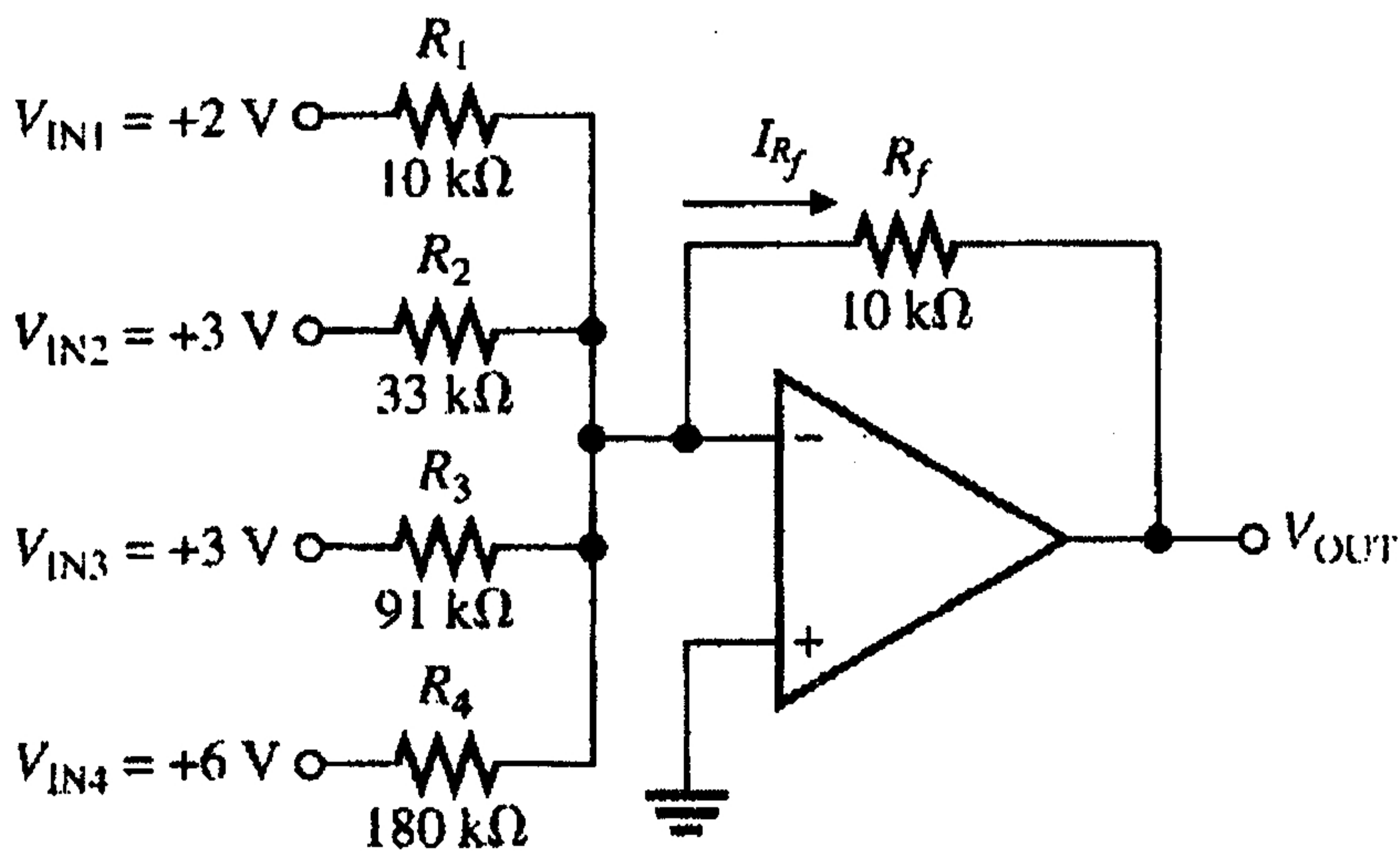


Figure 4

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第3頁共3頁

II. Choice Questions: (單選) (15%)

1. If the beta of a certain transistor operating in the linear region is 30 and the base current is 1mA, the collector current is
(a) 0.33 mA (b) 1 mA (c) 30 mA (d) unknown
2. During the positive half-cycle of the input voltage in a bridge rectifier,
(a) one diode is forward-biased (b) all diodes are forward-biased
(c) all diodes are reverse-biased (d) two diodes are forward-biased
3. Free electrons exist in the
(a) recombination band (b) lowest band (c) conduction band (d) valence band
4. When a sine wave has a frequency of 60 Hz, in 5 sec it goes through
(a) 6 cycles (b) 300 cycles (c) 1/16 cycles (d) 5 cycles
5. If the voltage in a resistive circuit is doubled, the power will be
(a) halved (b) unchanged (c) doubled (d) quadrupled

III. Fill-in-the-blank/Short-answer Questions (15%)

1. Why is the silicon the most widely used semi-conductive material? (as compared with germanium)
2. To achieve an output of 10V with an input of 300 mV, what voltage gain is required?
3. If the rms current through a 10 k Ω resistor is 5 mA, what is the power dissipated in this resistor?
4. Please describe the two pn-junction of BJT is reverse-biased or forward-biased when the BJT is operated in saturation mode.