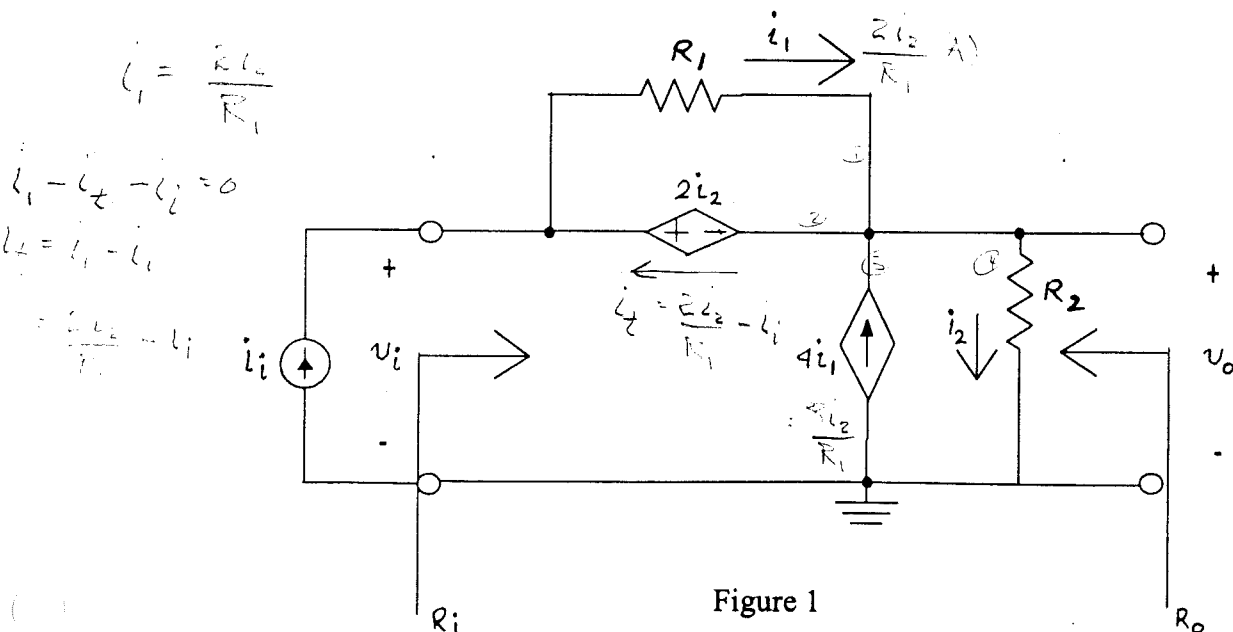


Course	Number	Section	
ELECTRONICS I	ELEC 311/2	U & W	
Examination	Date	Time	# of pages
Mid-term	Wednesday, October 15, 1997	11:45 a.m. – 1:00 p.m..	3
Instructor(s)			
Section U: Dr. M.O. Ahmad; Section W: Dr. R. Raut			
Materials allowed: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Please specify)			
Calculators allowed: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes			
Any non-programmable calculator is allowed			
Special Instructions:			
Answer all questions. All questions are of equalvalue. Your answers must be clear, concise, reasoned, and neatly organized.			

Given the circuit of Figure 1, derive expressions for:

- the open circuit transresistance gain  $R_m$ ,
- the input resistance  $R_i$ , and
- the output resistance  $R_o$ .



2. The circuit shown in Figure 2 employs an ideal op amp. Derive expressions for:

- the input resistance  $R_i$ , and
- the output resistance  $R_o$ .

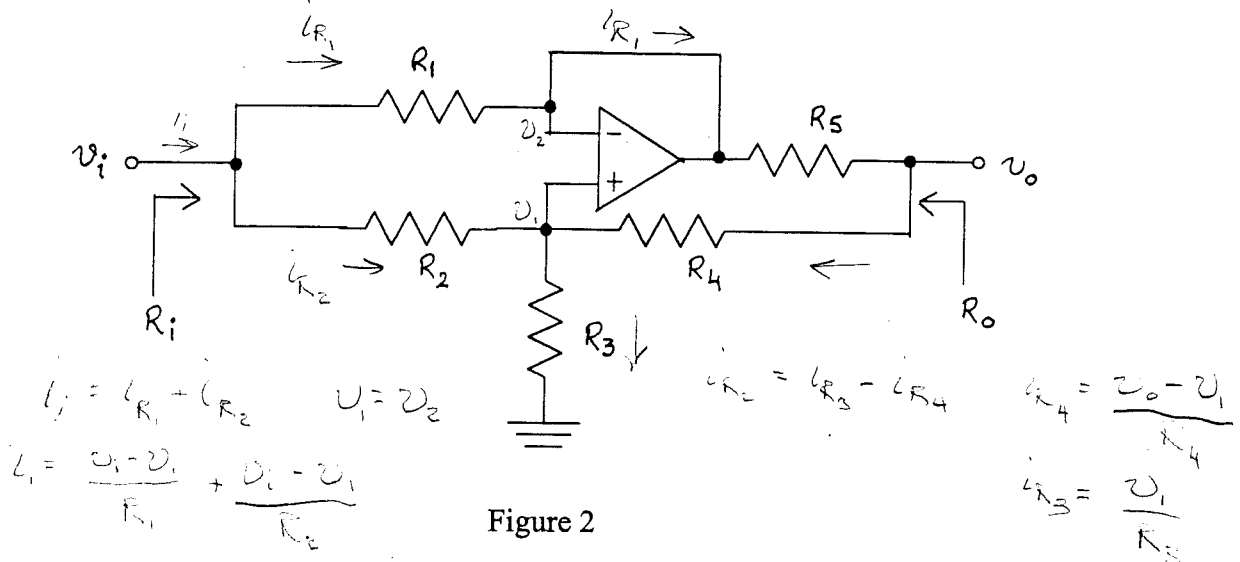


Figure 2

3. The circuit shown in Figure 3 employs an ideal op amp.

- Derive an expression for the transfer function  $T(s) = V_o(s)/V_i(s)$  and arrange it in the standard form.
- Find the dc gain and the 3-dB frequency

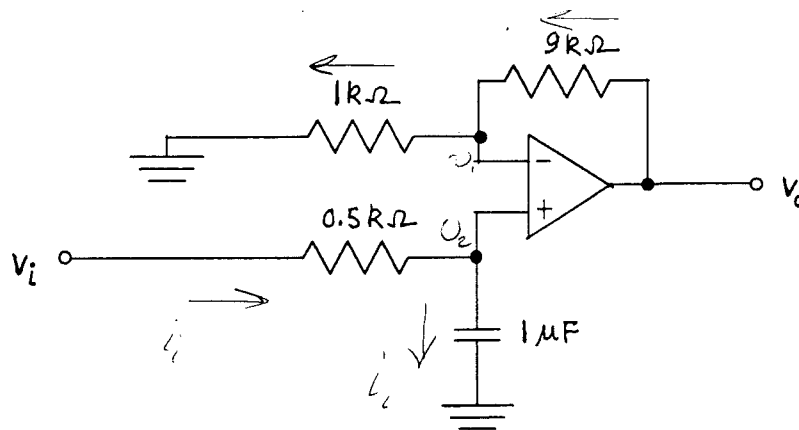


Figure 3

In the circuit shown in Figure 4,  $v_1$  is a sinusoid voltage of 10-V rms. Find the value of  $R$  so that the average diode current is 1 mA. The diode is ideal.

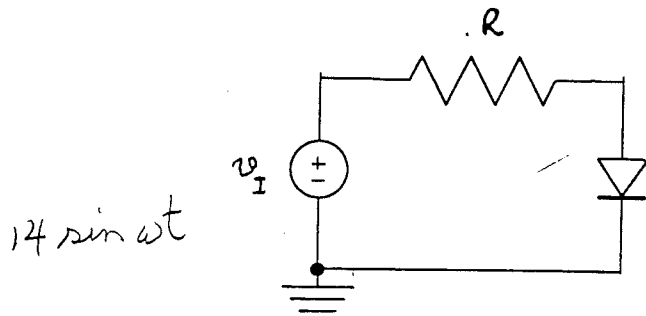


Figure 4

1. The circuit shown in Figure 2 employs an ideal op amp. Derive expressions for:

- the input resistance  $R_i$ , and
- the output resistance  $R_o$ .

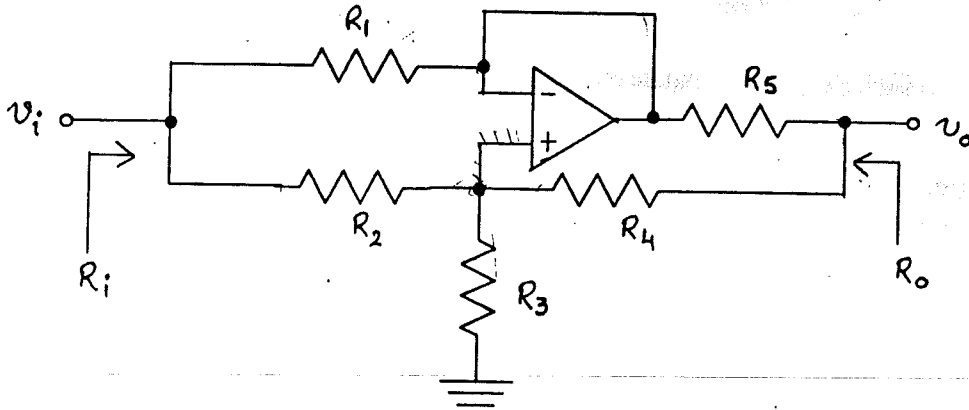


Figure 2

3. The circuit shown in Figure 3 employs an ideal op amp.

- Derive an expression for the transfer function  $T(s) = V_o(s)/V_i(s)$  and arrange it in the standard form.
- Find the dc gain and the 3-dB frequency

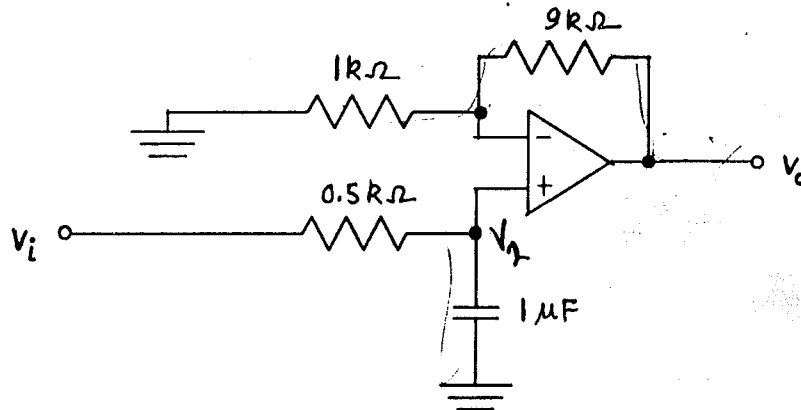
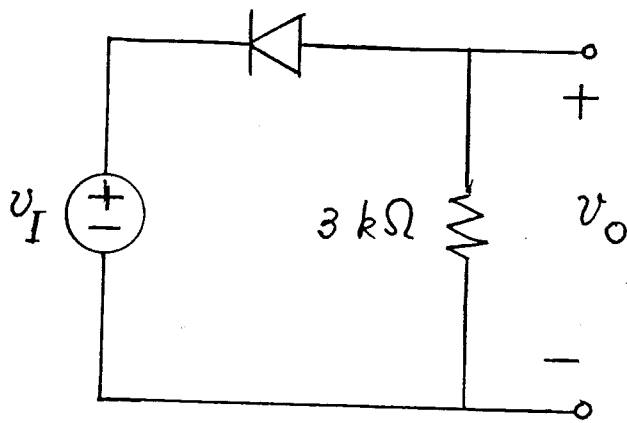


Figure 3

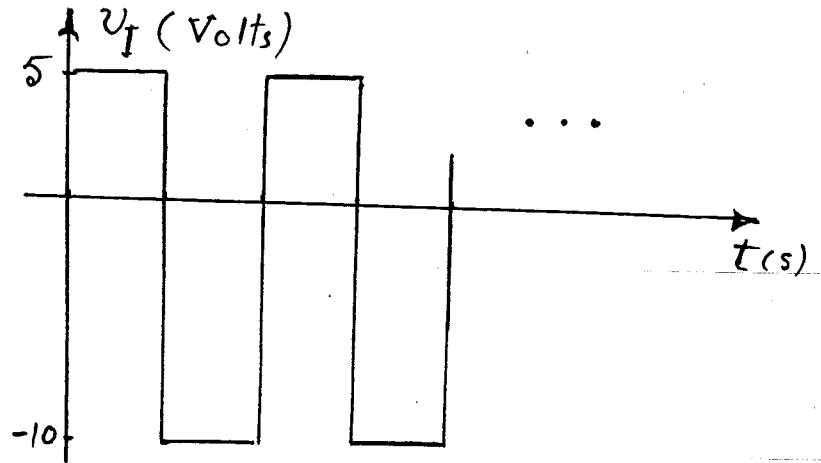
2. Assume that the diode in the circuit of Figure 2(a) has a constant voltage drop of 0.7 V when conducting. The input is a voltage waveform as shown in Figure 2(b).

- Draw the output waveform  $v_o$ .
- Find the average value of  $v_o$ .
- Find the value of the peak forward current for the diode
- Find the peak reverse voltage of the diode

(7 marks)



(a)

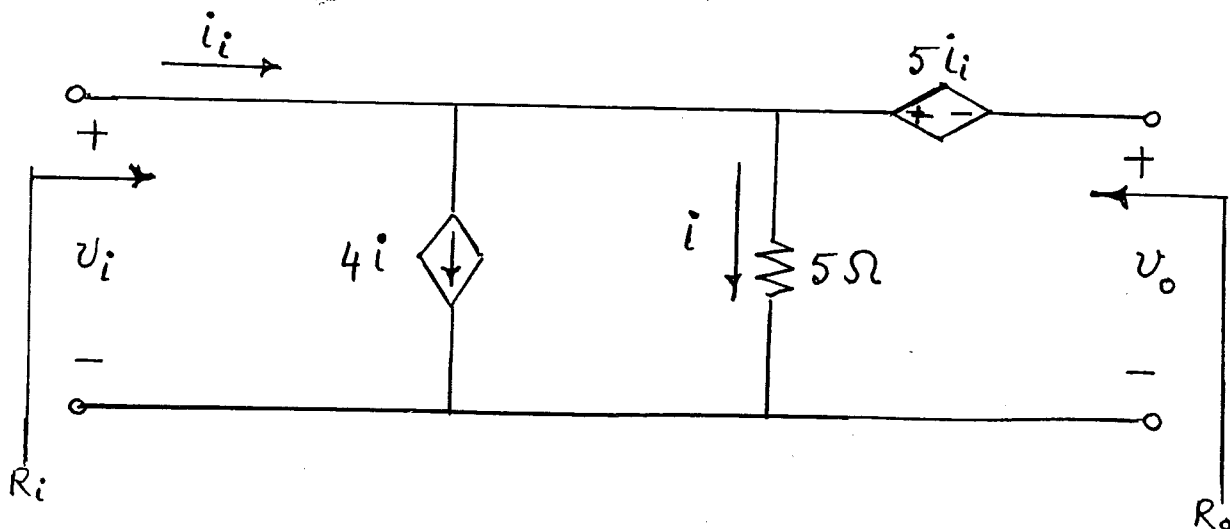


(b)

3. For the circuit shown in Figure 3, find the values of

- The voltage gain  $v_o/v_i$
- the input resistance  $R_i$
- the output resistance  $R_o$ .

(6 marks)



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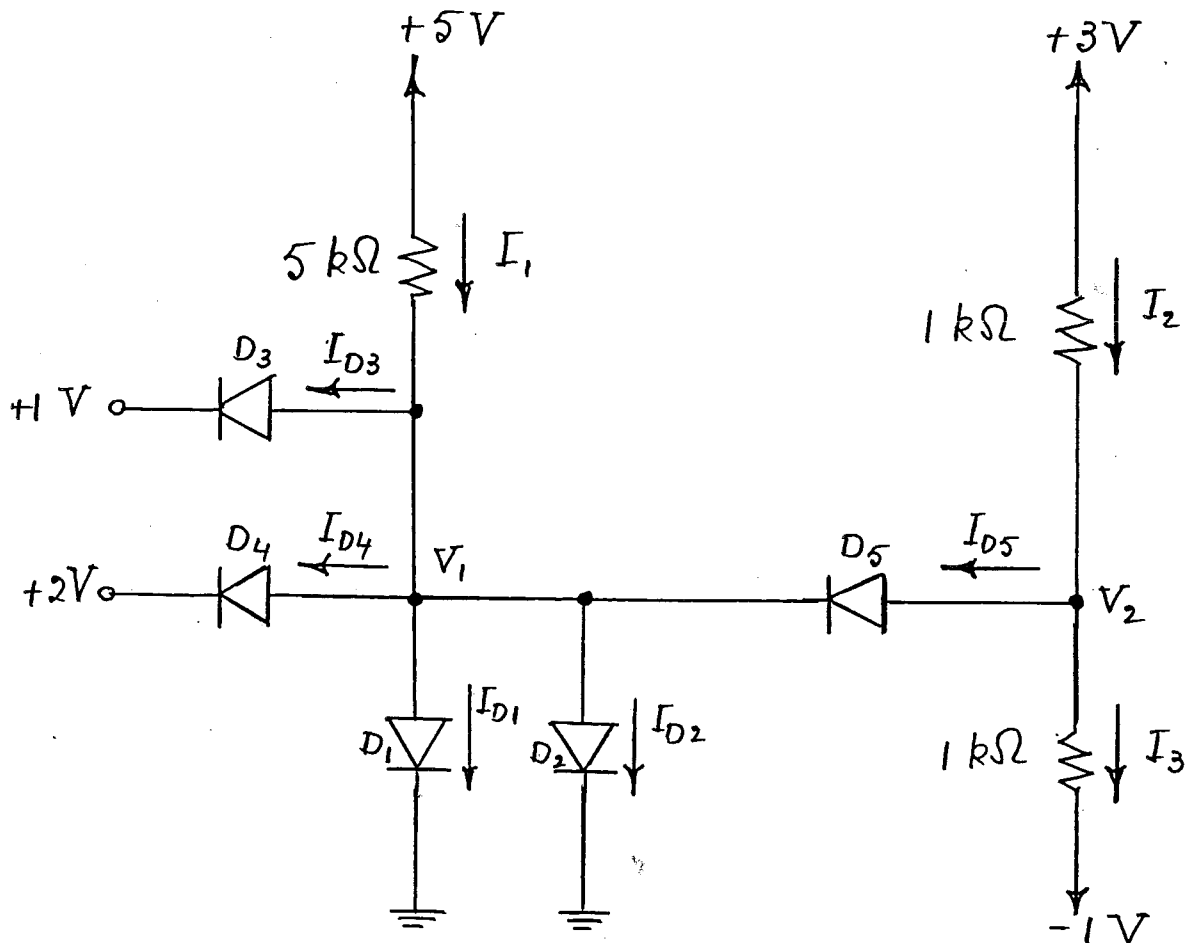
October 23, 1998

ANSWER ALL QUESTIONS

Time Allowed: 50 minutes

1. Assume that all the diodes in the circuit of Figure 1 are ideal. Find the values of the currents  $I_{D1}$  to  $I_{D5}$  and  $I_1$  to  $I_3$ .

(7 marks)



PLEASE TURN OVER

2. The circuit shown in Figure 2 employs an ideal op amp. Derive expressions for:

- the input resistance  $R_i$ , and
- the output resistance  $R_o$ .

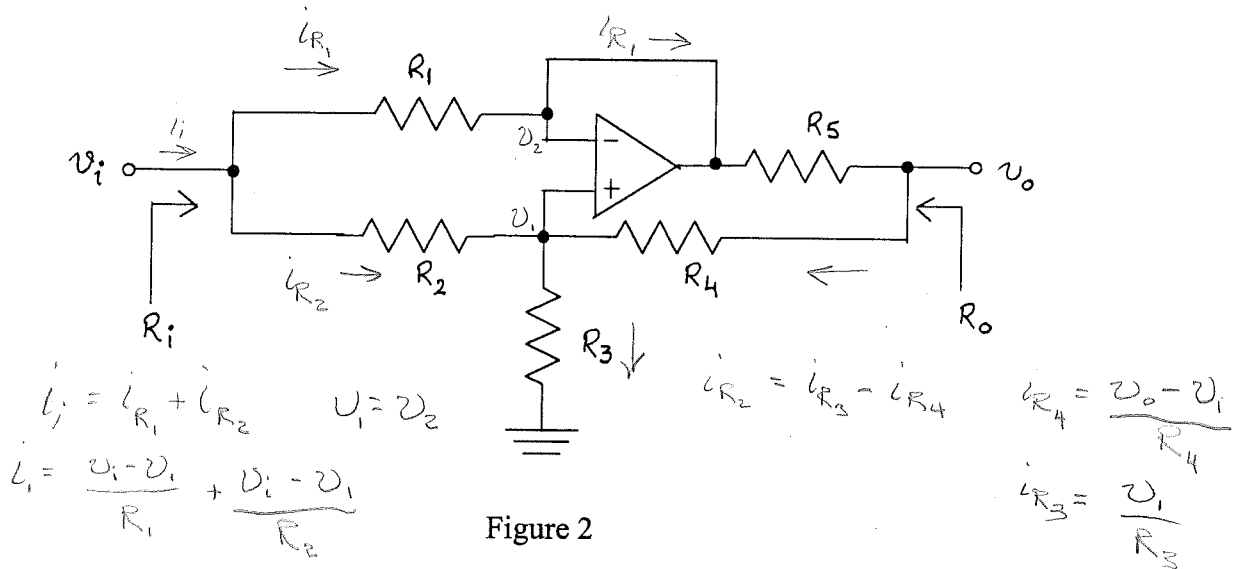


Figure 2

3. The circuit shown in Figure 3 employs an ideal op amp.

- Derive an expression for the transfer function  $T(s) = V_o(s)/V_i(s)$  and arrange it in the standard form.
- Find the dc gain and the 3-dB frequency

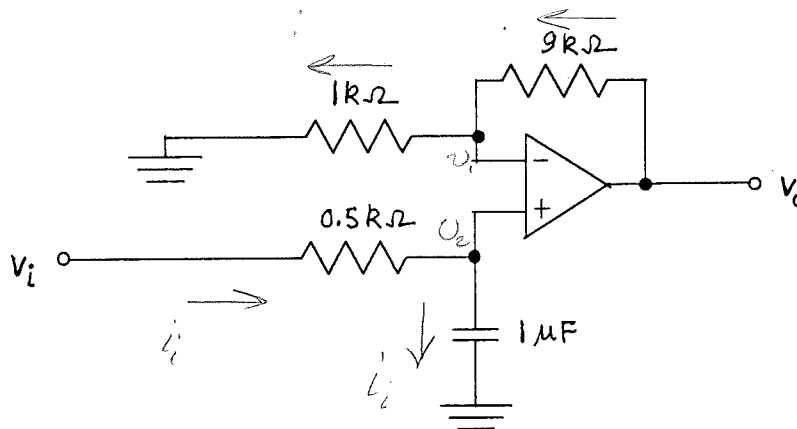
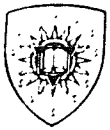


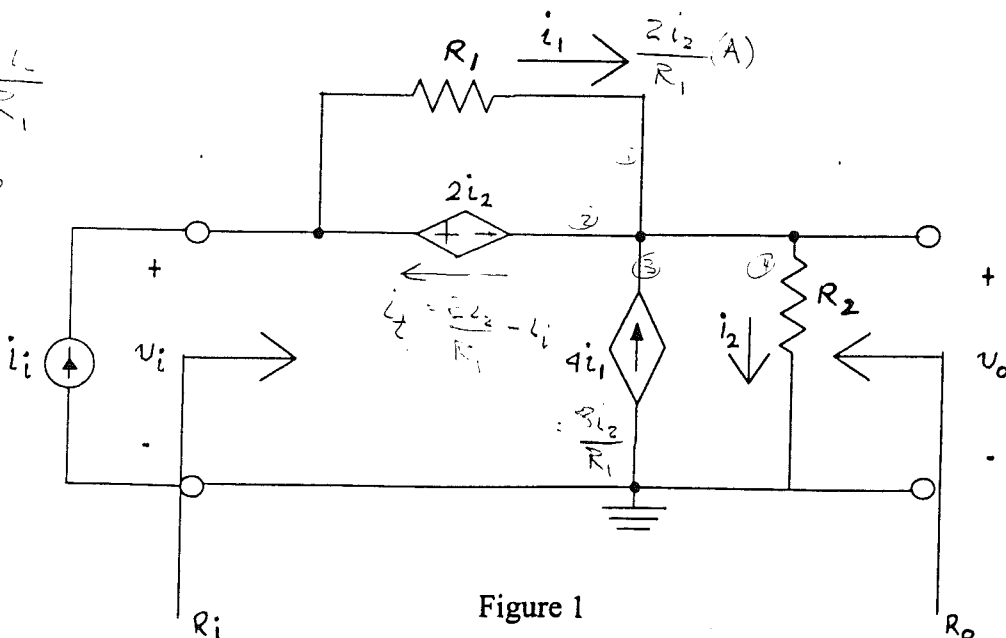
Figure 3



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1. Given the circuit of Figure 1, derive expressions for:

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ELECTRONICS I (ELEC 311/2)  
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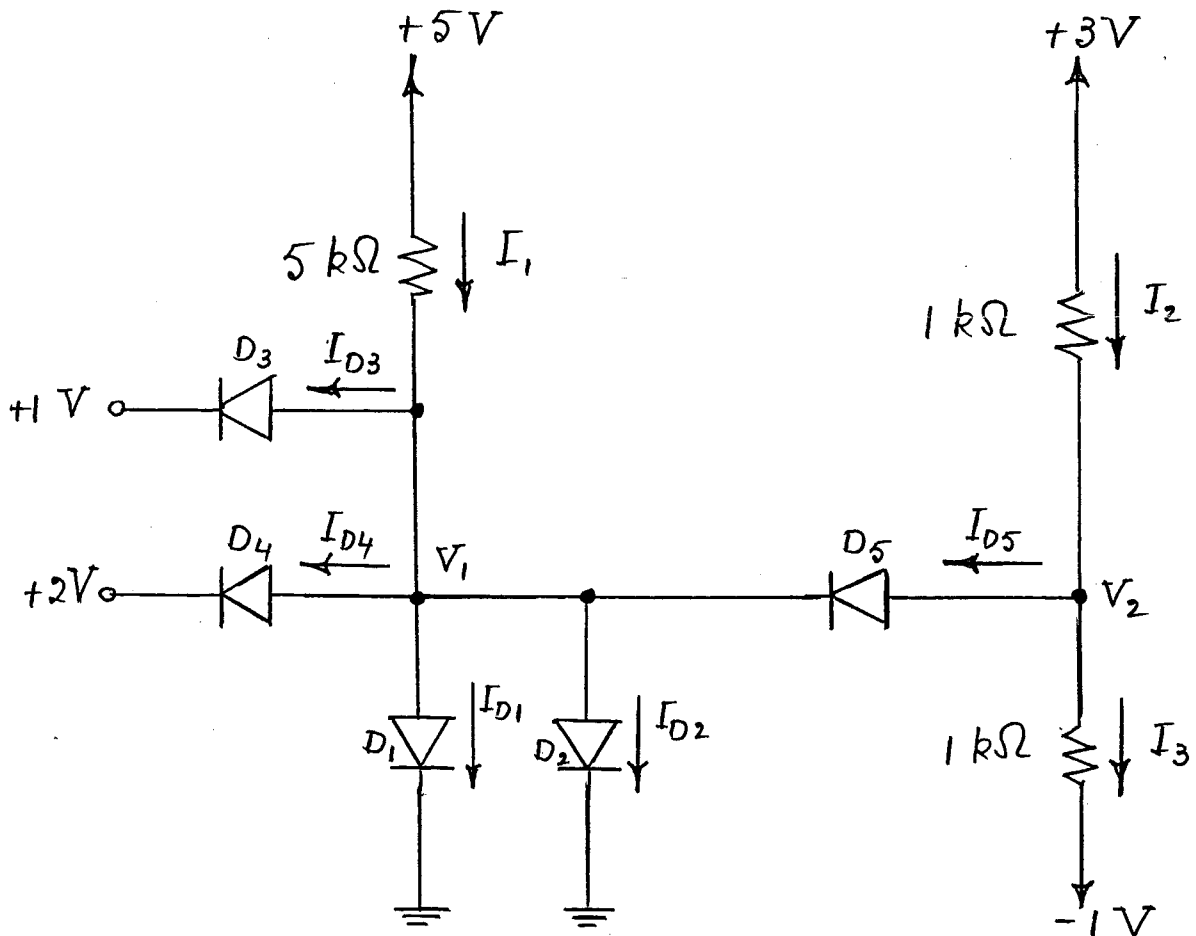
October 23, 1998

ANSWER ALL QUESTIONS

Time Allowed: 50 minutes

1. Assume that all the diodes in the circuit of Figure 1 are ideal. Find the values of the currents  $I_{D1}$  to  $I_{D5}$  and  $I_1$  to  $I_3$ .

(7 marks)



PLEASE TURN OVER