NAME _____ UCID _____

1. Answer all four questions. Maximum mark is 18.
2. For multiple-choice questions, indicate the correct answer. There may be more than one correct answer, in which case indicate all correct answers.
3. Show your work as much as possible, within time and space constraints.
4. Only this one sheet of paper will be collected and graded

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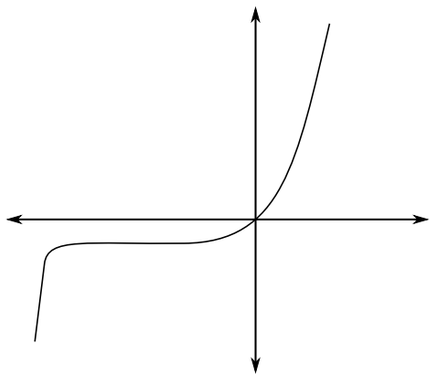
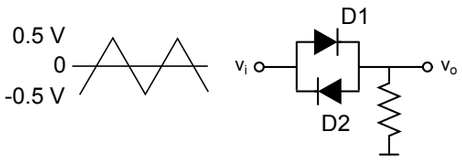
1. The iv characteristics of a diode D are drawn below. On the same axes, add the **reverse** characteristics of a second diode whose breakdown voltage is larger than that of D and whose reverse saturation current is smaller than that of D *(2 marks)*



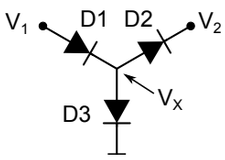
2. The circuit below uses ideal diodes D1 and D2 with cut-in voltages 0.3 V and 0.7 V, respectively. The input is a 1 V peak-to-peak triangle wave as shown. Fill in the boxes *(2 marks)*



$v_{o,maximum}$ = _____

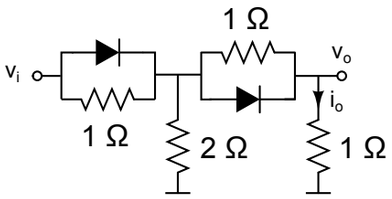
$v_{o,minimum}$ = _____

3. In the circuit below, V_1 and V_2 are voltage sources, V_X is a measurement, D1 is forward biased and D2 is reverse biased. Fill in the table *(2 marks)*



	True	False	Not enough information
D3 is forward biased	◯	◯	◯
$V_X > V_1$	◯	◯	◯
$V_X > V_2$	◯	◯	◯
$V_1 > V_2$	◯	◯	◯

4. In the circuit below, both diodes have a cut-in voltage of 0.3 V. *(12 marks)*
(a) Find expressions for v_o
(b) At what value(s) of v_i is $i_o = 0$?



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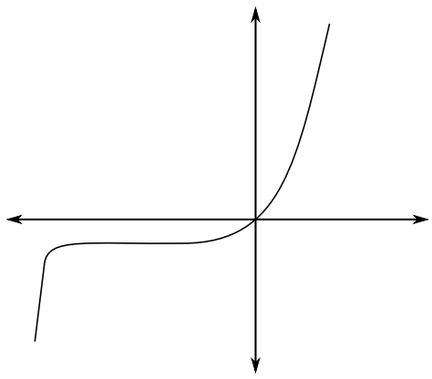
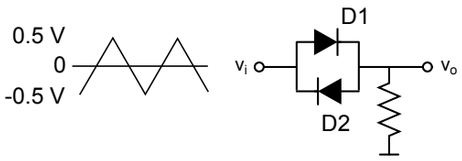
1. The iv characteristics of a diode D are drawn below. On the same axes, add the **reverse** characteristics of a second diode whose breakdown voltage is smaller than that of D and whose reverse saturation current is larger than that of D *(2 marks)*



2. The circuit below uses ideal diodes D1 and D2 with cut-in voltages 0.7 V and 0.3 V, respectively. The input is a 1 V peak-to-peak triangle wave as shown. Fill in the boxes *(2 marks)*



$v_{o,maximum}$ = _____

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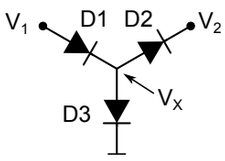
3. In the circuit below, V_1 and V_2 are voltage sources, V_X is a measurement, D1 is reverse biased and D2 is forward biased. Fill in the table *(2 marks)*



	True	False	Not enough information
D3 is forward biased	◯	◯	◯
$V_X > V_1$	◯	◯	◯
$V_X > V_2$	◯	◯	◯
$V_1 > V_2$	◯	◯	◯

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(b) At what value(s) of v_i is $i_o = 0$?