EE2255 電 子 學 **Quiz 2 (Ch3)** **Spring 2021**

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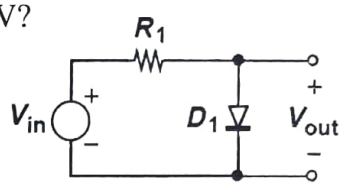
Part 1 : Single Choice Questions (50%)

For the following four questions, please choose "one" the most appropriate answer.

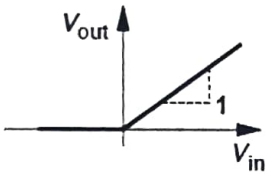
(A) 1. What is the diode current in the circuit below at V_{in}= -1V, R_1=2kΩ , use constant voltage model for D_1, with $V_{D,on}$=0.8V, V_T=26 mV?

(A) 0mA
(B) 0.9mA
(C) 1.8mA
(D) 2.6mA

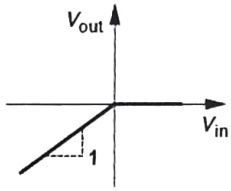


(B) 2. For a circuit in question 1, assume **ideal diode model**, which is its input/output characteristics?

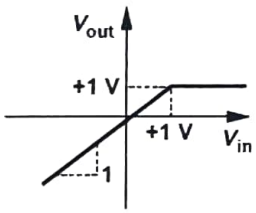
(A)



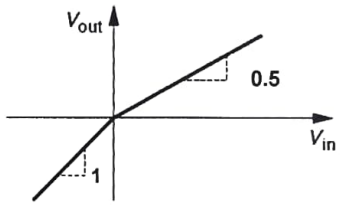
(B)



(C)

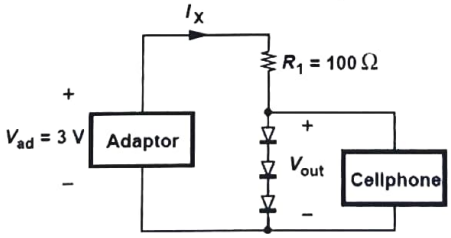


(D)

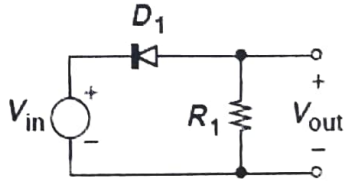


B (D) 3. Following figure is a regulator with all identical diodes of $V_{D,on}$=0.8V, V_T=26mV. Which answer is closest to the small signal resistance, r_d, of the diodes?

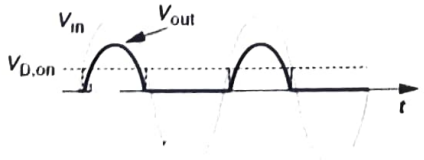
(A) 0Ω
(B) 4Ω
(C) 6Ω
(D) 10Ω



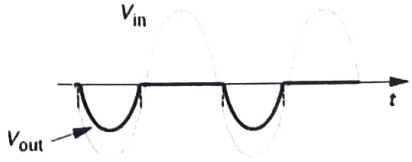
(B) 4. Which the correct response for the circuit on the right?



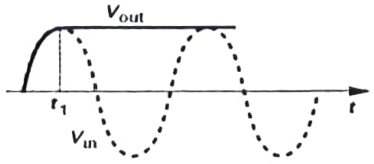
(A)



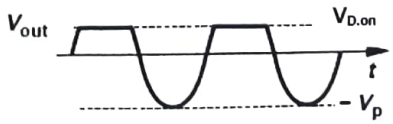
(B)



(C)

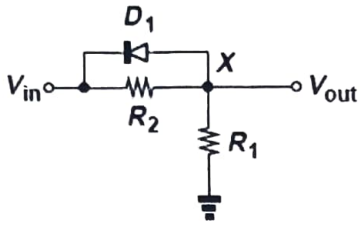


(D)



Part 2: Multiple Choice Questions (50%)
Please choose the most appropriate answers. 12.5 points for exact correct answers and 7 points for one wrong choice, 0 points for more than two wrong choices.

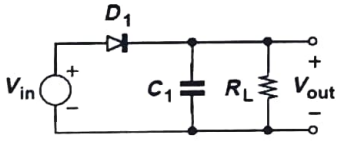
(BDE) 5. For the circuit below, assume $V_{D,on}$=0.8V, V_{in} ranges from -3V to 3V, and R_1=R_2, which are true?

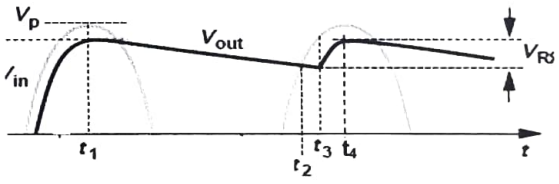


(A) D_1 is on when V_{in}=3V
(B) D_1 is off when V_{in}=0V
(C) When V_{in}>0, the slope of $V_{out}(V_{in})$ = 1
(D) V_{out}=0Vwhen V_{in}=0V
(E) Turning point in its input/output characteristic curve is at V_{in}=-0.8V

(BDE) 6. Choose the **Correct** statements about the small signal analysis.
(A) Small signal analysis can be applied for any kind of circuit operation.
(B) Small signal analysis bases on the technique of linear approximation.
(C) In small signal analysis a diode can be modeled as a resistor with its value I_S/V_T.
(D) To get good accuracy, the "small signal" voltage across the diode ΔV_D has to be much smaller than V_T.
(E) We have to carefully estimate the "small signal range" to make sure the precision of small signal analysis.

(ABD) 7. Choose the **Correct** statements for the rectifier circuit and its response below.





(A) D_1 is off between t_1 to t_3
(B) Charging time is less than 1/4 of a period
(C) For t= t_3~t_4, i_{C1}+i_{RL}=0
(D) V_{out} increases as charge in C_1 increases.
(E) D_1 experiences a maximum reserve-bias voltage at t=t_2.

(ABE) 8. For a half-wave rectifier below with a filter capacitor C_1, and input signal frequency f. Assume an ideal diode is used, and rectifier connected to constant loading current of I_L. Which statements are **Correct**?
(A) Ripple voltage increase with I_L ↑
(B) Ripple voltage decrease with f ↑
(C) Ripple voltage increase with C_1 ↑
(D) Capacitor is charge up by I_L
(E) Charge on C_1 increases when D_1 is on