

Any examinee found adopting unfair means would be expelled from the trimester/ program as per UIU disciplinary rules.

Q1. I-V characteristics of a silicon diode is shown in the figure – 1 at temperature T_x .

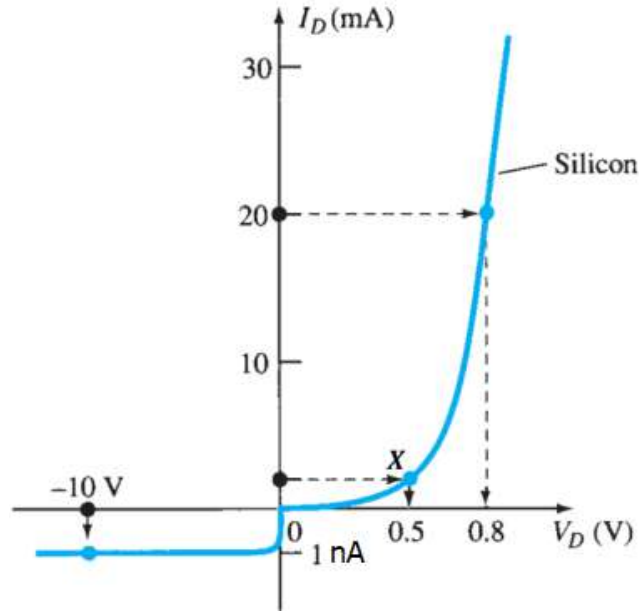


Fig 1: Diagram for Q1

Determine the followings:

- The thermal voltage, V_{T_x} for $n=1$. [2]
- The operating temperature of the diode. [1]
- The diode current at the point X. [1.5]
- If the temperature of the diode is decreased, show the changes in I-V characteristics by roughly sketching it on the same I-V characteristics curve. You don't need to mention any values on the new curve. [1.5]

Q2. a) Find I_1 , I_2 , I_3 , I_4 , I_0 & V_0 in the following circuit. [5]

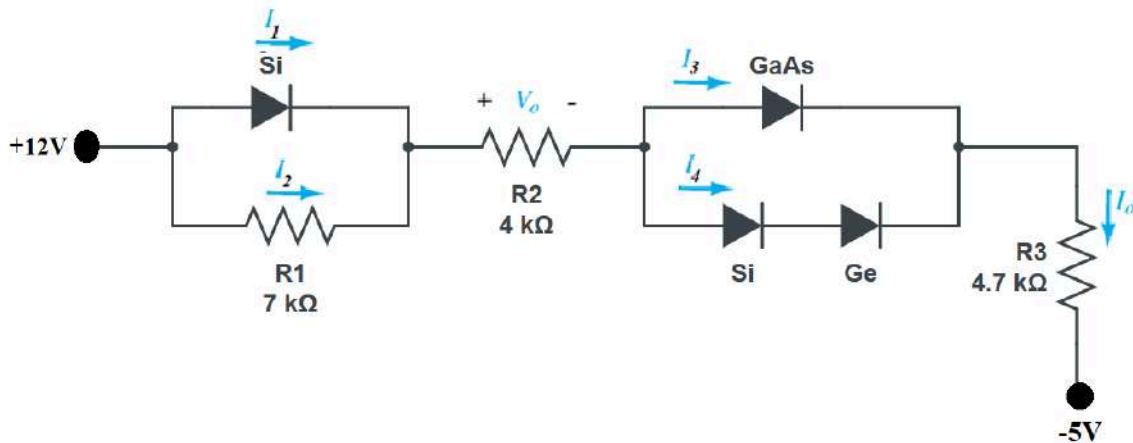


Fig 2: Circuit diagram for Q2(a)

b) Can any value of V' turn both the diodes on in the following network. ? If so, find the values of I_0 and V_0 in the network. [4]

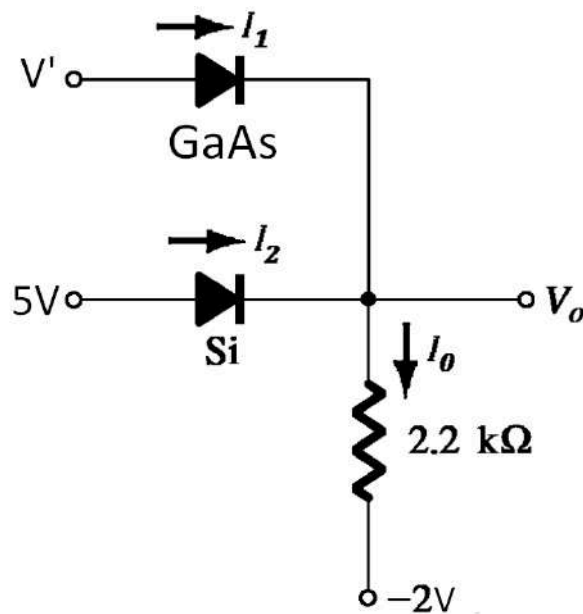


Fig 3: Circuit diagram for Q2(b)

Q3. For the following rectifier circuit, $V_{i,RMS}$ is found to be $5\sqrt{2}$ V and the frequency is 500 Hz.

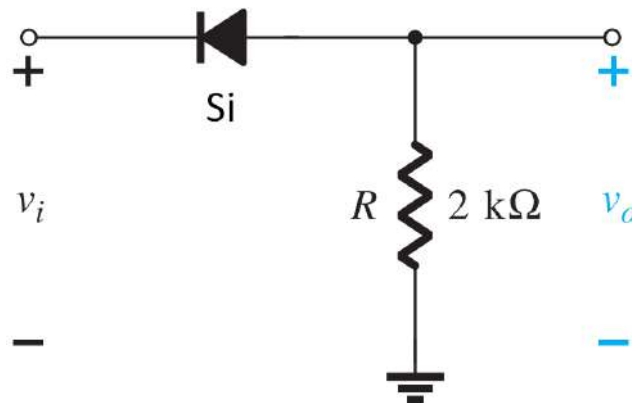


Fig 4: Circuit diagram for Q3

- Derive the expression of v_o and sketch it, mention the peak values in your graph. [3]
- Calculate PIV of the diode. If the breakdown voltage of this diode is 25v, can it be used safely in this circuit ? [1.5]
- Find the average of value of both v_i and v_o . [1.5]
- Can this circuit be considered as a clipper? Explain in detail. [1]

Q4. Analyze and sketch V_o for the network of the following circuit for the input shown below. Clearly mention the peak values in your sketch. [4]

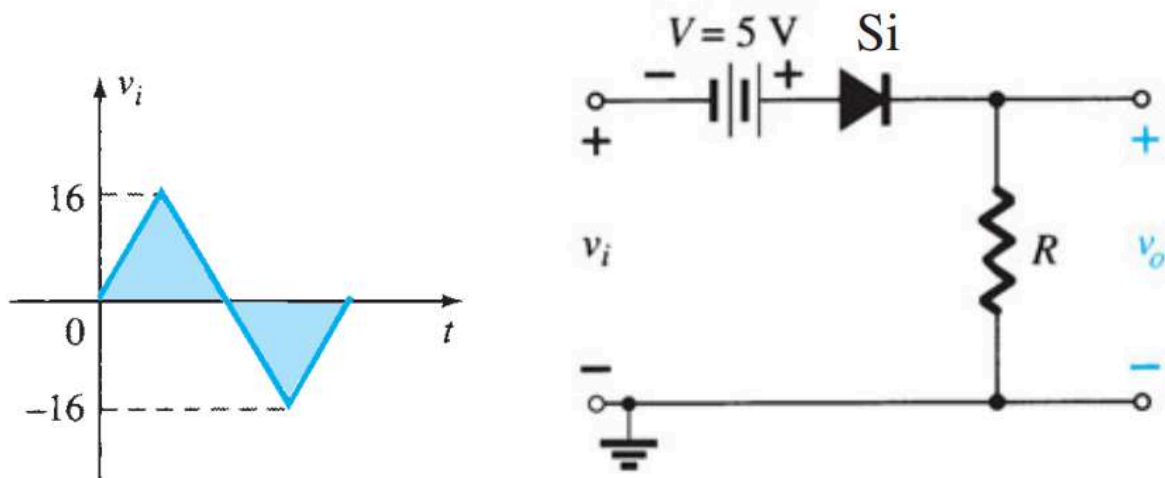


Fig 5: Circuit diagram for Q4

Q5. Design a clamper to perform the function indicated in following figure: [4]

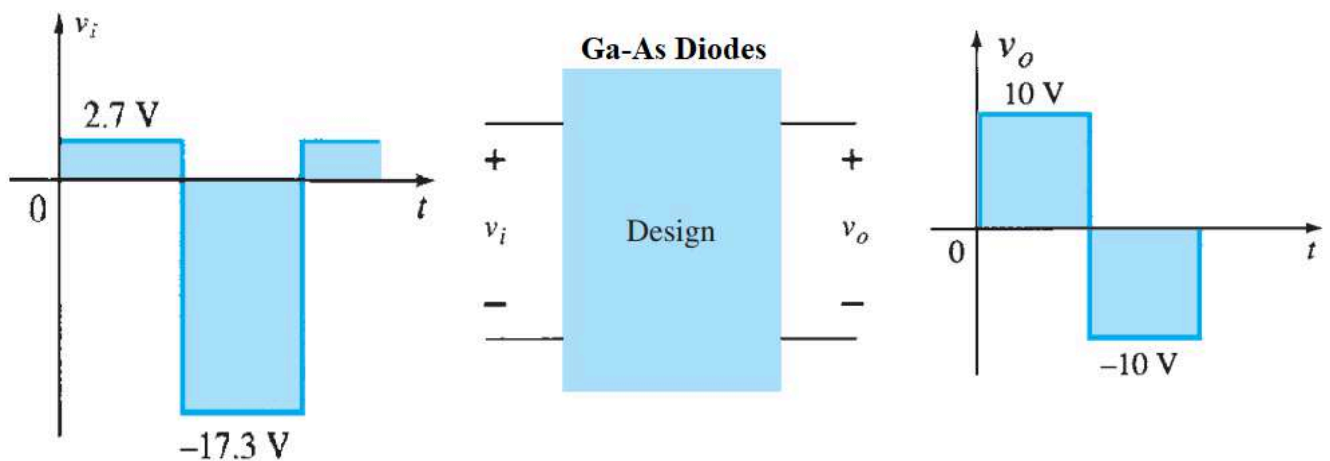


Fig 6: Diagram for Q5