



United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Mid-Term Examination

EEE 2123: Electronics, Trimester: Spring 2022

Total Marks: 30, Duration: 1 hour 45 minutes

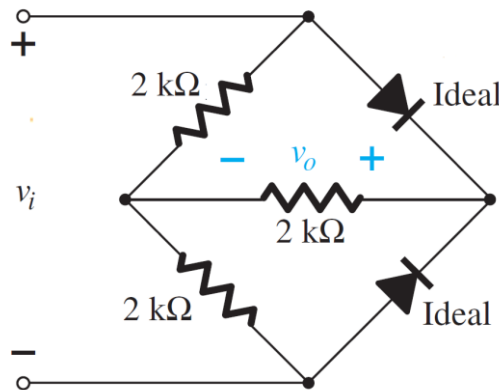
1. (a) The reverse saturation current I_S of a particular diode is found to be 2 nA at 10°C . Find the temperature at which this current would be increased to 32 nA ? [2]
 (b) Does temperature affect the turn-on (cut-in) potential of diodes? Explain in brief. [2]
 (c) Suppose a diode with following specifications is operating at 35°C . [4]

$$I_S = 6 \text{ nA}, n = 1, V_{ON} = 2 \text{ V} \text{ \& } |V_{br}| = 3 \text{ V}$$

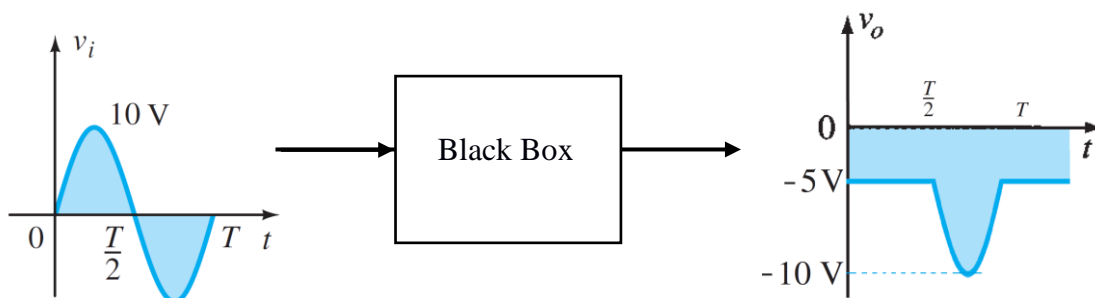
Calculate the amount of voltage that should be applied across this diode to obtain a current of

- 5 mA ($p \rightarrow n$ direction)
- 0 mA ($p \rightarrow n$ direction)
- 6 nA ($n \rightarrow p$ direction)

2. For the following rectifier circuit, $V_{i,RMS}$ is found to be $25\sqrt{2} \text{ V}$.
 CO-2

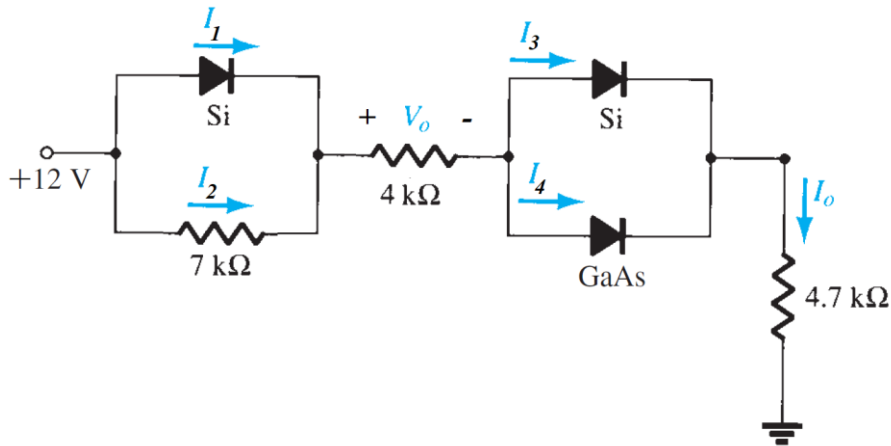


- Derive the expression of v_o and sketch it. You need to mention the peak values in your graph. [3]
 - Calculate PIV of any diode. [1]
 - Find the average of value of both v_i and v_o . [1]
 - Comment on the range of breakdown voltage of the given diode with necessary explanation. [1.5]
 - Can this circuit be considered as a clipper? Explain in detail. [1.5]
3. The black box contains a clipper circuit that generates the output voltage (v_o) shown in the figure below. From the given pattern of v_i and v_o , design the clipper circuit. Assume all diodes to be ideal. [5]
 CO-2



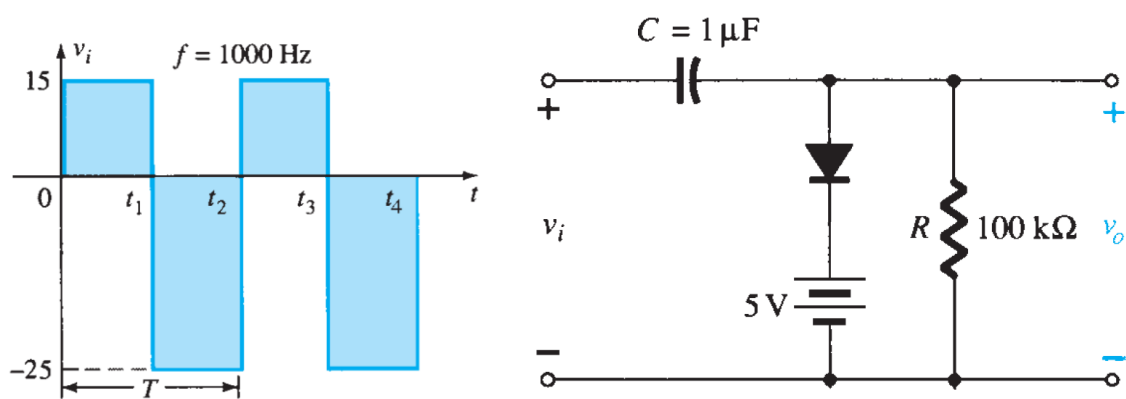
4. Find I_1, I_2, I_3, I_4, I_0 & V_0 in the following circuit. You must draw the equivalent circuit. [5]

CO-2



5. Sketch v_o for the following network mentioning peak values appropriately. Assume that the diode has cut-in (turn-on) voltage of 2.1 V. [4]

CO-2



COs	Description
CO-1	Describe the operating principle of semiconductor diodes and transistors using knowledge of basic semiconductor physics
CO-2	Analyze small analog electronic circuits by applying simple lumped circuit models of diodes and transistors