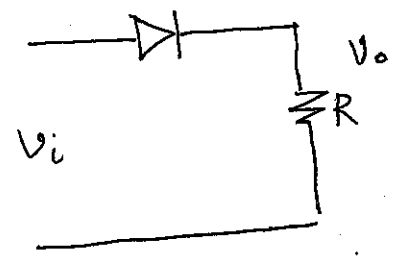
Tutorial Problem. 11.02.19.

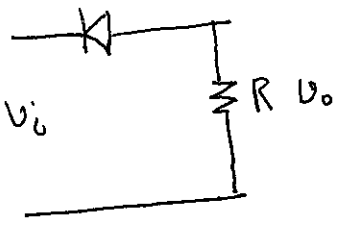
- For the circuits shown below determine the following.
  - transition state voltage.
  - Range of v_i for which the diode is ON and the range of v_i the diode is OFF.
  - i/o relationship for diode is ON and for the diode is OFF
  - sketch v_o in correspondence to v_i

Here v_i is sinusoidal wave with amplitude 10V.
[Consider the diode is Si diode]

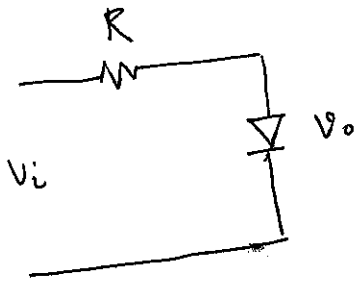
1

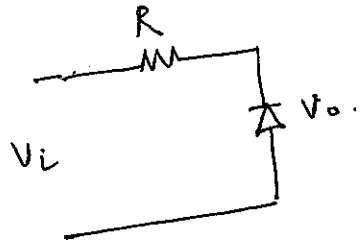


2.



3.

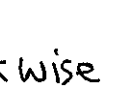


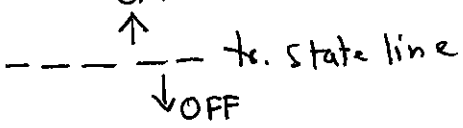


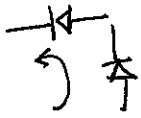
Steps Step 1: Determine transition state voltage.
@ transition $V_D = 0.7V$, $I_D = 0$.
- Redraw the CKT assuming the diode is going through transition.
- Apply KVL to determine v_i at which transition occurs.
[Since, v_i is unknown, consider it +ve]

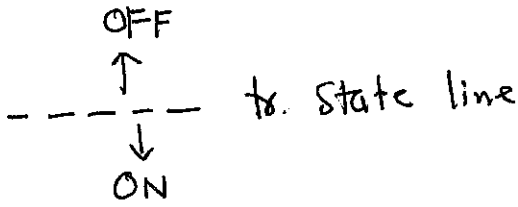
Step 2: - Draw the transition state voltage line on the v_i (input) wave shape

Step 3: Determine the range of v_i for which diode is on and range of v_i for which the diode is OFF

If Diode orientation is clockwise direction () then



If diode orientation is anticlockwise "  then



step. 4. Determine i/o relation..

when diode is "ON": Replace diode with 0.7. Redraw ckt and apply KVL

when diode is "OFF": Replace diode " open ckt. Redraw ckt and apply KVL

step 5. Sketch V_o base on the i/o relationship.