Simulation Exercise

Q1. Write the ngspice netlist for the circuit shown in Fig. 1. Run the simulation for:

a) Vs = 4V and -4V. Run the simulation and observe the transfer characteristics and input output voltage waveforms.

b) Change the polarity of the diode and repeat a.

c) Replace the 10K resistor by 1K and see the effect.

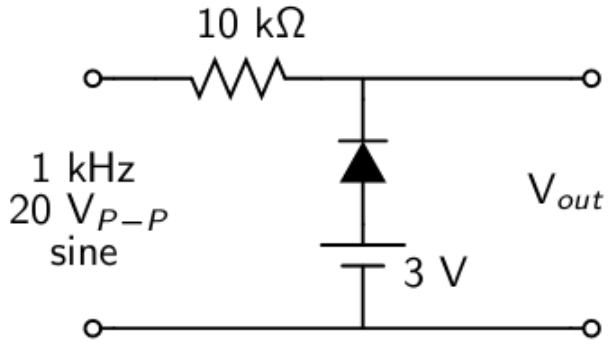

Figure 1: Clipping circuit Ex1

Q2. a) Design the circuits to generate the transfer characteristics shown in Fig. 2 and Fig. 3.

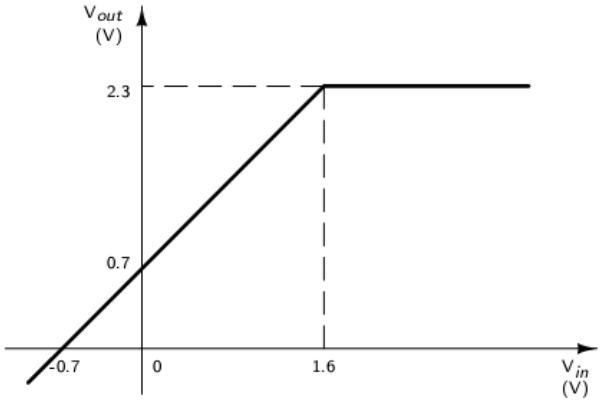

Figure 2: Transfer Characteristics-1

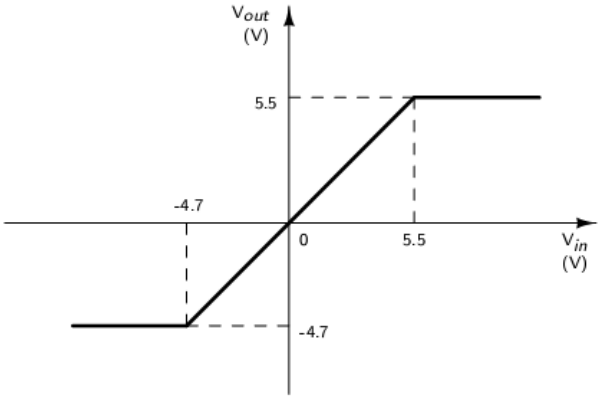

Figure 3: Transfer Characteristics-2

b) Write ngspice netlist for the circuits in Q2a and run the simulations to verify your designs.

Q3. a) Write the netlist and run the simulation for the circuits shown in Fig 4.

b) Repeat Q3a for V_R= 2V and -3V.Observe the output waveform and explain your observations.

c) Now change the polarity of the diode and repeat Q3a and b for the same.

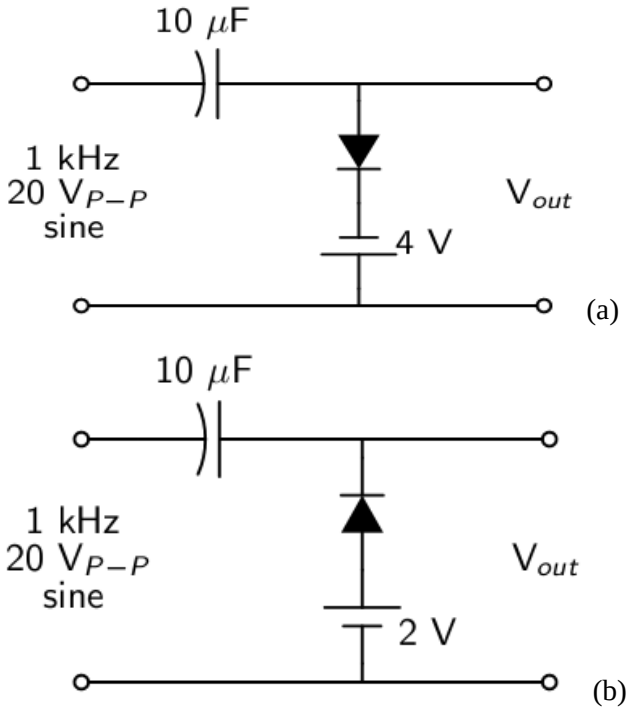

Figure 4 Circuit for Q3s

Q4. a) Try to analyze the circuit shown in Fig 5.

b) What are the voltages to which the capacitors C1 and C2 in the circuit charge?

c) What is the output of the circuit?

d) What will happen if the resistor is replaced by a 4.7kΩ resistor?

e) Write ngspice netlist and simulate the circuit and verify answers for b,c,and d.

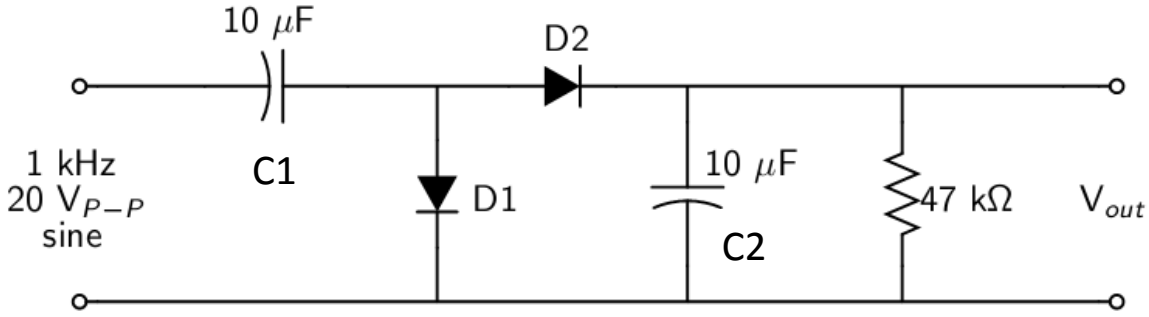

Figure 5 Circuit diagram for Q4