



- 1- In a particular oscillator characterized by the structure of figure (1), the frequency selective network exhibits a loss of 20 dB and a phase shift of 180° at ω_0 . What is the minimum gain and the phase shift that the amplifier must have for oscillations to begin?

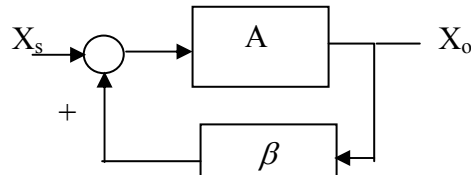


Figure (1)

- 2- For the comparator circuit shown in figure (2), find suitable values for all resistors so that the comparator levels are ± 6 V and so that the slope of the limiting characteristic is 0.1.
Use $V_{CC} = 10$ V and $V_D = 0.7$ V.

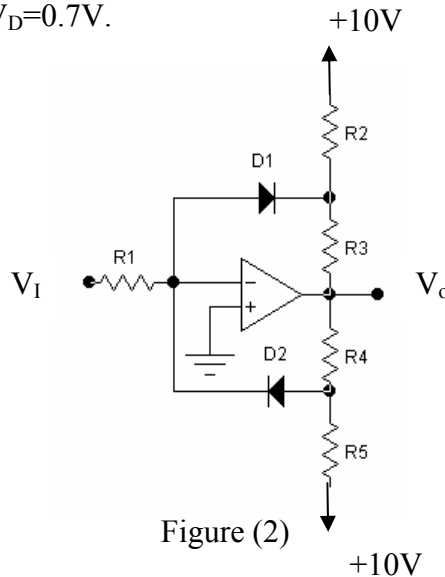


Figure (2)

- 3- For the circuits shown in figure (3) assuming $V_{fwd} = 0.7$ V , and Zener voltages to be V_{Z1} and V_{Z2} , sketch and clearly label the transfer function characteristics V_o-V_i assuming ideal op-amps.

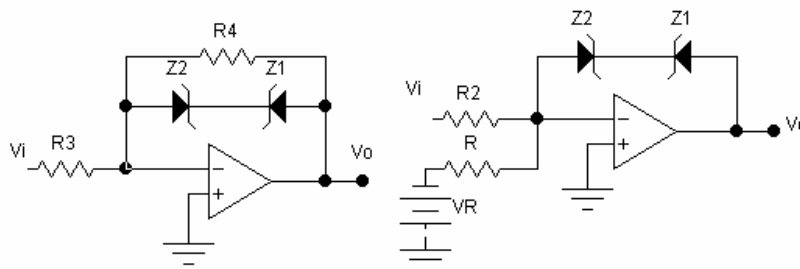


Figure (3)