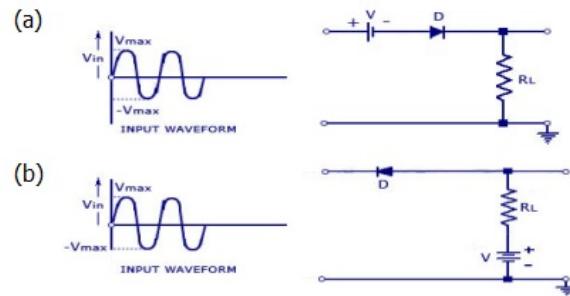


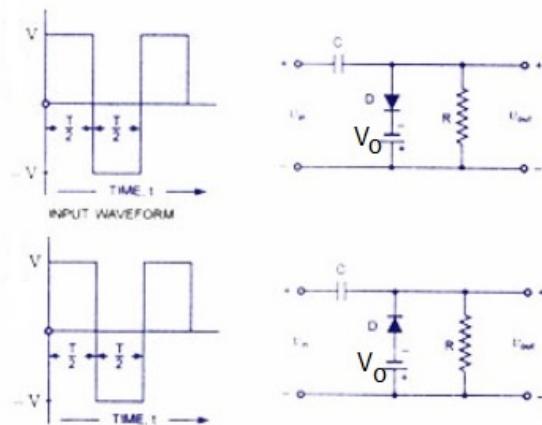
SCPY152 General Physics II

Problem Set #5 - Semiconductor Electronics and Special Relativity
 Date: April 20, 2022. Due date: April 25, 2022 (Submit to Google Classroom)

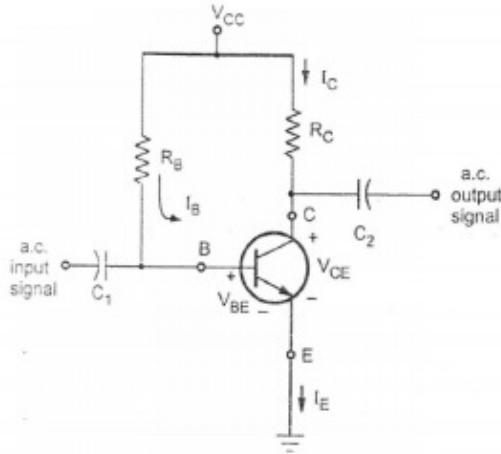
1. Draw the output signals from the following diode clipping circuits:
 $(V < V_{max})$



2. Draw the output signals from the following diode clamper circuits:
 $(V_0 < V)$



3. From the fixed biasing circuit appear in the following figure, with $\beta = 100$, $V_{CC} = 12V$, $R_C = 1.0k\Omega$, $R_B = 150k\Omega$, calculate V_{CEQ} , I_{CQ} and I_{BQ} .



4. At what speed does a meter stick move if its length is observed to shrink to 0.5 m?

5. The average lifetime of a π meson in its own frame of reference is 26.0 ns.

- If the π meson moves with speed $0.95c$ with respect to the Earth, what is its lifetime as measured by an observer at rest on Earth?
- What is the average distance it travels before decaying as measured by an observer at rest on Earth?

6. Assume appearance of an electron with total energy $E = 2.0MeV$ moving in z-direction, calculate its momentum p (in MeV/c), velocity β (in unit of c) in such direction and its kinetic energy (in MeV). ($m_e c^2 = 0.512MeV$)