EHB 335E Midterm – Group A (ITU ID Last digits 0, 1, and 6 only)

10 December 2020

3) For the class AB output stage below, $V_{CEmin,Q1} = |V_{CEmin,Q2}| = 0.8\,V$, $V_{CEmin,Q3} = |V_{CEmin,Q4}| = 0.5\,V$, $V_{BE,Q1} = |V_{BE,Q2}| = 0.5\,V$, $V_{BE,Q5} = 0.8\,V$, $R_L = 8\,\Omega$, $\beta_n = \beta_p = 50$.

a) Calculate the proper V_{cc} value considering the peak value of the load voltage for $P_{L,ave} = 49\,W$.

b) Find the maximum efficiency of this output stage. You can use the expressions we derived in our lectures.

c) Calculate the value of R_2 in order to avoid crossover distortion.

d) If the breakdown voltages of Q_1 and Q_2 are equal, i.e., $V_{CEmax,Q1} = |V_{CEmax,Q2}|$, what should be the minimum value?