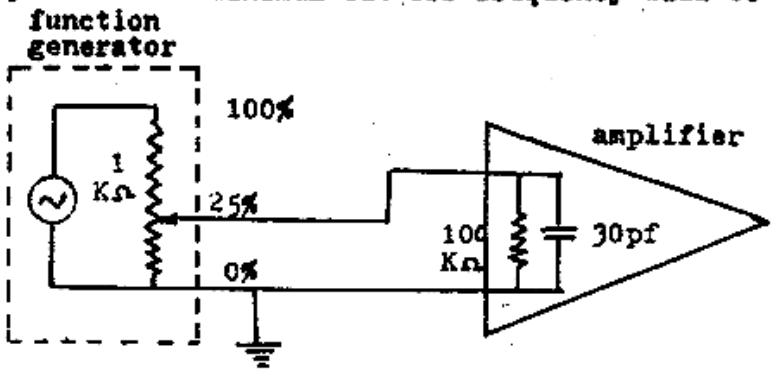
國立中央大學八十四學年度碩士班研究生入學試題卷

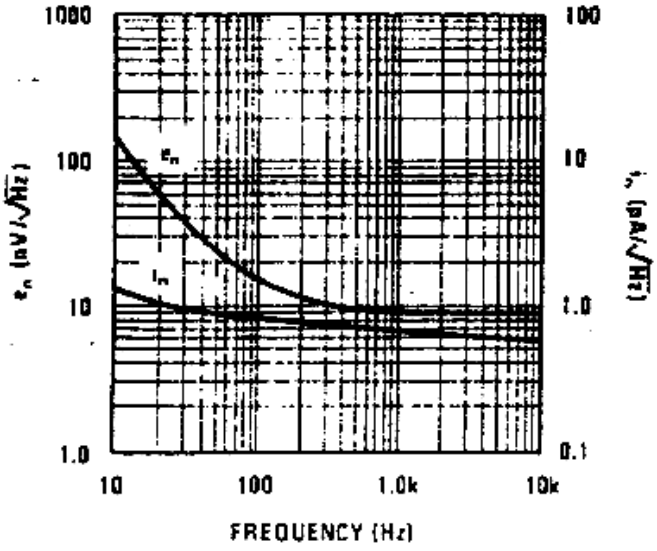
所別: 光電科學研究所 組 科目: 電子學 共 2 頁 第 1 頁

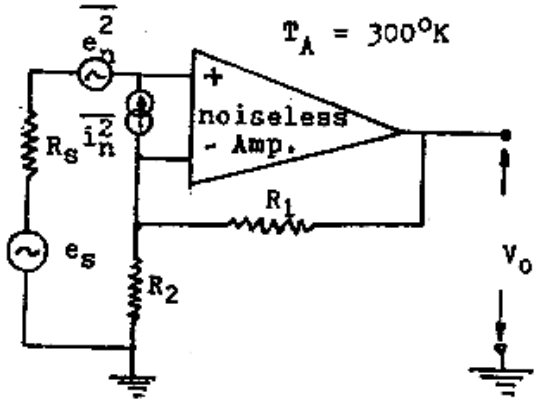
共五題，每題20分

20% 1. A function generator uses 1 KΩ potentiometer to adjest the signal amplitude. The input impedance of the amplifier is 100 KΩ paralled with 30 pf. If the slider is on the 10% and 25% of the potentiometer, how many times the minimum cut-off frequency will be ? (20%)

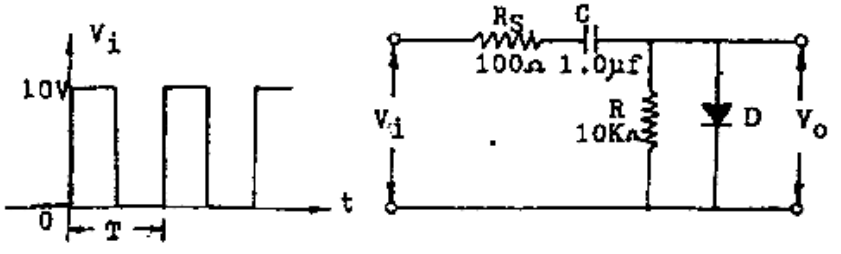


20% 2. Determine the total equivalent input noise per unit bandwidth for the amplifier as shown. If the amplifier is operate at 2 KHz from a source resistance of 1 KΩ, R_1 and R_2 are 200 KΩ and 1 KΩ respectively. (Boltzmann's Constant = 1.38×10^{-23} w-sec /°K) (20%)

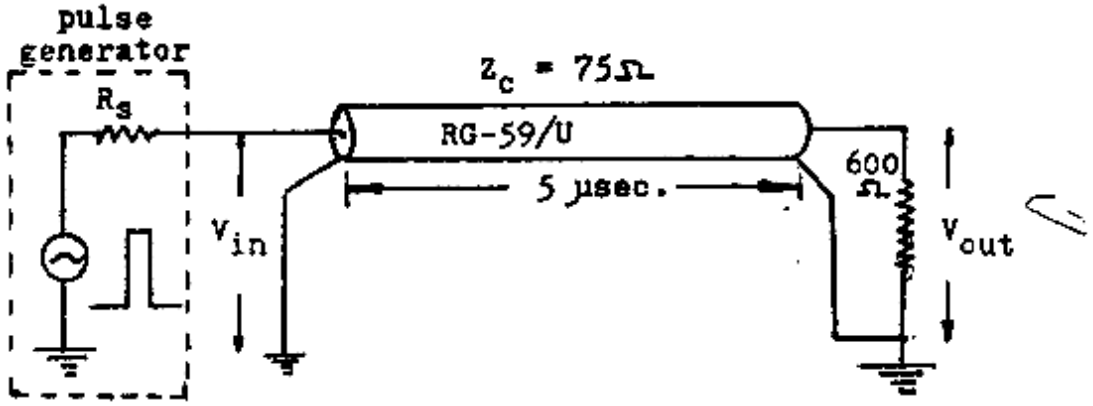




20% 3. In the circuit as shown, at t = 0 there is applied a symmetrical square-wave signal of amplitude 10 V and frequency 5 KHz. Draw the first several cycles of the output waveform, assuming that the capacitor is initially uncharged. (20%)



4. A pulse generator whose impedance is $R_s = 45\Omega$ delivers a 2-μsec 8-V pulse to a lossless RG-59/U ($Z_C = 75\Omega$)coaxial cable and terminated in 600Ω. The one-way delay of the cable is 5 μsec. Find the voltage waveforms at the input and output of the cable. (20%)



5. The four-diode gate is shown, if $R_c = R_L = 100K\Omega$, $V_r = 0$, $R_f = 25\ \Omega$, $R_R = \infty$, $R = 100\ \Omega$ (set at its midpoint), if $V_s = 2\ V_{peak}$ compute A, $(V_n)_{min}$, $(V_c)_{min}$. (20%)