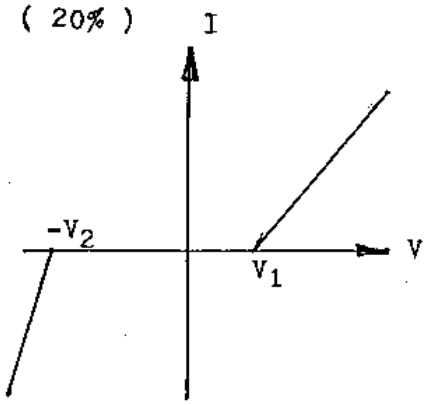
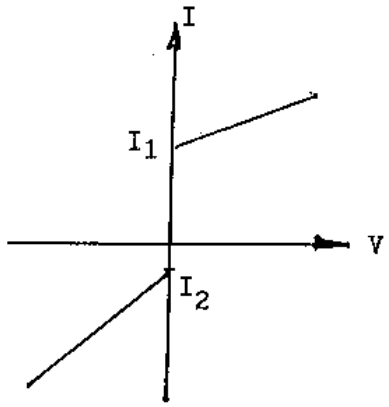
國立中央大學八十五學年度碩士班研究生入學試題卷

所別: 光電科學研究所　不分組　科目: 電子學　　共 2 頁 第 1 頁

1. Construct circuits use ideal diodes which exhibit terminal characteristics as shown. (20%)



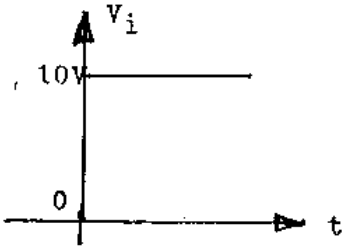
(a)

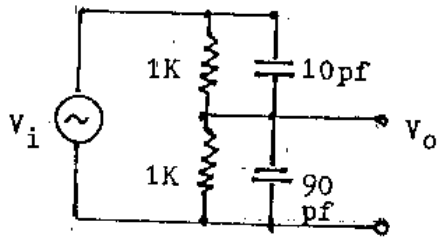


(b)

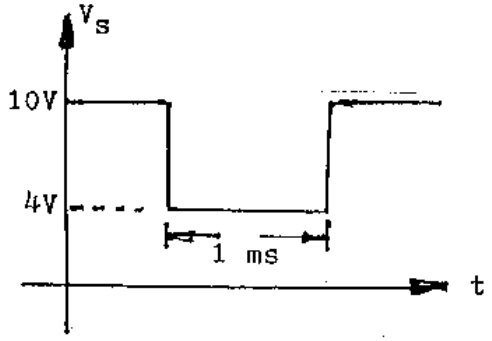
ideal diode
$V_F = 0$, $R_F = 0$.
$V_R = \infty$, $R_R = \infty$.

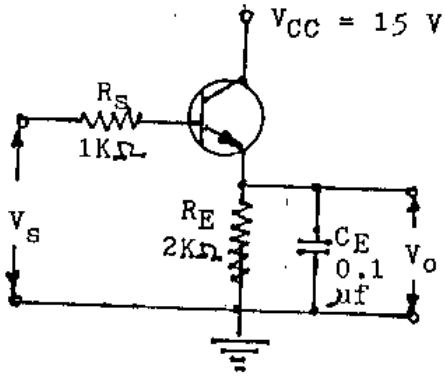
2. Use the voltage - divider rule to find the output voltage V_o, If V_i is step input. Calculate and sketch the output waveform. (20%)





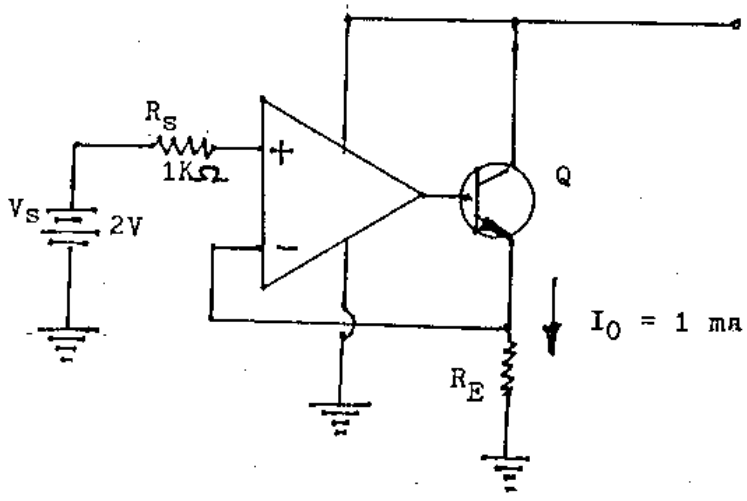
3. In the circuit as shown. Assume the input pulse is wide enough to allow completion of the circuit response to the leading edge of the pulse. Find the output waveform. (20%)





$V_{BE(act)} = 0.7V$
$h_{fe} = 60.$
$h_{ie} = 1K\Omega.$
$h_{re} = h_{oe} = 0.$

4. A Circuit for a voltage-controlled current source as shown. To find the value of R_E to obtain a circuit transconductance of 1 mA/ V. (20%)



5. An astable Multivibrator using the 555 IC. If C=1000pf, and find the values of R_A and R_B that result in an oscillation frequency of 100 KHz and duty cycle of 65%. (20%)