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碼

明新科技大學研究所碩士班 學年度招生考試入學答案卷

V 一般生 系所別：電子所 組別：

在職生 科 目：電子學

題號	初閱成績	閱卷者簽名 或蓋章	複閱成績	閱卷者簽名 或蓋章
一				
二				
三				
四				
五				
六				
七				
八				
九				
十				
總計				

- 注意：**
1. 請核對座位、准考證與答案卷左上角之號碼是否相符。
 2. 左下角**彌封處不可損壞**，彌封處蓋有印章，如有遺漏，應立即向監試人員聲明。
 3. 答案卷除答案外不得書寫任何與答案無關之符號、文字及撕毀。
 4. 答案卷左上角號碼須於繳卷時請監試人員撕去，考生不得自行銷毀。
 5. 試題卷須隨卷繳還。

←切勿損壞此彌封處

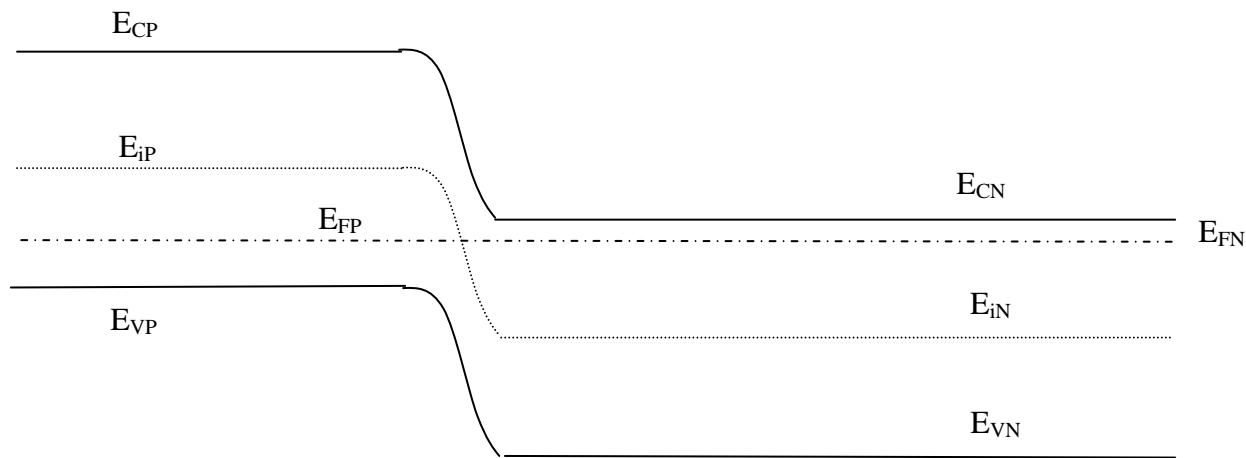
明新科技大學九十三年學年度研究所碩士班招生考試入學答案卷

- 注意：1. 試題題號務必書寫清楚，並依序於作答區範圍內作答。
 2. 請用藍色或黑色鋼筆、簽子筆或原子筆作答，不可使用鉛筆。
 3. 答案卷紙請節用，此紙耗盡，用其他紙繼續作答者無效。

↓從此欄寫起

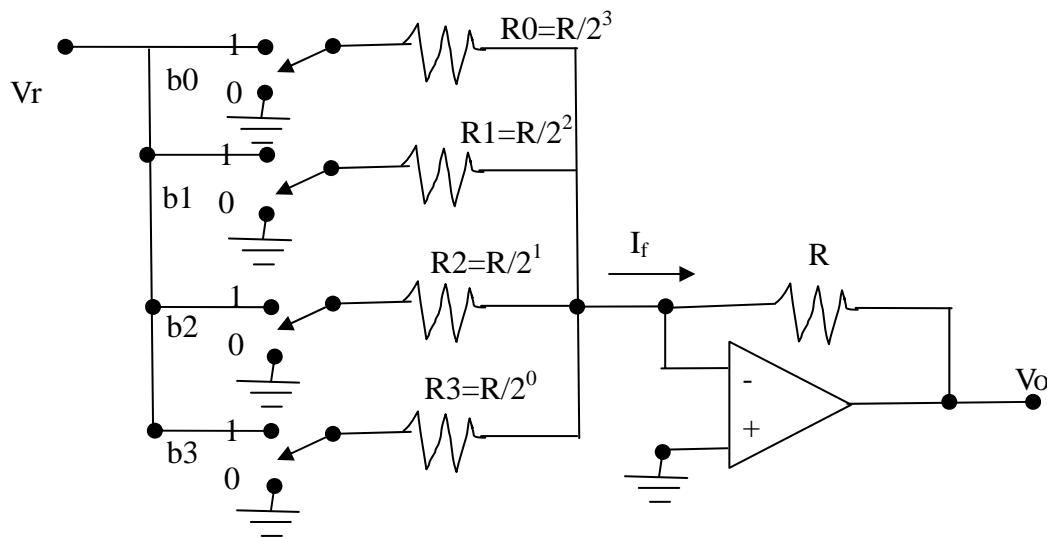
1. Mobility $\mu_n = D_n/V_T = 1300 \text{ cm}^2/\text{V}\cdot\text{s}$, $V_T = kT/q$, $\sigma = 40/(\Omega\cdot\text{m})$; concentration: (a) $n = \sigma/(q\mu) = 1.92 \times 10^{15} / \text{cm}^3$; (b). drift velocity: $v = J/(nq) = 6.51 \text{ m/s}$

2. Built-in voltage $V_0 = kT/q \ln(N_A/n_i)$ or $= qN_A W / (2\epsilon)$; built-in electric field $= V_0 / W$; transition capacitance $C_T = |dQ/dV| = \epsilon A / W$

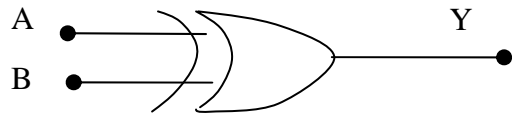


3. (a). hole number in emitter inject to base and recombine with the majority carriers, e-, of the base. (b). the majority carriers, electrons, diffuse into the emitter. (c) the thermal generation in the junction of the base and the collector. (d) Early effect: the effective base width will be decreased due to the increase of junction width between base and collector.

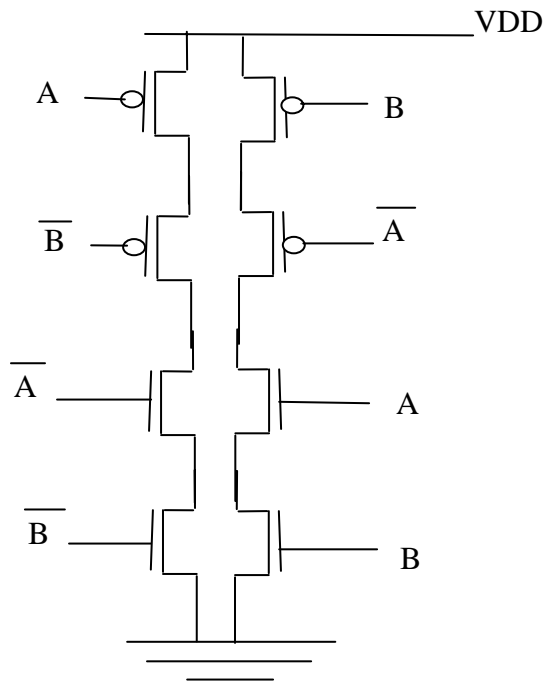
4. In general, the output voltage will be $V_o = -V_r (2^3 b_0 + 2^2 b_1 + 2^1 b_2 + 2^0 b_3)$. The switches can be made by MOSFETs.



5. The Exclusive-OR gate is expressed by $Y = A \oplus B$ where A and B are the input terminals.



A B	Y
0 0	0
0 1	1
1 0	1
1 1	0



6. For a low-frequencies $A_L(jf) = A_o / (1 - jf/f_L)$ --- (1); for high frequencies $A_H(jf) = A_o / (1 + jf/f_H)$ --- (2) (a) The 3-dB high frequency for the amplifier with feedback is $f_{Hf} = (1 + \beta A_o) f_H = 51 f_H$. At this frequency the gain of the amplifier without feedback is, from (2), $A_H(jf_{Hf}) = A_o / (1 + j51)$ and $|A_H(jf_{Hf})| \sim 19.6$; The 3-dB low frequency with feedback is $f_{Lf} = f_L / (1 + \beta A_o) = f_L / 51$. At this frequency we have, from (1), $A_L(jf_{Lf}) = A_o / (1 - j51)$ and, again, $|A(jf_{Lf})| \sim 19.6$ (b) $f_{Hf}/f_H = 51$ and $f_{Lf}/f_L = 1/51$ (c) $f_{Hf} = 51 f_H = 1.53 \text{ MHz}$; $f_{Lf} = 10/51 = 0.196 \text{ Hz}$

