

中国科学院 & 中国科学技术大学

2004 年硕士学位研究生入学考试试题参考答案

试题名称：电子线路

一. (20分)

(5分) (1) $V_o = A_v V_i + V_{o\text{静}}$

$$\begin{cases} 7 = A_v \times 0.01 + V_{o\text{静}} \\ 6.5 = A_v \times 0.015 + V_{o\text{静}} \end{cases} \Rightarrow A_v = -100$$

(5分) (2) $f_T = A_o \cdot f_{3dB}$

$$\therefore A_o = \frac{f_T}{f_{3dB}} = \frac{10\text{MHz}}{10^4\text{Hz}} = 10^3$$

$$\therefore \text{反馈深度 } D = 1 + A_o F = 1 + 10^3 \times 10^{-1} \approx 100$$

$$\Rightarrow \text{闭环 } A_{f0} = \frac{A_o}{D} = 10$$

$$f_{3dB} = D \cdot f_{3dB} = 100 \times 10^4 = 10^6 \text{ Hz}$$

(5分) (3) $n=3$ 级

$$\therefore B_{\Sigma} = \sqrt{2^n - 1} B_i \Rightarrow B_i = \frac{5\text{MHz}}{0.51} = 9.8\text{MHz}$$
$$A_i = f_T / B_i = 10.2$$

$$n=3 \text{ 时 } A_{\Sigma} = A_i^3 = 1061.$$

(5分) (4) $f_s < f_p = f_o < f_1$