

## 臺北市立南港高工 97 學年度教師甄選筆試命題試題紙

甄選科別：電子科

科目：電子電路

解答

$$1. \quad R_{BB} = 33.3k\Omega, \quad V_{BB} = 12V \times \frac{50k\Omega}{100k\Omega + 50k\Omega} = 4V$$

$$I_{E1} = \frac{4V - 0.7V}{\frac{33.3k}{1+100} + 3k} = 0.98mA$$

$$V_{C1} = 12V - 0.98mA \times 5k = 12V - 4.9V = 7.1V$$

$$V_{E2} = 7.1V + 0.7V = 7.8V$$

$$I_{E2} = \frac{12V - 7.8V}{2k} = 2.1mA$$

$$V_{C2} = 2.1mA \times 1k\Omega = 2.1V$$

$$2. \quad V_{GS} = 15V \times \frac{30k}{170k + 30k} = 2.25V$$

$$K = \frac{200mA}{(4V - 2V)^2} = 50mA/V^2$$

$$I_D = 50m(2.25V - 2V)^2 = 3.125mA$$

$$V_{DS} = 15V - 3.125mA \times 2k\Omega = 8.75V$$

$$3. \quad f_o = \frac{1}{2\pi \times 0.01\mu F \sqrt{\frac{50k + 2k}{50k \times 200k \times 2k}}} = 812Hz$$

$$A_o = \frac{200k}{2 \times 50k} = 2$$

$$BW = \frac{1}{\pi \times 0.01\mu F \times 200k} = 159Hz$$

$$4. \quad I_1 = I_2 = I_N = \beta \times \frac{I_{ref}}{\beta + N + 1}$$

$$\frac{I_{ref} - I_1}{I_{ref}} \times 100\% = \frac{N + 1}{\beta + N + 1} \times 100\% < 2\%$$

$$\frac{9 + 1}{\beta + 9 + 1} < \frac{1}{50}$$

$$\beta > 490$$

$$5. \quad 0.7 \times (2.2k + VR) \times 47nF + 0.7 \times 22k \times 47nF = 2ms$$

$$VR = 36.59k\Omega$$

選擇 50kΩ 最適合