

《电路与模拟电子技术》 期末试题 (A) 参考答案及评分标准

1. (10 pt)

$$4 + 4I + 5 - U =$$

$$\frac{U}{2} + 2 + I = 0 \quad (6 \text{ pt})$$

$$I = -3 \text{ A}, U = 2 \text{ V} \quad (4 \text{ pt})$$

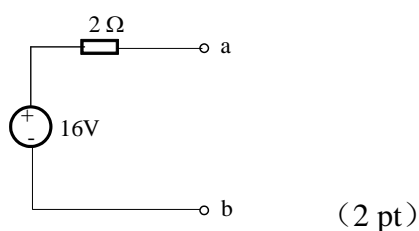
2. (10pt) 5A: $I' = \frac{5}{9} \text{ A}; \quad (3 \text{ pt})$

$$30\text{V}: I'' = \frac{5}{9} \text{ A} \quad (3 \text{ pt})$$

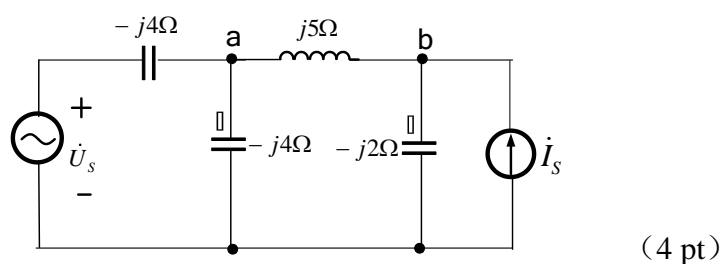
$$I = \frac{10}{9} = 1.11 \text{ A} \quad (1 \text{ pt})$$

3. (15pt) $U_{OC} = 16 \text{ V} \quad (7 \text{ pt})$

$$R_{eq} = 2 \Omega \quad (6 \text{ pt})$$



4. (15pt)



$$\dot{U}_{ab} = 150 \angle 90^\circ \text{ V} \quad (11 \text{ pt})$$

5. (10pt)

$$V_A = (-6 + 0.7) \text{ V} = -5.3 \text{ V} \quad (5 \text{ pt})$$

$$I_D = \frac{10 - V_A}{R_1} + \frac{0 - V_A}{R_2} \approx 1.3 \text{ mA} \quad (5 \text{ pt})$$

6. (10 pt) (a) saturation distortion; $R_b \uparrow \quad (5 \text{ pt})$

(b) cutoff distortion; $R_b \downarrow \quad (5 \text{ pt})$

7. (15pt)

$$1) I_B = \frac{V_{CC} - V_{BE}}{R_b + (1 + \beta)R_e}, \quad I_E \approx I_C = \beta I_B, \quad V_{CE} = V_{CC} - I_E R_e \quad (5 \text{ pt})$$

2) Draw the Small-Signal equivalent circuit (2 pt)

$$r_{be} \approx (1 + \beta) \frac{26mV}{I_E}, \quad A_v = \frac{v_o}{v_i} = \frac{(1 + \beta)(R_e // R_L)}{r_{be} + (1 + \beta)(R_e // R_L)} \quad (4 \text{ pt})$$

$$R_i = R_b // [r_{be} + (1 + \beta)(R_e // R_L)] \quad (2 \text{ pt})$$

$$R_o = R_e // \frac{r_{be}}{(1 + \beta)} \quad (2 \text{ pt})$$

$$8. (15pt) \quad v_{O1} = (1 + \frac{R_2}{R_1})v_{I1} \quad (6 \text{ pt})$$

$$\frac{v_{O1} - v_{I2}}{R_2} = \frac{v_{I2} - v_O}{R_1} \quad (6 \text{ pt})$$

$$v_O = (1 + \frac{R_1}{R_2})(v_{I2} - v_{I1}) \quad (3 \text{ pt})$$