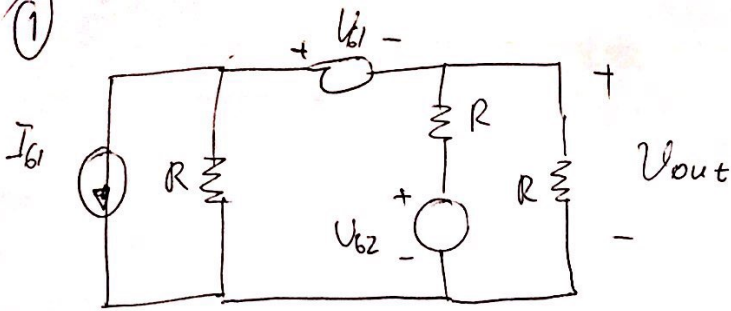


①



$$\bar{I}_G = \overset{U_{G1}: OFF}{U_{G2}: ON} R \parallel R = \frac{R}{2} \quad \bar{I}_r = \frac{U_{G2}}{R + \frac{R}{2}} = \frac{2}{3} \frac{U_{G2}}{R}$$

$$V_{OUT} = \frac{U_{G2}}{3}$$

$$I_G: ON, U_{G2}: OFF, U_{G1}: OFF$$

$$I_G: OFF, U_{G1}: ON, U_{G2}: OFF$$

$$V_{OUT}'' = -\frac{1}{3} I_{G1} R$$

$$V_{OUT}''' = -\frac{1}{3} U_{G1}$$

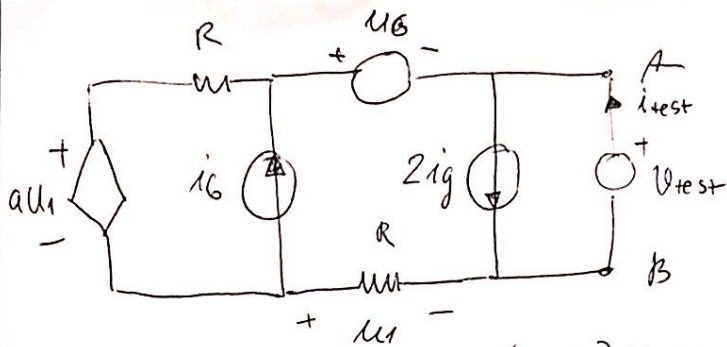
$$V_{OUT} = \frac{1}{3} (U_{G2} - U_{G1} - I_{G1} R)$$

$$-U_{G1} - V_{OUT} = U_X = -U_{G1} - \frac{1}{3} U_{G2} + \frac{1}{3} U_{G1} + \frac{1}{3} I_{G1} R$$

$$U_X = \frac{1}{3} I_{G1} R - \frac{2}{3} U_{G1} - \frac{1}{3} U_{G2}$$

$$U_X = \frac{1}{3} (I_{G1} R - 2U_{G1} - U_{G2})$$

$$P_{I_{G1}} = \frac{1}{3} I_G (I_{G1} R - 2U_{G1} - U_{G2})$$



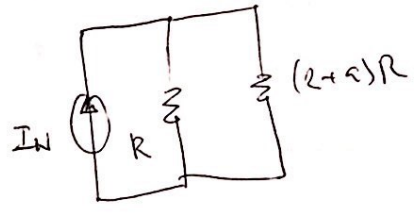
$$(1+a)u_1 = -2(1+a)igR$$

$$u_1 = -2igR$$

$$u_1 + a u_1 - igR - U_G = U_{AB}$$

$$-2(1+a)igR - igR - U_G = U_{AB}$$

$$U_{AB} = -igR(3+2a) - U_G = U_T$$



$R_T$ :

$$U_{test} = (1+a)R i_{test} + R i_{test} =$$

$$= R i_{test} (2+a)$$

$$u_1 = i_{test} \cdot R$$

$$i_{test} = \frac{U_{test}}{R(2+a)}$$

$$U_{test} = u_1 + a u_1 + R i_{test}$$

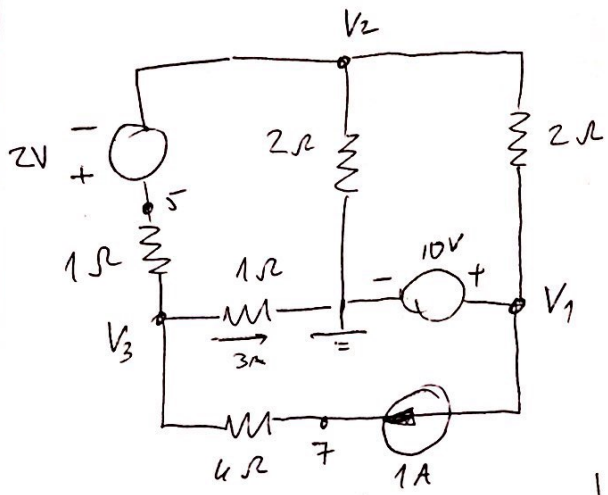
$$R_{TEV} = (2+a)R$$

$$I_N = \frac{-igR(2a+3) - U_G}{(2+a)R}$$

$$= -\frac{igR(2a+3) + U_G}{(2+a)R} = I_N$$

$$I_R = \frac{(2+a)R}{(2+a)R + R} \cdot I_N = \frac{2+a}{3+a} I_N = -\frac{igR(2a+3) + U_G}{(3+a)R}$$

$$P = I_R^2 \cdot R = \frac{(igR(2a+3) + U_G)^2}{R(3+a)^2}$$



$V_1 = 10V$   
 $V_2 \left( \frac{1}{2} + \frac{1}{2} + 1 \right) - \frac{1}{2} V_1 - V_3 = -2$

$2V_2 - 5 - V_3 = -2$   
 $2V_2 - V_3 = 3$

$V_3 \left( \frac{1}{1} + \frac{1}{1} \right) - V_2 = 3$   
 $2V_3 - V_2 = 3$

$2V_2 - 2V_3 = 6$

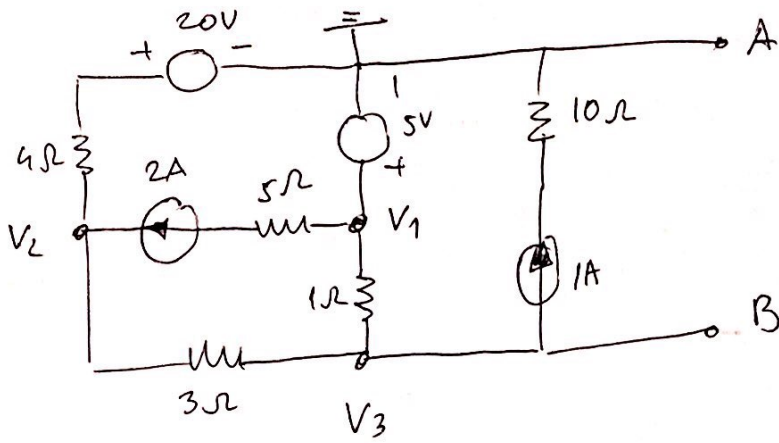
$2V_3 - V_2 = 3$

$3V_2 = 9$      $V_2 = 3V$      $V_3 = 3V$

$3 - 10 = -7$

$I_A = 3A$      $I_C = -3.5A$      $I_B = -2A$      $I_D = -4.5$

$P_{2V} = 4W$      $P_{10V} = 45W$      $P_{1A} = -3W$



$$V_1 = 5V \quad V_2 \left( \frac{1}{4} + \frac{1}{3} \right) - \frac{1}{3} V_3 = 7 \quad | \cdot 12$$

$$7V_2 - 4V_3 = 84$$

$$V_3 \left( \frac{1}{3} + 1 \right) - \frac{1}{3} V_2 - V_1 = -1 \quad | \cdot 3$$

$$4V_3 - V_2 - 3V_1 = -3$$

$$4V_3 - V_2 = 12$$

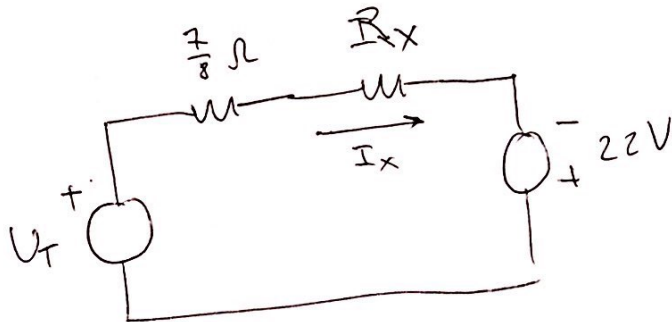
$$6V_2 = 96$$

$$V_2 = 16V$$

$$V_3 = 7V$$

$$V_T = -7V \quad R_T = \frac{7}{8} \Omega$$

$$\frac{7 \cdot 1}{7+1} = \frac{7}{8}$$



$$I_x = 8A$$

$$I_x \left( R_x + \frac{7}{8} \right) - V_T - 22 = 0$$

$$R_x + 7 = 15$$

$$8R_x = 8 \quad R_x = 1\Omega$$

$$P_{R_x} = 64W$$

$$P_{22V} = 176W$$