

$$\therefore V_a = 5V$$

$$\therefore V_a \left(\frac{1}{2} + 1 + \frac{1}{18} \right) - V_o \frac{1}{18} - V_b = 0$$

$$\Rightarrow V_a \frac{14}{9} - V_o \frac{1}{18} - V_b = 0$$

$$\Rightarrow 28V_a - 18V_b - V_o = 0$$

closed loop #14

$$\Rightarrow 18V_b + V_o = 140 \text{ --- (I)}$$

$$\therefore V_b \left(1 + \frac{1}{3} + \frac{1}{4} \right) - V_o \frac{1}{4} - V_a = 0$$

$$\Rightarrow V_b \frac{19}{12} - V_o \frac{1}{4} = 5$$

$$\Rightarrow 19V_b - 3V_o = 60 \text{ --- (II)}$$

$$\textcircled{I}, \textcircled{II} \Rightarrow$$

$$V_b = 6.57V$$

$$V_o = 21.6V$$

$$\frac{2-V}{2} + \frac{2-4}{3} = 0$$

$$\Rightarrow V = 0.66$$

closed loop #18

$$\frac{4-2}{3} + \frac{4-V}{2} = 0$$

$$\Rightarrow V = 5.33V$$

$$\therefore V_0 = 5V$$

240

$$V_1 = \frac{5}{3} V$$

closed loop #16

~~40~~

$$\frac{\frac{5}{3} - 1}{20} + \frac{\frac{5}{3} - V_2}{10} = 0$$

$$\Rightarrow \frac{1}{30} + \frac{1}{6} - \frac{V_2}{10} = 0$$

$$\Rightarrow V_2 = 2V$$

$$\frac{2}{40} + \frac{V_o}{100} = 0$$

$$\Rightarrow V_o = -5$$

closed loop #16

$$\frac{V_i}{100} + \frac{V_i - V}{40} = 0$$

$$\Rightarrow V_i - V = -\frac{V_i \cdot 40}{100}$$

$$\Rightarrow V = \frac{7}{5} V_i$$

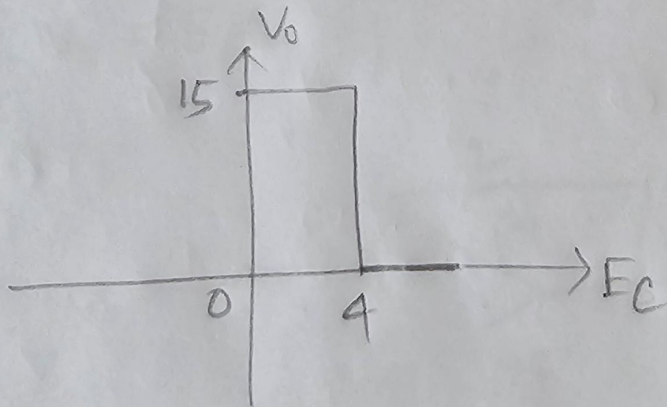
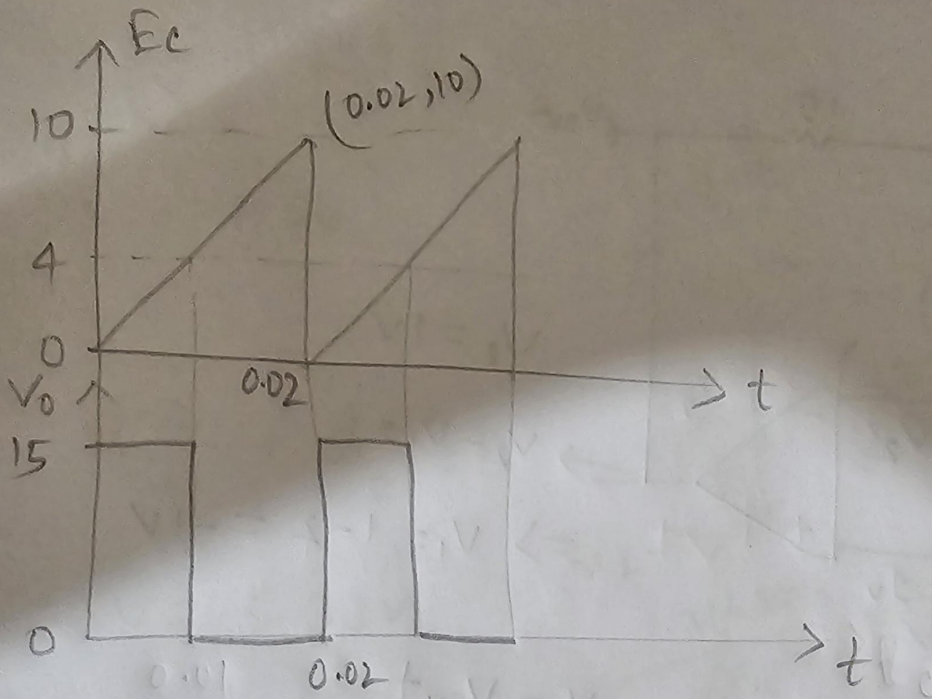
closed loop #15

$$\frac{\frac{7}{5} V_i}{50} + \frac{\frac{7}{5} V_i}{100} + \frac{V_o}{80} = 0$$

$$\Rightarrow \frac{V_o}{80} = -\frac{21 V_i}{500}$$

$$\Rightarrow \frac{V_o}{V_i} = -3.36$$

open loop #6



open loop #6

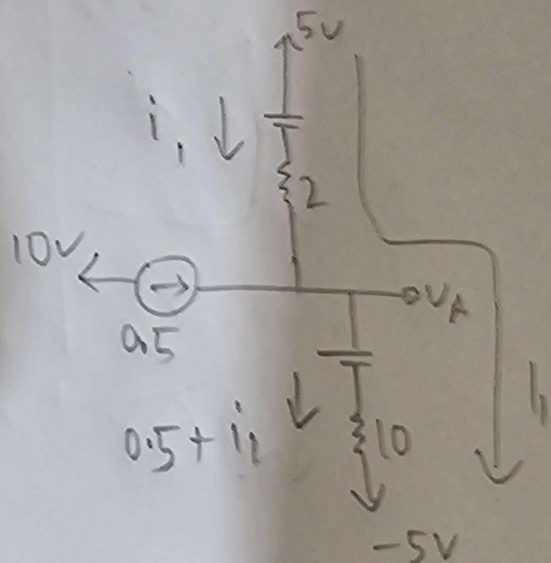
$$V = \frac{10}{0.02} t$$

$$\Rightarrow 4 = \frac{10}{0.02} t \Rightarrow t = 0.008$$

high time = 40%

assume both diode are on

diode #16



$$\cancel{-5} + 0.7 + 2i_1 + 0.7 + 10i_1 + 10 \times 0.5 - 5 = 0$$

$$\Rightarrow i_1 = 0.3$$

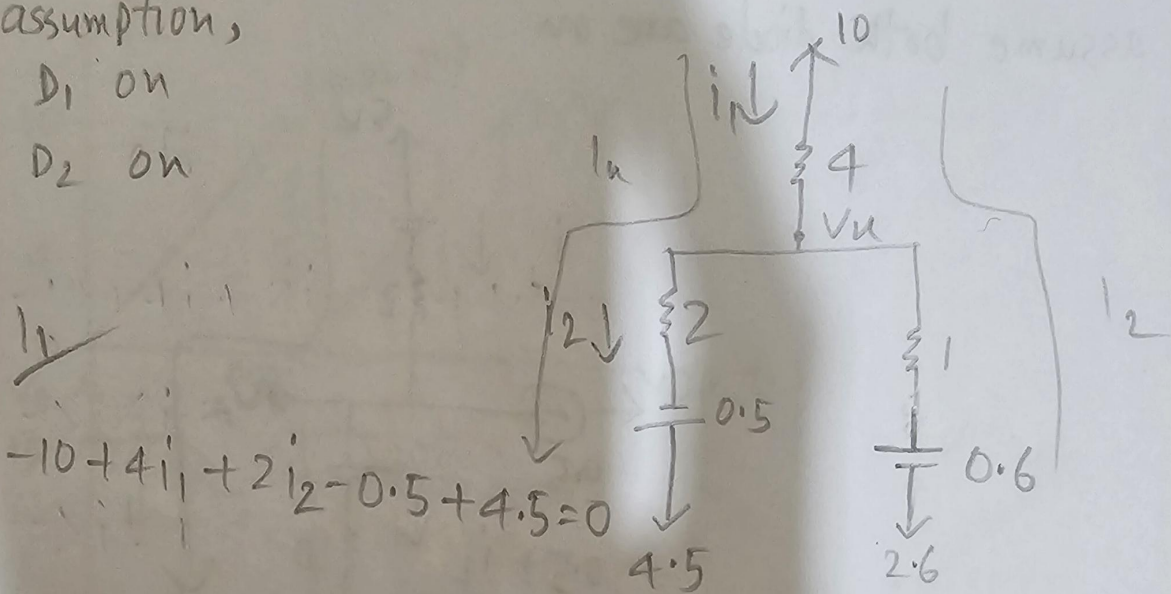
$$\therefore V_A = 0.7 + 10(0.3 + 0.5) - 5$$
$$= 3.7V$$

summer 24

assumption,

D_1 on

D_2 on



$$-10 + 4i_1 + 2i_2 - 0.5 + 4.5 = 0$$

$$\Rightarrow 4i_1 + 2i_2 = 6 \quad \text{--- (I)}$$

i_2

$$-10 + 4i_1 + i_1 - i_2 + 0.6 + 2.6 = 0$$

$$\Rightarrow 5i_1 - i_2 = 6.8 \quad \text{--- (II)}$$

$$\textcircled{I}, \textcircled{II} \Rightarrow i_1 = 1.4, i_2 = 0.2$$

$$\therefore I_{D1} = 0.2, I_{D2} = 1.2$$

summer24mid

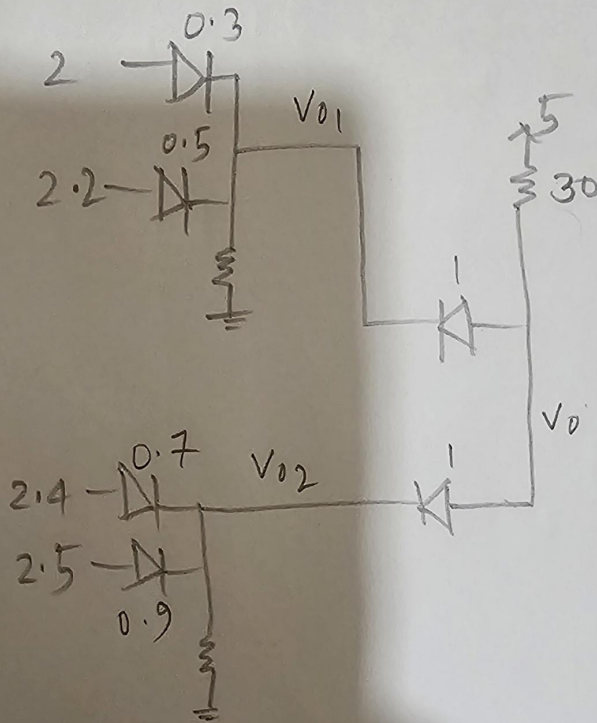
$$v_n \left(\frac{1}{4} + 1 + \frac{1}{2} \right) - \frac{10}{4} - \frac{4}{2} - \frac{3.2}{1} = 0$$

$$\Rightarrow v_n = 4.4$$

summer24mid

diode logic #11

diode logic #11



$$V_{01} = 2 - 0.3 = 2.2 - 0.5 = 1.7V$$

$$V_{02} = 2.4 - 0.7 = 1.7V$$

} maximum voltage
for OR gate

D4 off