

4) ۱۱

$$a) V_o = \sqrt{5} D = 9V_s$$

$$b) I_L = 1.8A \quad \Delta I_L = 2.4A$$

$$I_{L,max} = I_L + \frac{\Delta I_L}{2} = 2.8A$$

$$I_{L,min} = I_L - \frac{\Delta I_L}{2} = 0.4A$$

$$c) \frac{\Delta V_s}{V_s} = 0.4\%$$

4) ۹

$$L_{min} = \frac{(1-D)R}{f}$$

$$D = \frac{V_o}{V_s} \quad D_{max} = \frac{V_o}{\Delta_o} = 0.15 \quad D_{min} = \frac{V_o}{V_s} = 0.125$$

$$I_L = I_R = \frac{P_o}{V_o} \quad I_{R,min} = \frac{V_{\Delta}}{R_o} = 2.1V_{\Delta} \quad I_{R,max} = \frac{12\Delta}{R_o} = 4.125A$$

$$R = \frac{V_o}{P} \quad R_{max} = \frac{V_o \cdot r}{V_{\Delta}} = 0.125\Omega \quad R_{min} = \frac{V_o \cdot r}{12\Delta} = 2.1\Omega$$

$$L_{min} = \frac{(1-D_{min})R_{max}}{f} = \frac{(1-0.125)(0.125)}{2(100000)} = 1.14\mu H$$

4) ۱۲

$$D = \frac{V_o}{V_s} = \frac{12}{15} = 0.8$$

$$\text{Let } f = 500\text{kHz}$$

$$\text{Let } \Delta I_L = 0.1 \cdot I_L \quad I_L = 0.15 = 0.11A$$

$$L = \frac{(V_s - V_o)D}{(\Delta I_L)f} = \frac{(15-12) \cdot 0.8}{0.11 \times 500000} = 1.14\mu H$$

$$C = \frac{1 - 0.8}{1 \times 1.14 \times 10^{-4} \times 0.1 \times 500000} = 1.14\mu F$$

4) 14

a) $r_c = 0.1 \Omega$ $\Delta i_L = r_{LM} \Delta A = \Delta i_c$

$\Delta V_{DES R} = \Delta i_c r_c = 1 \mu A \times 0.1 \Omega = 1 \mu V$

$\frac{\Delta V_c}{V_c} = \frac{1 \mu V}{1 V} = 1 \%$

b) $\frac{\Delta V_c}{V_c} = 10 \%$

$r_c \frac{\Delta V_c}{\Delta i_c} = \frac{0.1 \mu A \times 1 V}{1 \mu A} = 0.1 \Omega$

$r_c = \frac{\Delta V_c (10)^{-4}}{C} \Rightarrow C = \frac{20 \times 10^{-4}}{r_c} = \frac{20 \times 10^{-4}}{0.1 \Omega} = 1400 \mu F$

4) 14

$V_o = \frac{V_s}{1-D}$ $D = 1 - \frac{V_o}{V_s} = 1 - \frac{1}{10} = 0.9$

$R = \frac{V_o}{I_o} = \frac{1 V}{1 A} = 1 \Omega$

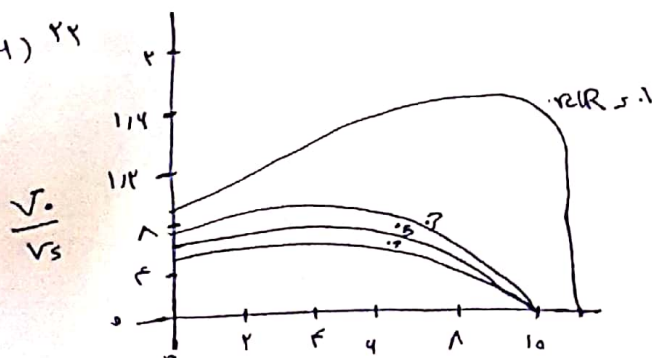
$I_L = \frac{V_s}{(1-D)R} = \frac{10}{(1-0.9) \times 1} = 10 A$

$I_{L, min} = 0.1 \times 10 = 1 A$ $\Delta I_L = 9 A$

$\Delta I_L = \frac{V_s D T}{\Delta I_L} = \frac{10 \times (0.9) / 1000}{9} = 1 \mu s$

$C = \frac{0.9 V}{900000} = 1 \mu F$

4) 14



4) 14 $D = \frac{1 V_o}{V_s + |V_o|} = \frac{1}{1+1} = 0.5$

$I_L = \frac{V_s D}{R(1-D)} = \frac{1 \times 0.5}{1 \times (1-0.5)} = 1 A$

$I_{L, min} = 0.1 \times 1 = 0.1 A$

4) 20

$$\Delta I_L = \gamma(2.4) = 1.07 \text{ A}$$

$$L = \frac{V_S D T}{\Delta I_L} = \frac{1.8 \times 4}{1.07 \times 100000} = 1.31 \mu\text{H}$$

$$C = \frac{0.4}{10 \times 1000 \times 100000} = 1.4 \mu\text{F}$$

4) 21

$$D = \frac{|V_o|}{V_S + |V_o|}$$

$$R = \frac{V_o}{P}$$

$$L_{\min} = \frac{(1-D)^2 R}{\gamma f}$$

$$I_L = \frac{P}{V_S D}$$

$$C = \frac{D}{R \frac{\Delta V_o}{V_o} f}$$

$V_S(\text{V})$	$P(\text{W})$	D	$R(\Omega)$	$L_{\min}(\mu\text{H})$	$I_L(\text{A})$	$C(\mu\text{F})$
10	10	0.125	1.6	1.4	1.12	2.4
10	10	0.125	1.6	1.4	1.12	2.4
15	6	0.144	1.5	1.4	1.12	3.2
15	10	0.144	1.5	1.4	1.12	3.2

4) 20

$$D = \frac{1}{1 - \frac{V_S}{V_o}} = \frac{1}{1 - \frac{10}{-10}} = 0.5$$

$$I_{Lr} = I_o = 1 \text{ A}$$

$$I_{L1} = \frac{V_o}{V_S} I_{Lr} = 1 \text{ A}$$

$$\Delta I_{L1} = \frac{V_S D}{L_1 f}$$

$$L_1 = \frac{V_S D}{\Delta I_{L1} f} = \frac{10 \times 0.5}{0.1 \times 100000} = 5 \text{ mH}$$

$$\Delta I_{Lr} = \frac{V_S D}{L_r f}$$

$$L_r = \frac{V_S D}{\Delta I_{Lr} f} = \frac{10 \times 0.5}{0.1 \times 100000} = 5 \text{ mH}$$

4) 20

$$I_{L1} = I_S = \frac{V_o}{V_S R} = \frac{4}{10 \times 1} = 0.4 \text{ A}$$

$$D = \frac{V_o}{V_o + V_S} = \frac{4}{4 + 10} = 0.286$$

$$L_1 = \frac{V_S D}{(\Delta I_{L1}) f} = \frac{10 \times 0.286}{0.1 \times 100000} = 2.86 \mu\text{H}$$

$$I_{Lr} = I_o = \frac{V_o}{R} = \frac{4}{1} = 4 \text{ A}$$

$$L_r = \frac{V_S D}{\Delta I_{Lr} f} = \frac{10 \times 0.286}{0.1 \times 100000} = 2.86 \mu\text{H}$$

4) १८

$$V_{Cr} = V_o = 4$$

$$\Delta V_{Cr} = \Delta V_o = \frac{V_o D}{RC_p f}$$

$$C_r = \frac{0.1 \times 4}{2 \times 10^4 \times 500000} = 1.4 \mu F$$

$$C_1 = C_r = 1.4 \mu F$$

4) १८

$$V_L = V_s - V_o$$

$$V_L = V_o - V_D$$

$$(V_s - V_o)DT + (V_o - V_D)(1-D)T = 0$$

$$V_o = V_D - (V_s - V_o) \frac{D}{1-D}$$