

Wenue! E. Diargos  
BSECE - 201

1.) ①  $V_S = 220V_{ac}$

②  $V_{CM2} = \frac{1}{15} \cdot 220V$

$V_{(N2)} = 14.67V \approx 15V$

where  $V_{(N3)} = V_{(N2)}$

$V_{(N3)} = 14.67V \approx 15V$

$$R_1 = \frac{V^2}{P} = \frac{(14.67)^2}{0.1k}$$

$$R_1 = 2.15W$$

$$R_2 = \frac{V^2}{P} = \frac{(14.67)^2}{0.1k}$$

$$R_2 = 2.15W$$

2.)  $I_{Z(max)} = \frac{2W}{12}$

$$I_{Z(max)} = 0.167A \approx 166.67mA$$

3.) where  $I_E = 1.13mA$

$$\therefore \frac{I_E}{2} = \frac{1.13mA}{2} = 0.565mA$$

$$r_{e1} = r_{e2} = r_{e3} = \frac{20mV}{0.565mA} = 35.02\Omega$$

where:

$$Z_i = 2B r_e$$

$$= 2(100)(35.02\Omega) = 9.20k\Omega$$

$$A_v = \frac{R_C}{2r_e} = \frac{10k}{2(35.02)} = 142.86$$

$$A_{vd} = \frac{R_C}{r_e} = \frac{10k}{35.02} = 285.71$$

$$A_{vc} = \frac{10k}{2(10k)} = 0.5$$

$$CMRR = \frac{A_{vd}}{A_{vc}}$$

$$= \frac{285.71}{0.5}$$

$$CMRR = 571.42$$

$$CMRR(dB) = 20 \log(571.42)$$

$$CMRR(dB) = 55.14dB$$

4.) @ Current Mirror Circuit

where:  $I_C \approx I_x$

$$I_x = \frac{12 - 0.7}{10k} = 1.13mA$$

$$I_x \approx I_E$$

$$I_E = 1.13mA$$

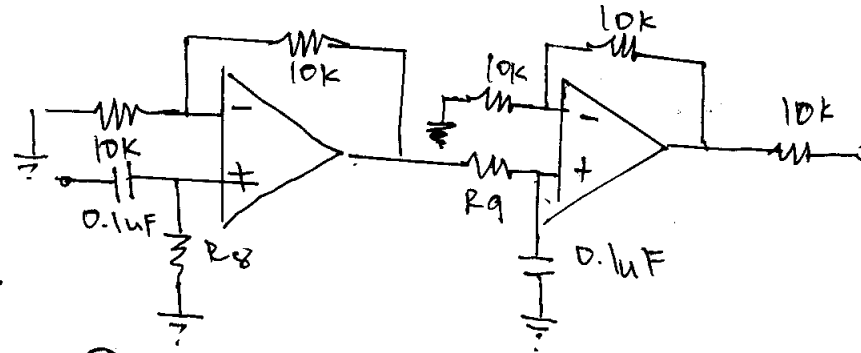
5.) maximum power output ( $P_o$ )  
where  $P_o = ?$

$$P_o = \frac{(V_{cc})^2}{2R_L} = \frac{(12)^2}{2(8)}$$

$$P_o = 9W$$

b.) @ 2nd pass Filter:

$$f_0 = 1\text{kHz} \quad \& \quad BW = 1\text{kHz}$$



@ :  $R_8$

$$f_0 = \frac{1}{2\pi R_8 C_1}$$

$$\therefore R_8 = \frac{1}{2\pi (1\text{kHz}) (0.1\mu\text{F})}$$

$$R_8 = 1.59\text{k}\Omega$$

7.)  $V_{UTP} = ?$  &  $V_{LTP} = ?$

$$V_{UTP} = \frac{R_2}{R_1 + R_2} (+V_{sat})$$

$$= \frac{(10) 10\text{k}}{10\text{k} + 10\text{k}}$$

$$V_{LTP} = \frac{R_2}{R_1 + R_2} (-V_{sat})$$

$$= \frac{10\text{k}}{10\text{k} + 10\text{k}} (-10\text{V})$$

@  $R_9$

$$f_0 = \frac{1}{2\pi R_9 C_2}$$

$$\therefore R_9 = \frac{1}{2\pi (1\text{kHz}) (0.1\mu\text{F})}$$

$$R_9 = 1.59\text{k}\Omega$$

$$V_{UTP} = 5\text{V}$$

$$V_{LTP} = -5\text{V}$$

Q. 1)

a)

