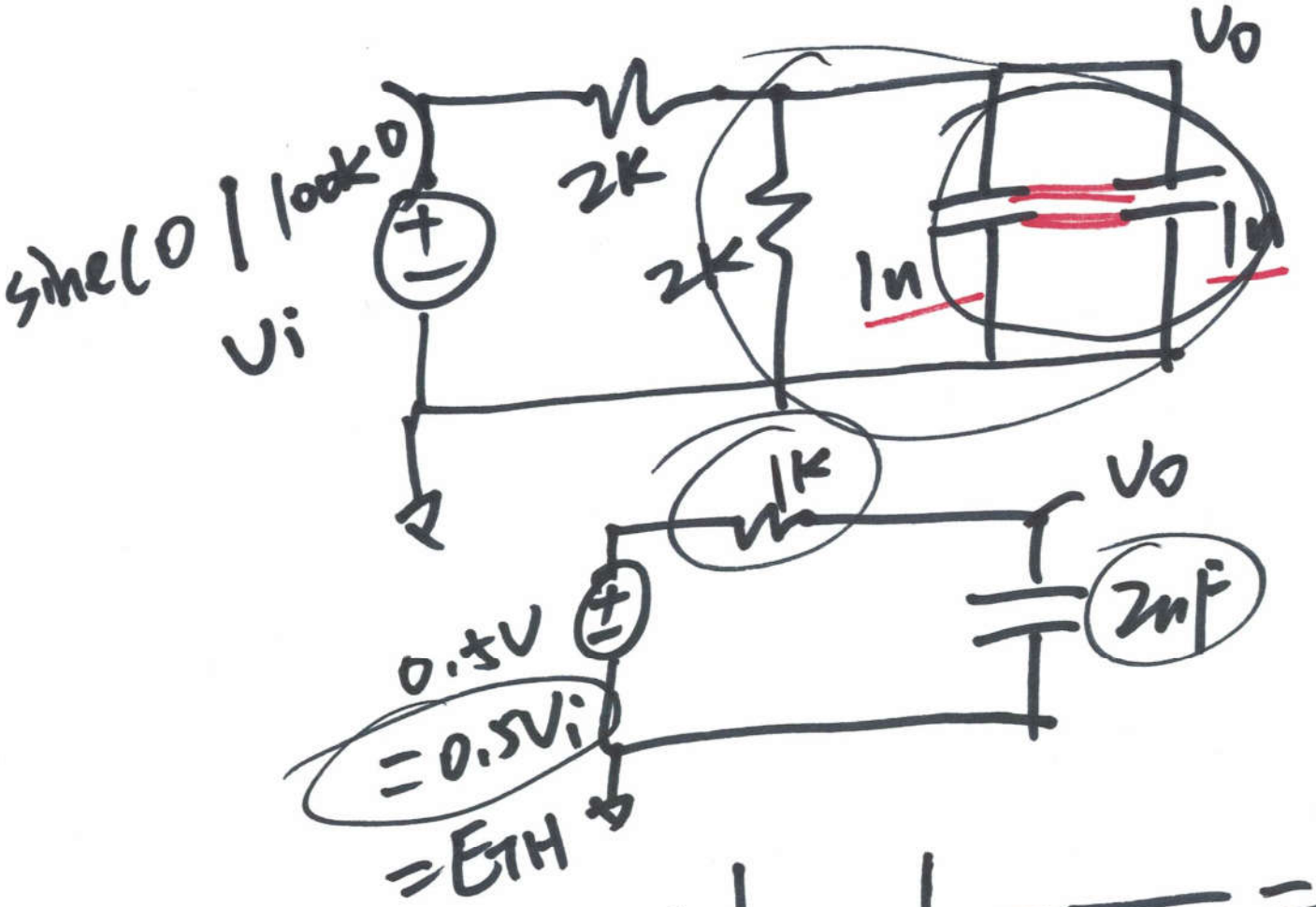


$\uparrow C = \varepsilon \frac{A\uparrow}{d}$

$V_i = a + bj$

$0.5V_i = \underline{0.5a} + \underline{0.5b}j$

① $\tan^{-1} \frac{0.5b}{0.5a}$

$\left| \frac{V_o}{0.5V_i} \right| = \frac{1}{\sqrt{1^2 + (WRC)^2}} = \frac{1}{\sqrt{1 + 1.58}} = \frac{1}{1.6}$

$WRC = 2\pi f \cdot 1K \cdot 2n = 6.28 \cdot 100k \cdot 1K \cdot 2n$

$= \underline{1.256}$

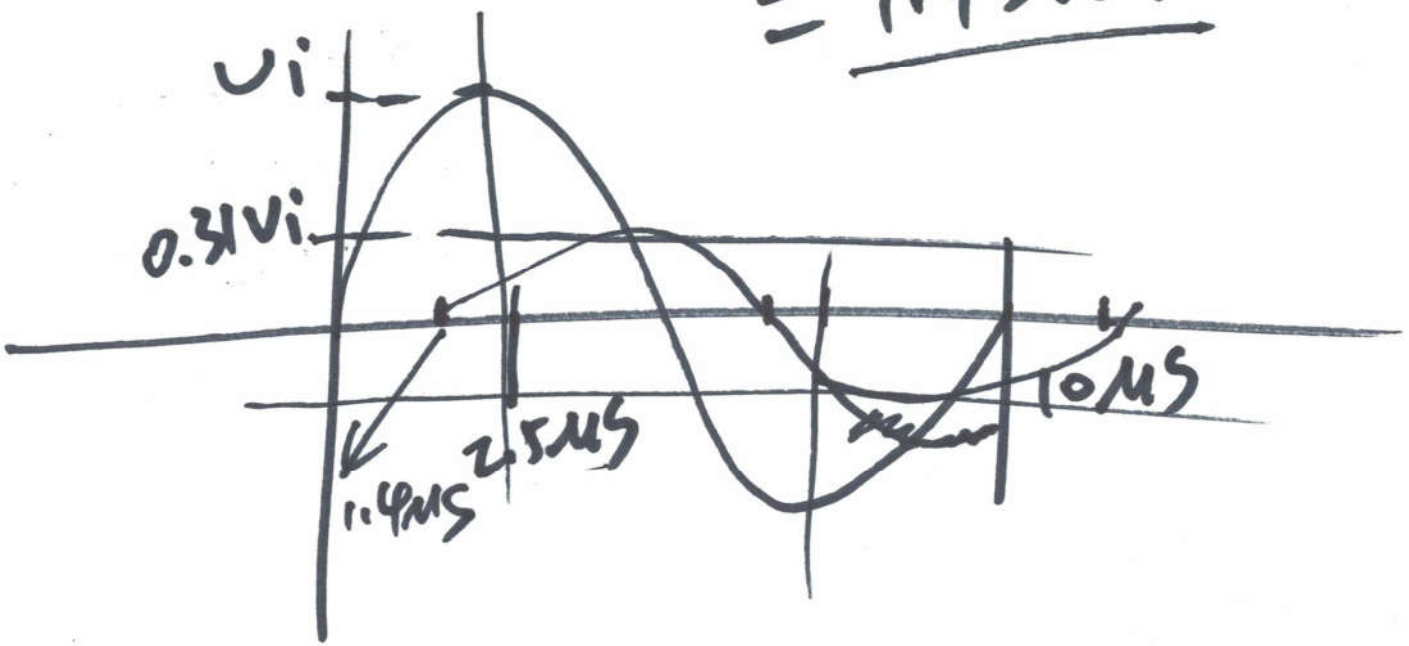
$$\left|\frac{V_o}{V_i}\right| = \frac{1}{1.6} \times 0.5 = \underline{0.31}$$

$$\Delta\theta = \angle V_o - \angle V_i = 0 - \tan^{-1} \omega RC$$

$$= -\tan^{-1} 1.256 = \ominus 51.47^\circ$$

$$t_d = \frac{\Delta\theta}{360^\circ} \cdot T = \frac{51.47^\circ}{360^\circ} \cdot \underline{10\mu s}$$

$$= \underline{1.43\mu s}$$

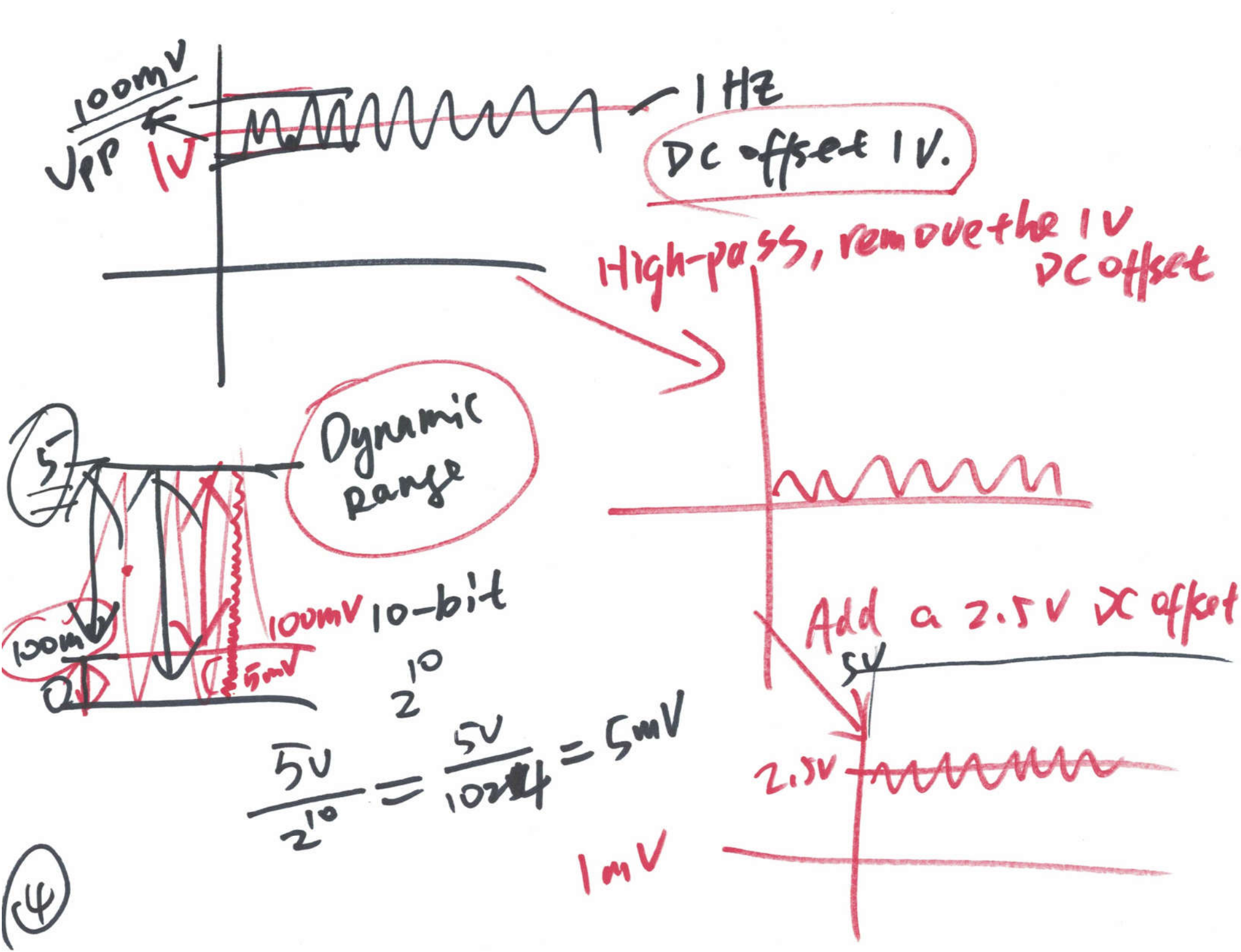


$v_i \cdot 0.5\hat{j}$

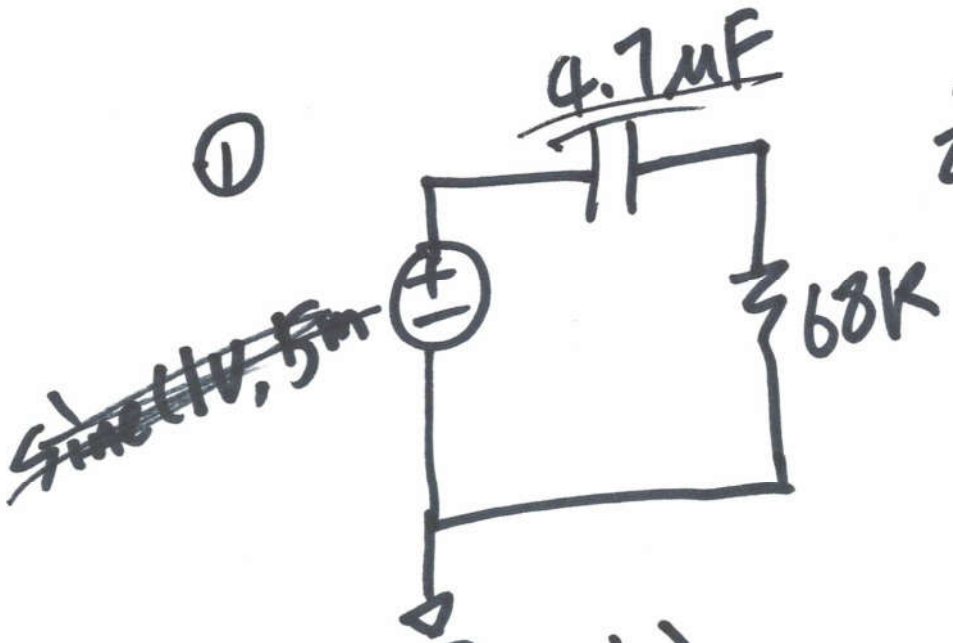
$(a+b\hat{j}) \times 0.5\hat{j} = 0.5a\hat{j} \oplus -0.5b$

$\tan^{-1} \frac{0.5a}{0.5b}$

(3)


100mV
Vpp 1V
1 Hz
DC offset 1V.
High-pass, remove the 1V DC offset
Dynamic range
5V
100mV
10-bit
100mV
5mV
$\frac{5V}{2^{10}} = \frac{5V}{1024} = 5mV$
Add a 2.5V DC offset
5V
2.5V
1mV
(4)

APC
Analog—Digital Converter



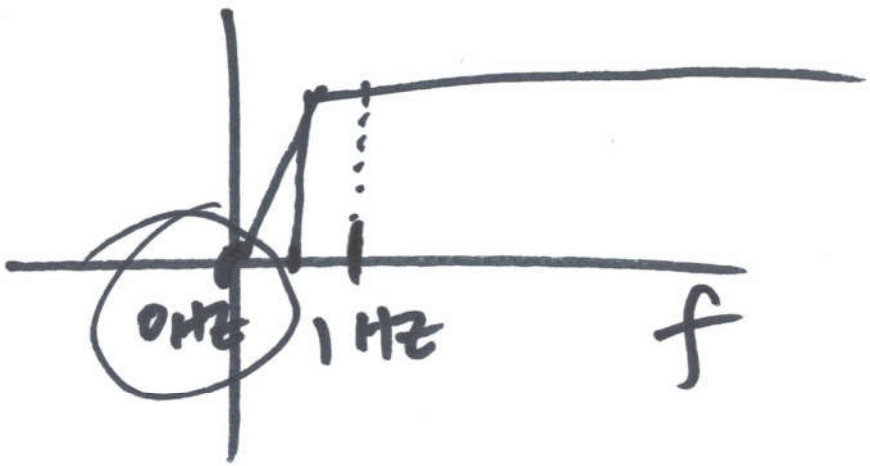
$$\frac{1}{2\pi R \cdot 4.7\mu} = 0.5$$

$$R = \frac{1}{2\pi \cdot 0.5 \cdot 4.7\mu}$$

$$= 68K$$

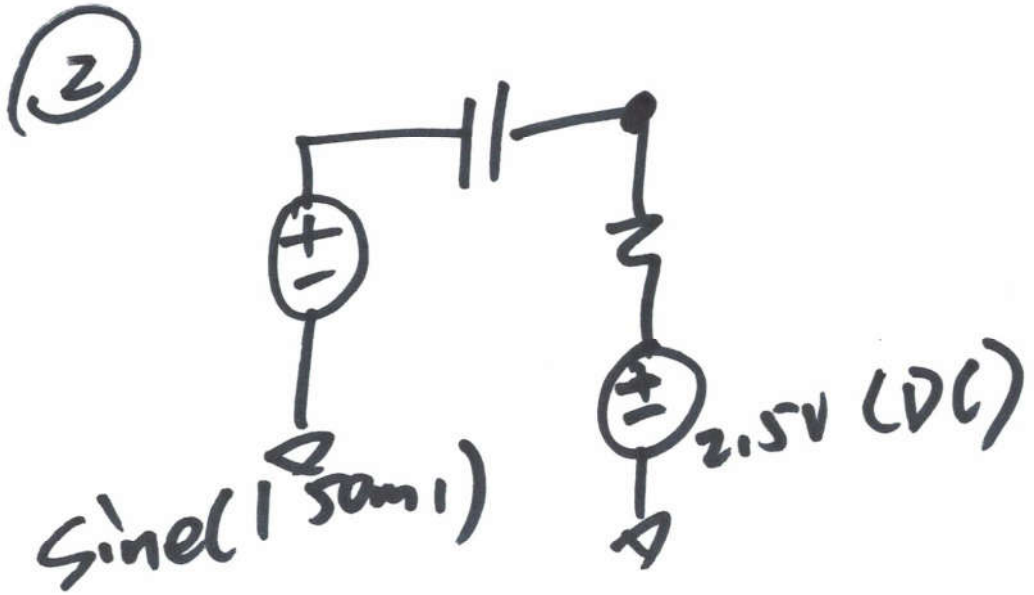
Sine(1 50m 1)

$f_c = 0.5Hz$



(3)

(2)



(6)