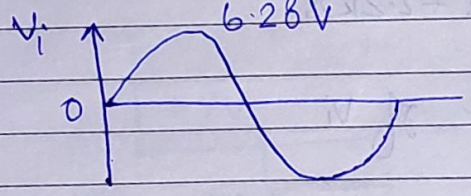
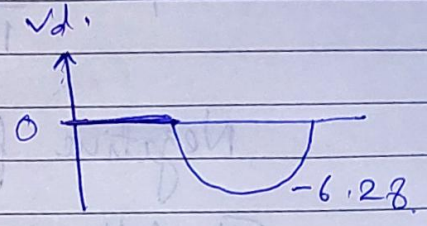
Date .....

Tutorial - 2

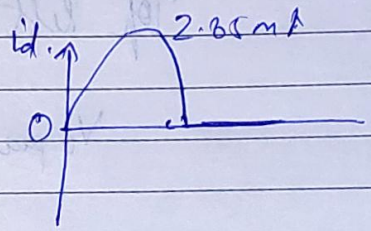
1(a) $V_{DC} = 0.318 V_m$

$V_m = \frac{V_{dc}}{0.318} = \frac{2}{0.318} = 6.28V$





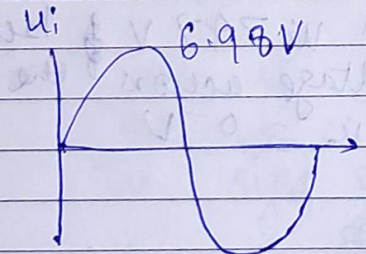
$I_M = \frac{V_M}{R} = \frac{6.28}{2.2k\Omega} = 2.85mA$

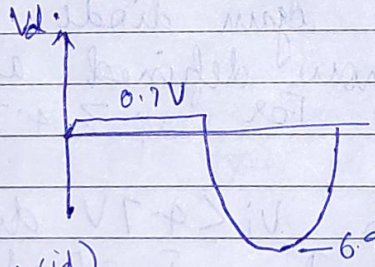


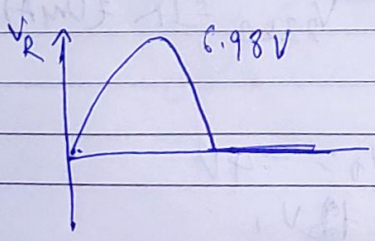
1(b) Using $V_{DC} = 0.318(V_m - V_T)$

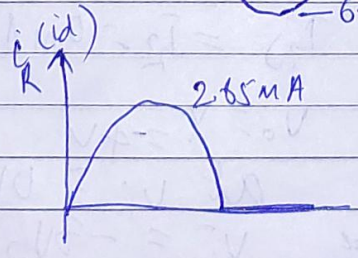
$2V = 0.318(V_m - 0.7V)$

Solving $V_m = 6.98V \cong 10:1$ for $V_m : V_T$









Date .....

2. Positive pulse of v_i

Top left diode on, bottom left diode off

$\Rightarrow$ 1.1kΩ

$$V_{opeak} = \frac{1.1k\Omega(170V)}{1.1k\Omega + 2.2k\Omega} = 56.67V.$$

Negative pulse of v_i

Top left diode on bottom left diode off

$$\therefore V_{o\,peak} = \frac{1.1k\Omega(170V)}{1.1k\Omega + 2.2k\Omega} = 56.67V$$

$$V_{dc} = 0.636(56.67V) = 36.04V$$

3. (a) Diode on for $v_i \geq 4.7V$

For $v_i > 4.7V$, $v_o = 4V + 0.7V = 4.7V$

For $v_i < 4.7$, diode off & $v_o = v_i$

(b) Again diode on for $v_i \geq 4.7V$ but v_o now defined as voltage across the diode

For $v_i \geq 4.7V$ $v_o = 0.7V$

For $v_i < 4.7V$ diode off

$I_D = I_R = 0mA$ & $V_{2.2k\Omega} = IR = (0mA)R = 0V$

$\therefore v_o = v_i = -4V$

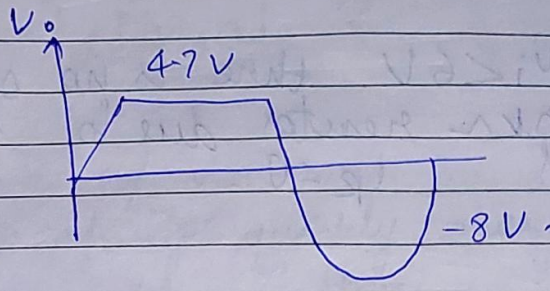
at $v_i = 0V$, $v_o = -4V$

$v_i = -8V$, $v_o = -12V$,

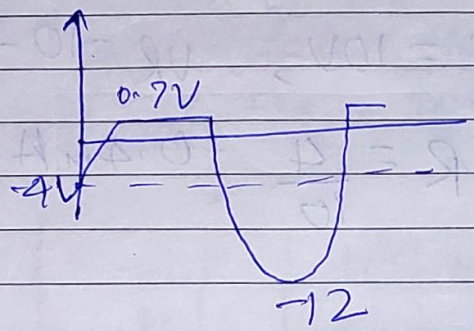
Spiral

Date .....

(a)



(b)



4. For the V_i

The right Si diode is reverse biased

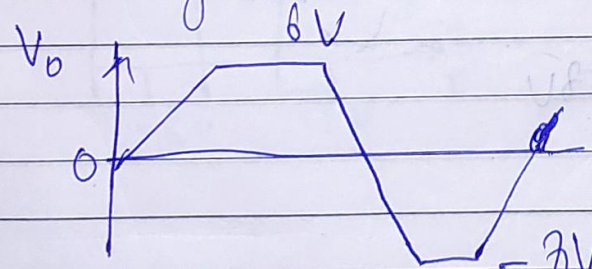
The left Si diode is on for levels of $V_i \geq 6V$.

For $V_i < 6V$ both diodes are reverse biased & $V_o = V_i$

For $-ve$ V_i

The left Si diode is reverse biased

The right Si diode is on for $V_i \leq -8V$.



Date .....

ip: For $-8V < V_i \leq 6V$ there is no conduction through 10kΩ resitor due to lack of complete ckt. $i_R = 0$.

For $V_i \geq 6V$:

$$V_R = V_i - 6V.$$

For $V_i = 10V$, $V_R = 10 - 6 = 4V$.

$$i_R = \frac{4}{10} = 0.4mA$$

For $V_i \leq -8V$.

$$V_R = V_i - V_o = V_i + 8.$$

for $V_i = -10V$.

$$V_R = 10 + 8 = 2V.$$

$$i_R = \frac{-2}{10} = -0.2mA.$$