3.2

(a) The diode is conducting and since it is ideal, the voltage drop across it is 0 V.

Hence, \( V = -3 \) V.

\[
I = \frac{3 - (-3)}{10 \, \text{k}\Omega} = 0.6 \, \text{mA}.
\]

(b) Diode is cutoff, hence

\( V = 3 \) V

and \( I = 0 \, \text{A} \).

(c) Diode is conducting here.

\( V = 3 \) V.

\[
I = \frac{3 - (-3)}{10 \, \text{k}\Omega} = 0.6 \, \text{mA}.
\]
(a) 

Diode is cutoff
so,
\[ V = -3V \]
\[ I = 0A \]

(b) 
\[ V_{p+} = 10V, \quad V_{p-} = 0V, \quad f = 1\text{kHz} \]

(c) 
\[ V_{p+} = 0V, \quad V_{p-} = -10V, \quad f = 1\text{kHz} \]

\[ V_c = 0V. \]

(NEITHER DIODE D1 CONDUCTS
\[ \Rightarrow \] NO OUTPUT.)
(d) \[ V_{p+} = 10V, \ V_{p-} = 0V, \ f = 1kHz \]
Both \( D_1 \) and \( D_2 \) conduct when \( V_I > 0V \).

(e) \[ V_{p+} = 10V, \ V_{p-} = -10V, \ f = 1kHz \]
\( D_1 \) conducts when \( V_I > 0 \) and \( D_2 \) conducts when \( V_I < 0 \),
Thus, the output follows the input.

(f) \[ V_{p+} = 10V, \ V_{p-} = 0V, \ f = 1kHz \]
\( D_1 \) is cutoff when \( V_I < 0V \).
(g) \[ V_{p+} = 0V, \; V_{p-} = -10V, \; f = 1kHZ \]

(D) shows low ground when \( u_I \geq 0 \) and is cutoff when \( u_I < 0 \), whereby the output follows \( u_I \).

(h) \[ V_0 = 0V \]

\( V_0 = 0V \). The output is always shorted to ground as D1 conducts when \( u_I \geq 0 \) and D2 conducts when \( u_I < 0 \).

(i) \[ V_{p+} = 10V, \; V_{p-} = -5V, \; f = 1kHZ \]
- When $V_I > 0$, D1 is cutoff and $V_o$ follows $V_I$.
- When $V_I < 0$, D1 is conducting and the circuit becomes a voltage divider where the negative peak is,
\[
-10V \cdot \frac{1k\Omega}{1k\Omega + 1k\Omega} = -5V
\]

![Graph](image)

$V_{p+} = 10V$, $V_{p-} = -5V$, $f = 1k\Omega$

- When $V_I > 0$, the output follows the input as D1 is conducting.
- When $V_I < 0$, D1 is cutoff and the circuit becomes a voltage divider.

![Graph](image)

$V_{p+} = 1V$, $V_{p-} = -9V$, $f = 1k\Omega$

- When $V_I > 0$, D1 is cutoff and D2 is conducting, the output becomes 1V.
- When $V_I < 0$, D1 is conducting and D2 is cutoff. The output becomes $V_o = V_i + 1V = -10 + 1 = -9V$. 