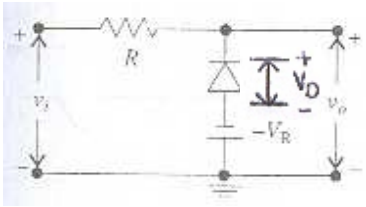
negative peak or positive base clipper:

Circuit diagram of negative peak clipper is shown in figure.



Case (i) : consider for a diode $R_f = 0$, $R_r = \infty$, $V_\gamma = 0$ (diode is an idle one)

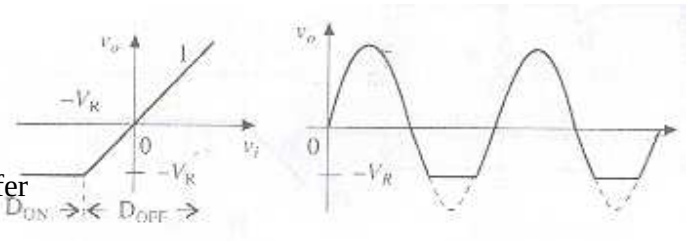
Now for the given circuit, $V_D = V_i - (-V_R)$
If $V_i > -V_R$, V_D =positive value so diode is in OFF state(replaced with open circuit)
Then $V_O = Vi$

If $V_i < -V_R$, V_D =negative value so diode is in ON state(replaced with short circuit)
Then $V_O = -V_R$
Here the input waveform below the reference level ($-V_R$) has been clipped means negative peak(positive base)of the input signal is clipped.

Transfer characteristics:

If $V_i > -V_R$, Then $V_O = V_i$ so slope of transfer characteristics curve is one

If $V_i < -V_R$, Then $V_O = -V_R$ so slope of transfer characteristics curve is zero



Case (ii) : consider for a diode $R_f = 0$, $R_r = \infty$, $V_\gamma \neq 0$ (by replacing diode with simplified equivalent circuit)

Now for the given circuit, $V_D = V_i - [-(V_R + V_\gamma)]$

If $V_i > -(V_R + V_\gamma)$, V_D = positive value so diode is in OFF state

Then $V_O = Vi$

If $V_i < -(V_R + V_\gamma)$, V_D =negative value so diode is in ON state

Then $V_O = -(V_R + V_\gamma)$

Here the input waveform below the level $-(V_R + V_\gamma)$ has been clipped

Transfer characteristics:

If $V_i > -(V_R + V_\gamma)$, Then $V_O = V_i$ so slope of transfer characteristics curve is one

If $V_i < -(V_R + V_\gamma)$, Then $V_O = -(V_R + V_\gamma)$ so slope of transfer characteristics curve is zero

Case (iii) : consider for a diode $R_f \neq 0$, $R_r = \infty$, $V_\gamma \neq 0$ (by replacing diode with piece wise linear equivalent circuit)

Now for the given circuit, $V_D = V_i - [-(V_R + V_\gamma)]$

If $V_i > -(V_R + V_\gamma)$, V_D = positive value so diode is in OFF state
Then $V_O = Vi$

If $V_i < -(V_R + V_\gamma)$, V_D =negative value so diode is in ON state

$V_O = -[(V_R + V_\gamma) + i R_f]$

$V_O = -[(V_R + V_\gamma) + (R_f /R + R_f) [V_i -(V_R + V_\gamma)]]$

$V_O = -[(V_R + V_\gamma)(R /R + R_f) + V_i (R_f /R + R_f)]$

$V_O = -[(V_R + V_\gamma) + V_i (R_f /R + R_f)]$ by considering R is large.

Here the input waveform below the level $-(V_R + V_\gamma)$ may not be clipped completely. means negative peak(positive base)of the input signal is not clipped totally.

Transfer characteristics:

If $V_i > -(V_R + V_\gamma)$, Then $V_O = V_i$ Then slope of transfer characteristics curve is one.

If $V_i < -(V_R + V_\gamma)$, then $V_O = -[(V_R + V_\gamma) + V_i (R_f /R + R_f)]$ so slope of transfer characteristics curve is $R_f /R + R_f$