(Q1) An amplifier has a voltage gain of 500 without feedback. If a negative feedback is applied, the gain is reduced to 100. Calculate the fraction of output feedback. If, due to ageing of components, the gain without feedback falls by 20%, calculate the percentage fall in gain with feedback.

Q2 The schmitt trigger has $+V_{sat} = 10V$ and has $-V_{sat} = -10V$, $V_A = 5V$. The schmitt trigger characteristics are shown in Fig. Q2. Using this schmitt trigger, generate a square wave at a frequency of 1KHz. Specify required RC.

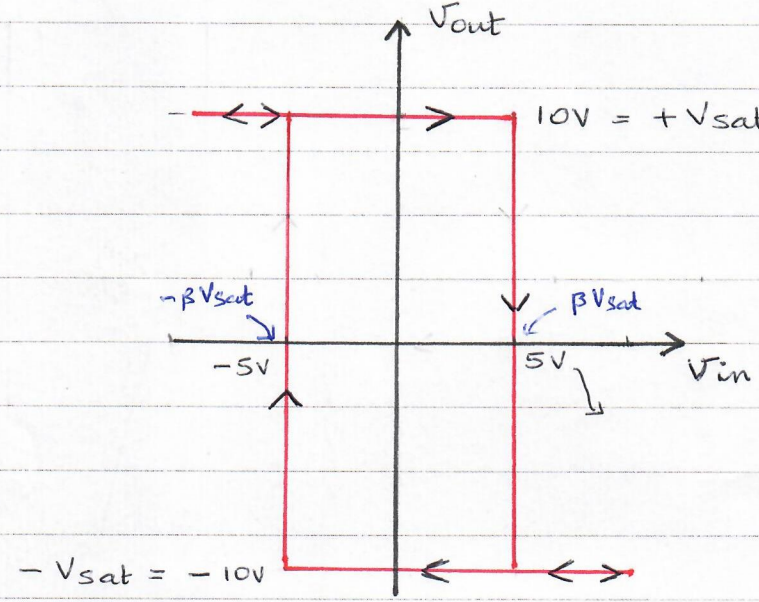

Fig. Q2 (schmitt Trigger characteristics)

(Q3.) An opamp is having the saturation levels $+V_{sat}(V_H)$ and V_L ($-V_{sat}$). The opamp is connected as a schmitt trigger as shown in Fig. Q3. Sketch the transfer function V_{out} versus V_{in}.

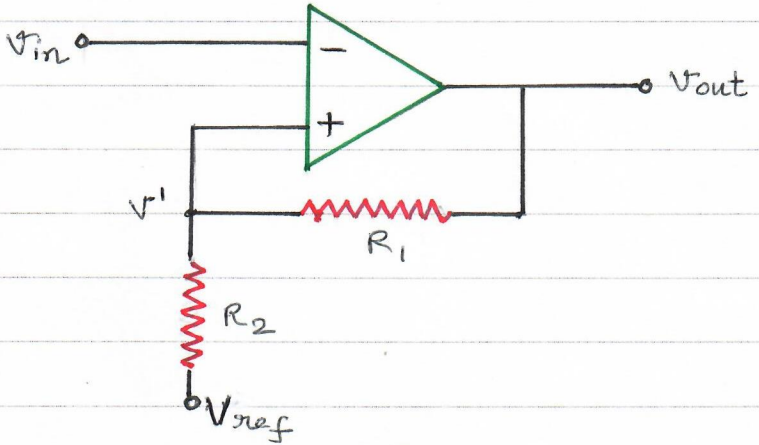

Fig. Q3

(Q4) The stable state of the monostable given in Fig. Q4 is output V_o at $+V_{sat} = 10V$. When a negative trigger at the non inverting terminal is applied the mono changes state and the output voltage V_o instantaneously changes to $-V_{sat} = -10V$.

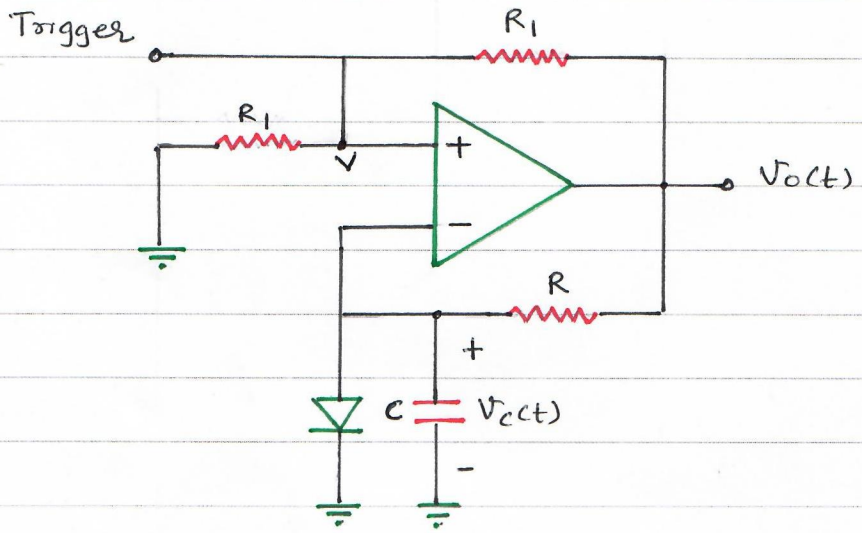

Fig. Q4

i) Sketch the waveforms of voltage across the capacitor $V_c(t)$ and output voltage $V_o(t)$ starting from the instant of application of negative trigger. Label the amplitudes and transition times legibly.

ii) Show that the mono puts out a pulse at the output of width $T = RC \ln 2$ and amplitude $\pm 10V$. [4+4]

(Q5) Design an op-amp circuite to give an output voltage proportional to produce questient of two voltages (V_1/V_2).

Q6 The circuit of Fig. Q6 is, in essence, a noninverting amplifier with a feedback impedance Z_N and is known as a negative-impedance converter (NIC). Find the Thevenin or driving-point impedance to the right of the input terminals, and explain why such a name is appropriate. Assume that op-amp is ideal

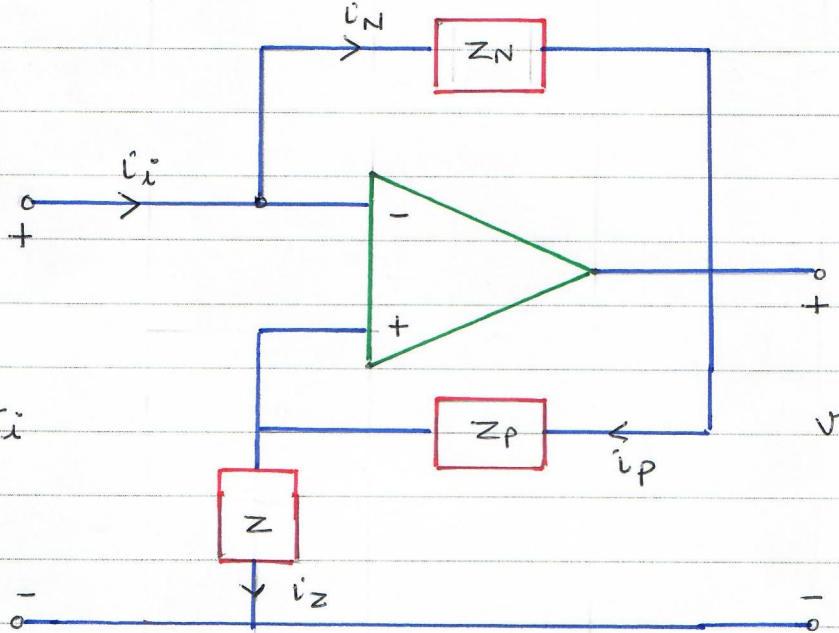

Fig. Q6