Filter Sheet.

Q1 Design a 1st order HP Filter to have $f_c = 10KHz$ and a Max. gain of (20dB). draw the cct. diagram and calculate all required components?

Q2 A filter with a transfer function given by:

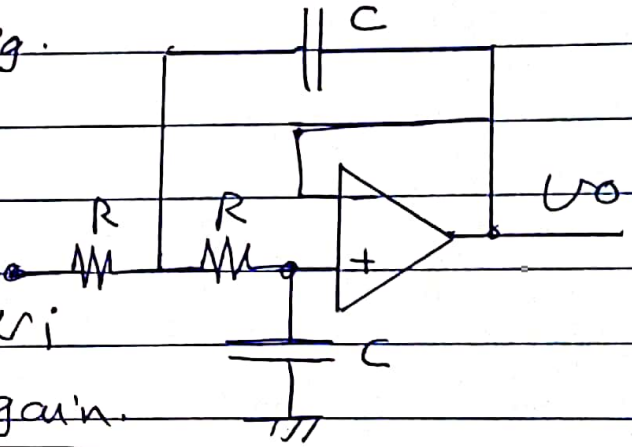
$$H(S) = \frac{60S^3}{S^3 + 2S^2 + 3S}$$

identify: filter type, Filter order and Max. gain of the filter?

Q3 For the cct. shown in Fig. the transfer function:

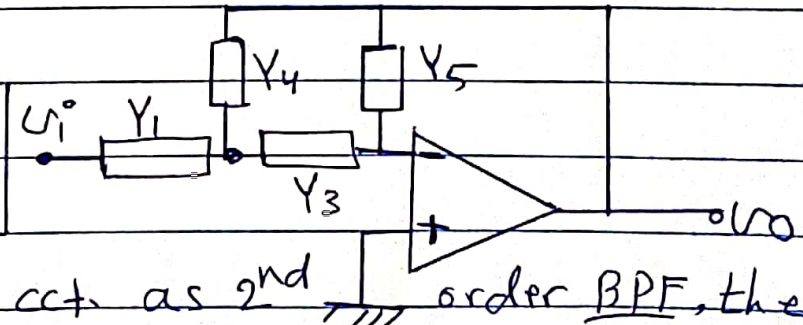
$$H(S) = \frac{V_o}{V_i} = \frac{1}{1 + 2RCS + R^2C^2S^2}$$

- Identify type & order.
- derive expression for the cutoff freq (f_c), Max. gain.
- Sketch the frequency Response.



Q4 For the filter shown

$$H(S) = \frac{-Y_1 Y_3}{Y_5(Y_1 + Y_3 + Y_4) + Y_3 Y_4}$$



1) Choose Y's to make the cct. as 2nd order BPF, the derive expressions for Center freq, Selectivity Q and Max. gain?
2) Design the cct. to have $f_c = 10KHz$. $Q = 10$, $K_{max} = 10$
3) choose Y's to realize 2nd order HPF
4) " " " " " " LPF