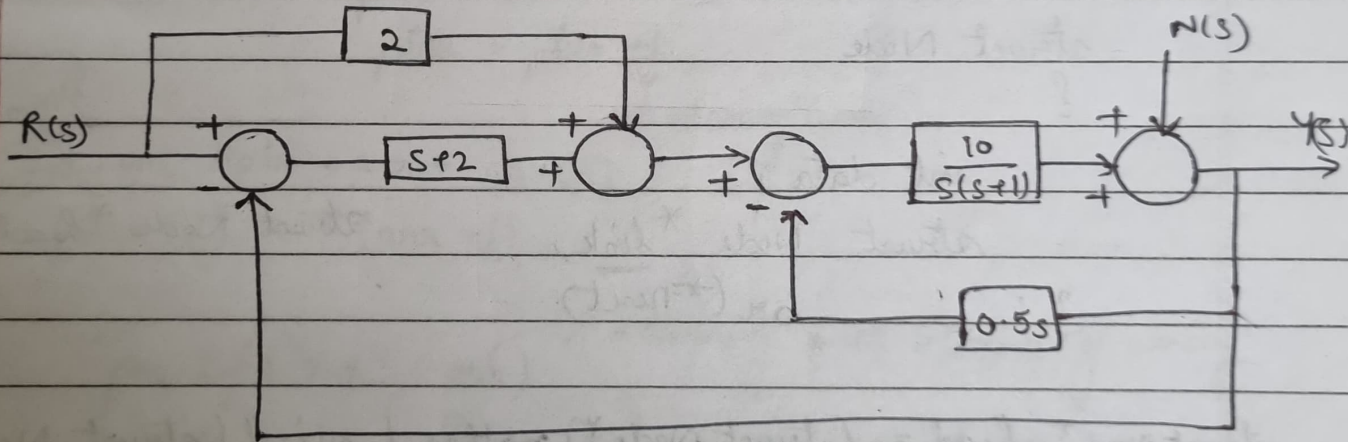


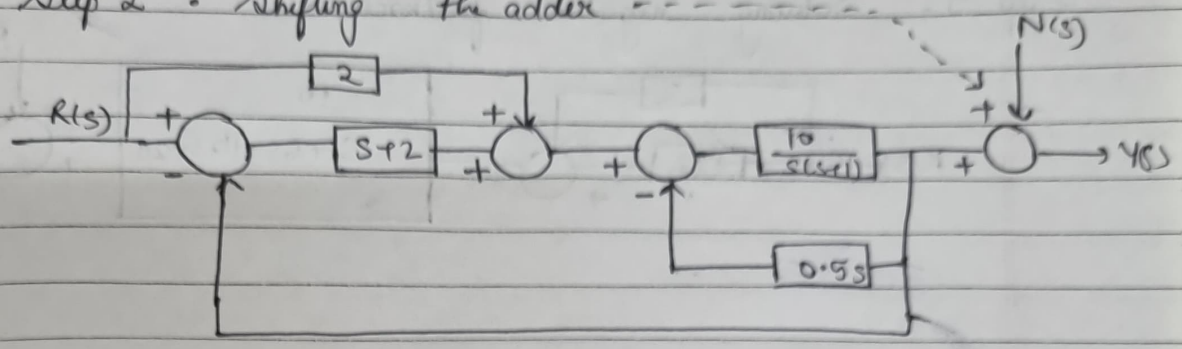
Q1). (a).  $\frac{Y(s)}{R(s)}$

Step 1: Split the summing point.

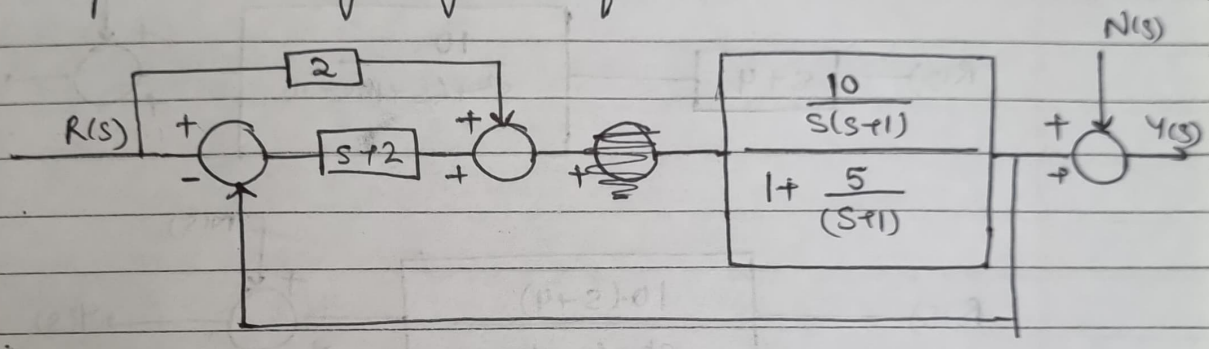


Step 2:

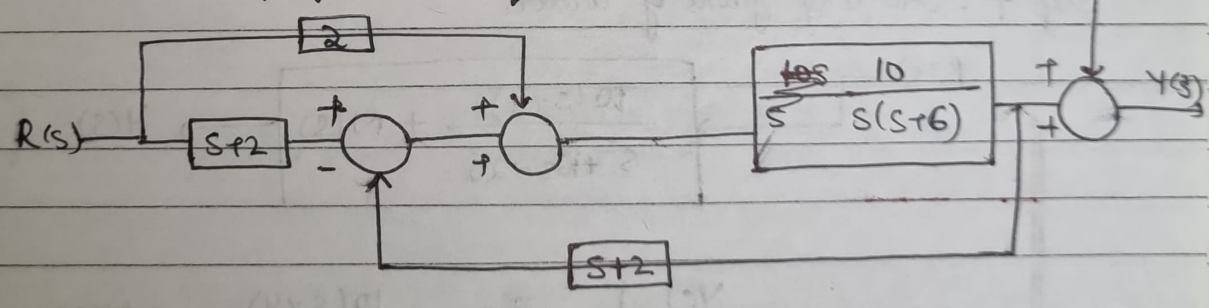
Step 2 : Shifting the adder



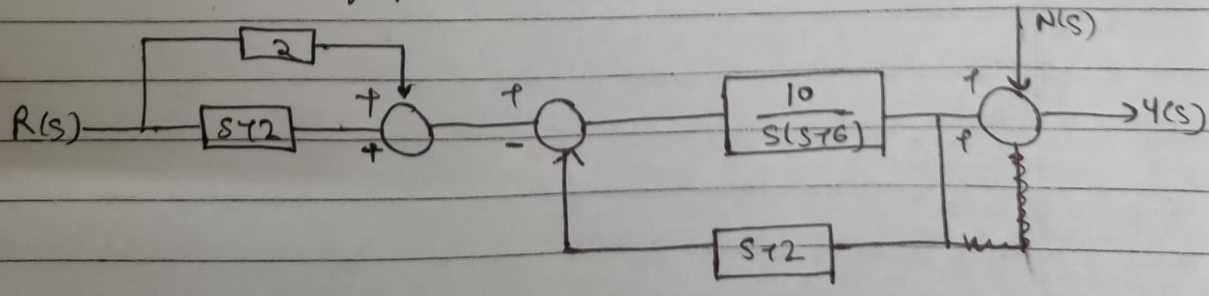
Step 3 : Solving negative feedback.



Step 4 : Shifting adder after  $s+2$ .



Step 5 : Rearranging adders

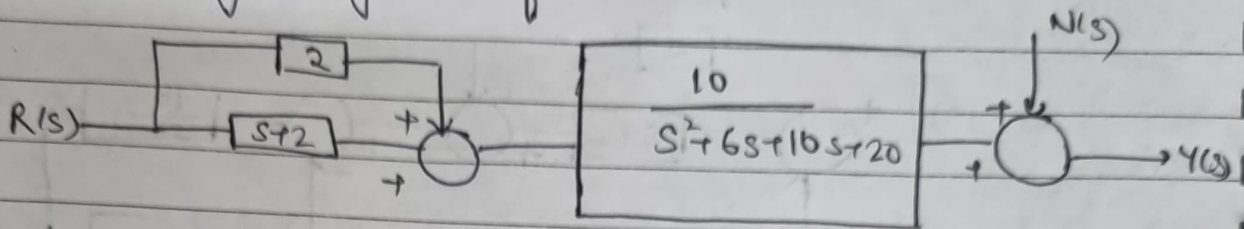


$$\frac{10}{s(s+6)}$$

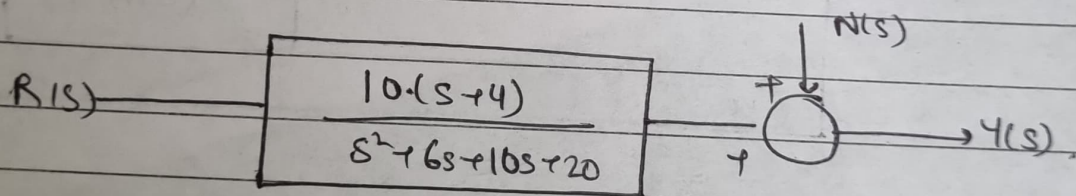
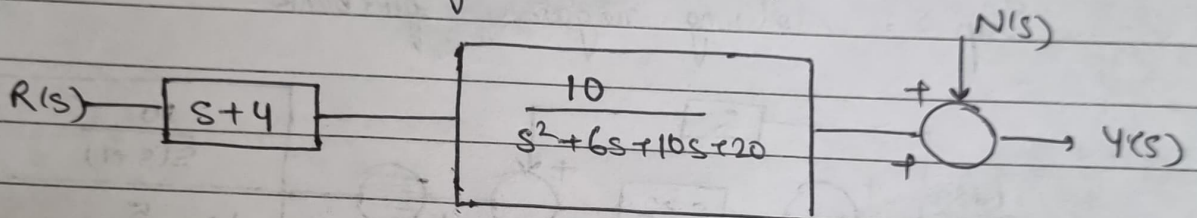
$$1 + \frac{10}{s(s+6)} \times (s+2)$$

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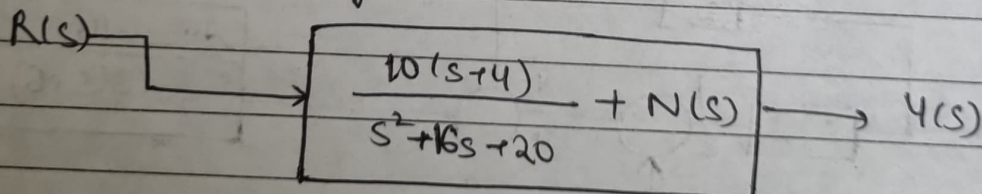
Step 5: Solving negative feedback:-



Step 6: Adding gains of blocks in parallel.



Step 7: Adding gains of adder.



$$\left. \frac{Y(s)}{R(s)} \right|_{N=0} = \frac{10(s+4)}{s^2 + 16s + 20}$$