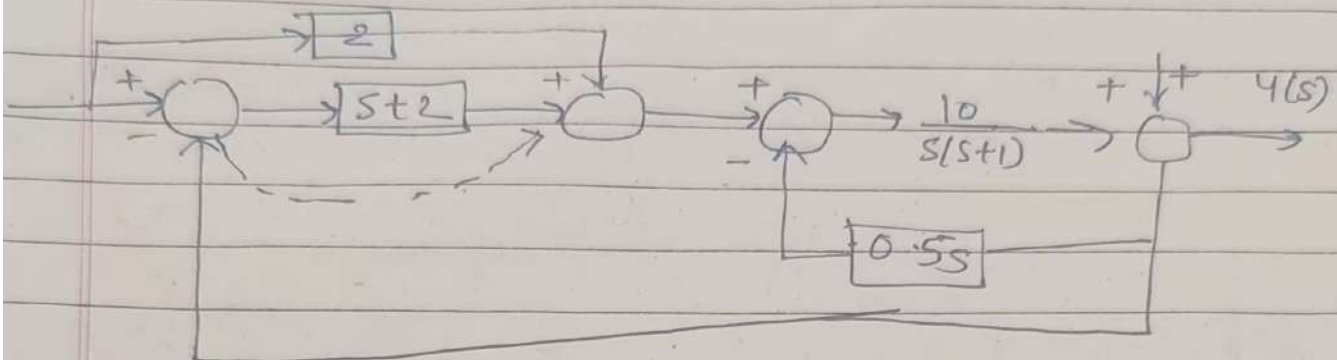
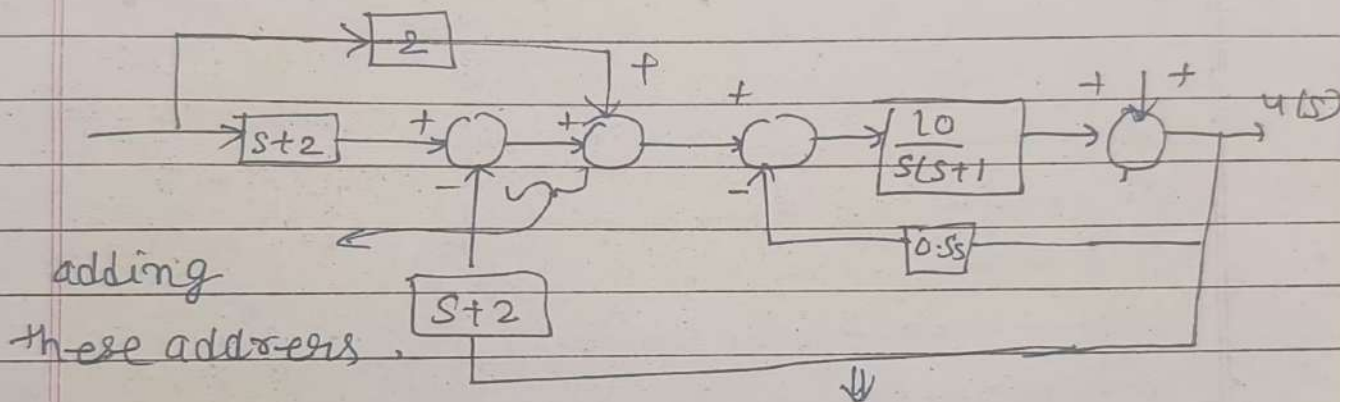


Splitting the 3 input adder into 2 input adders.

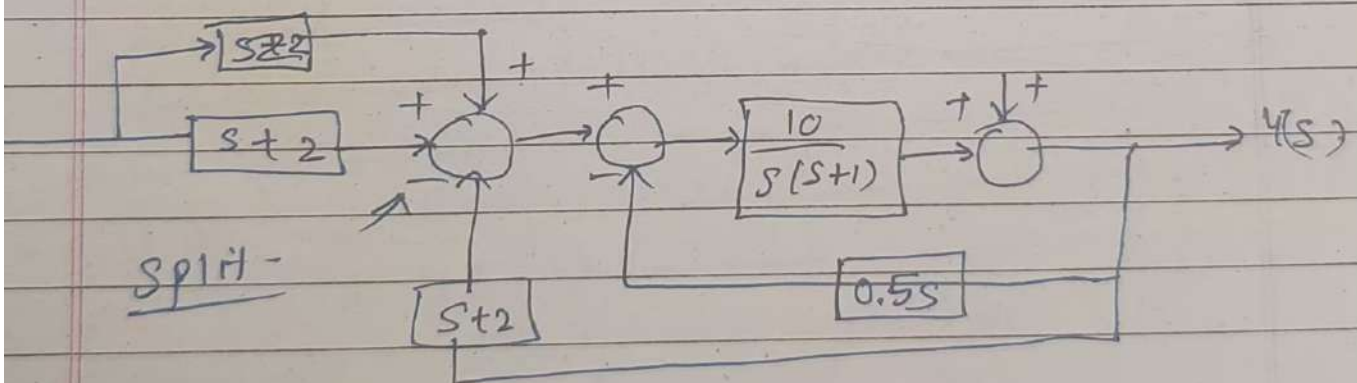


Shifting order. \Downarrow

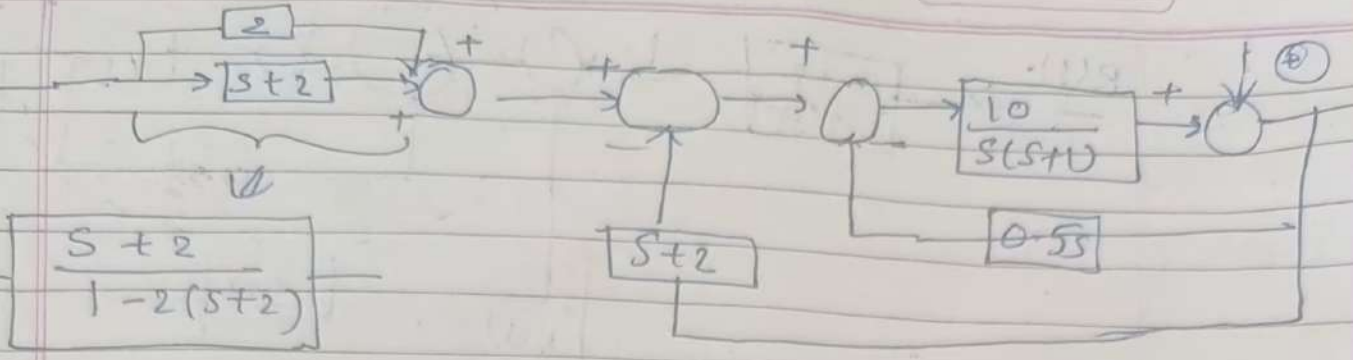


adding these adders.

\Downarrow

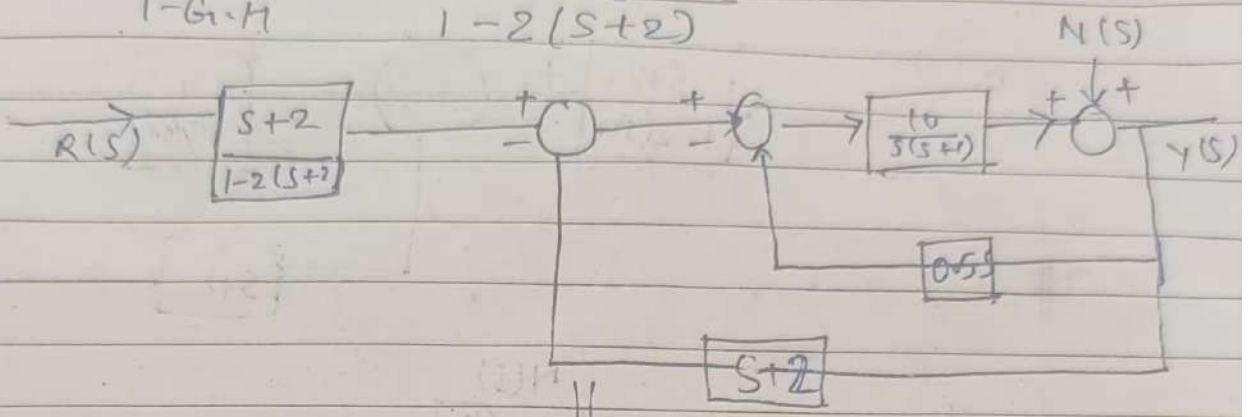


split -

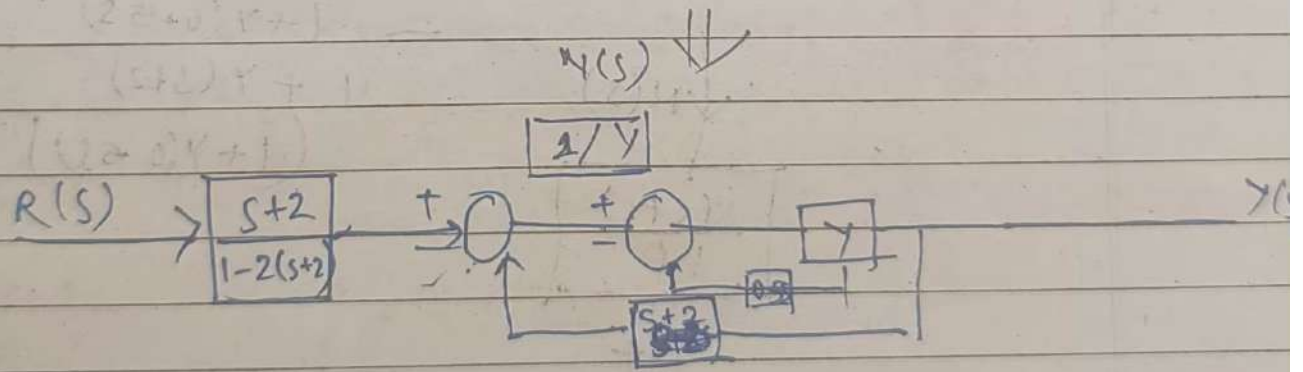
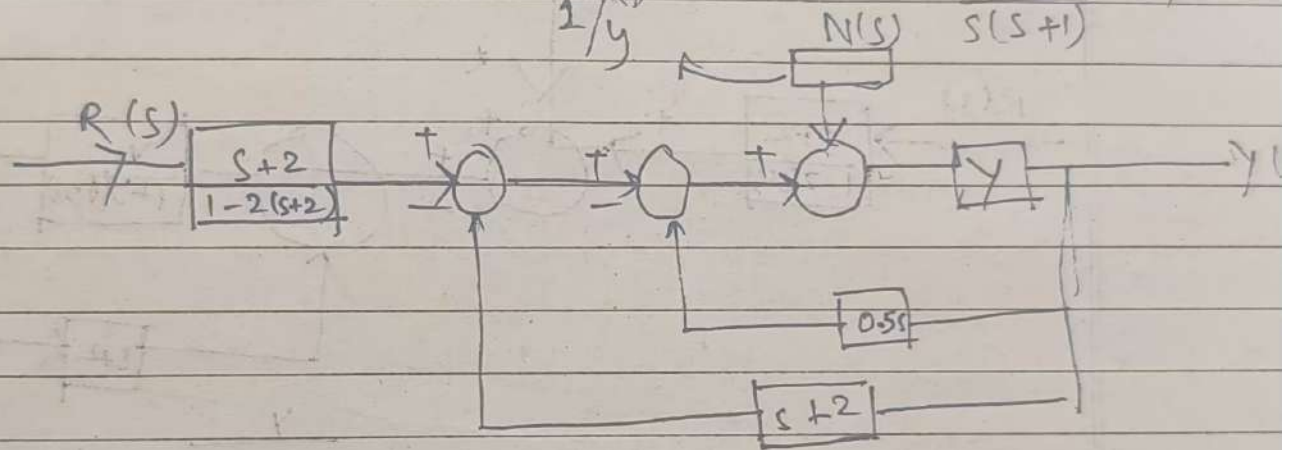


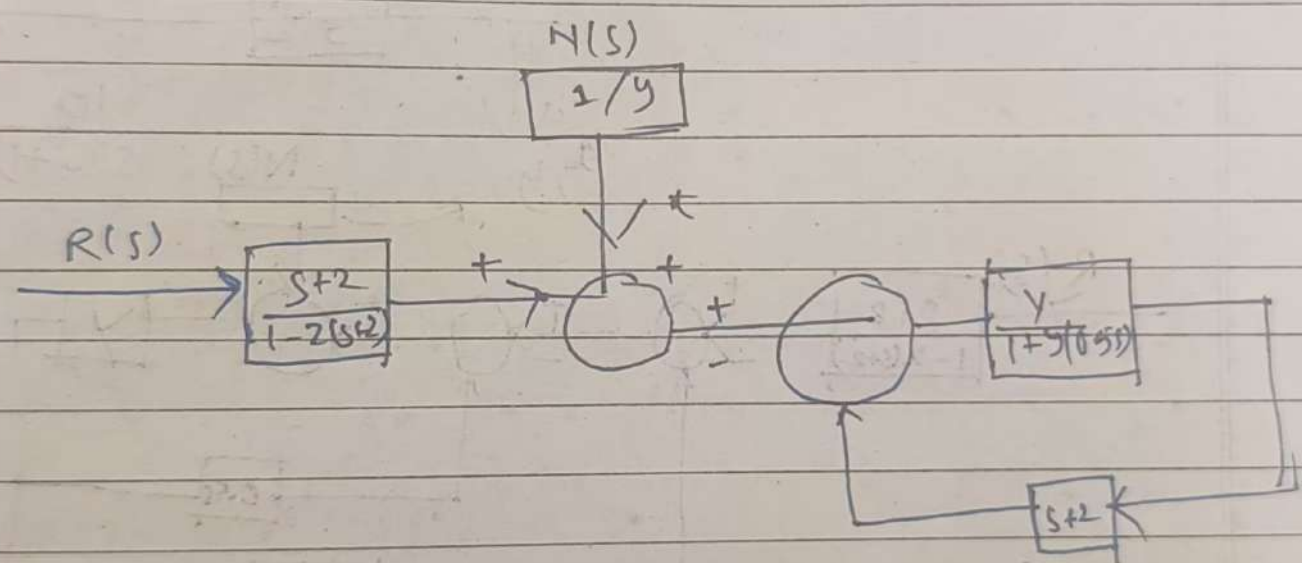
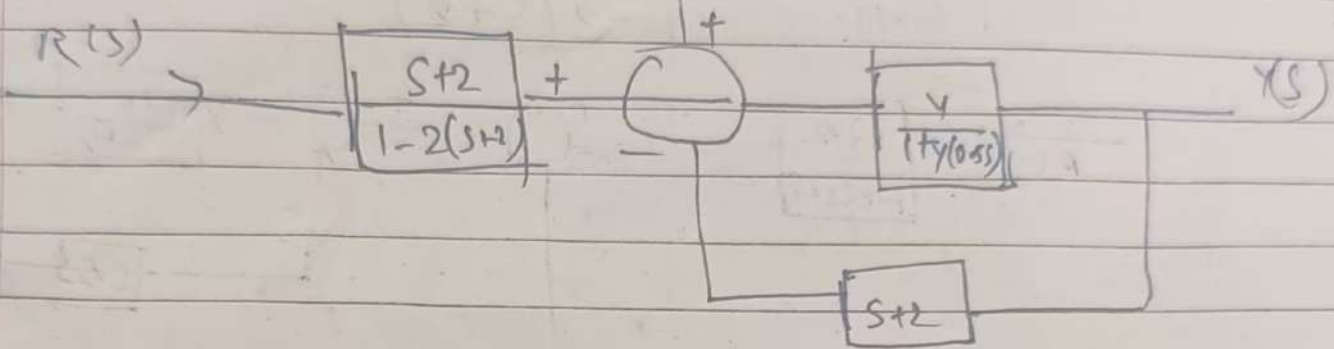
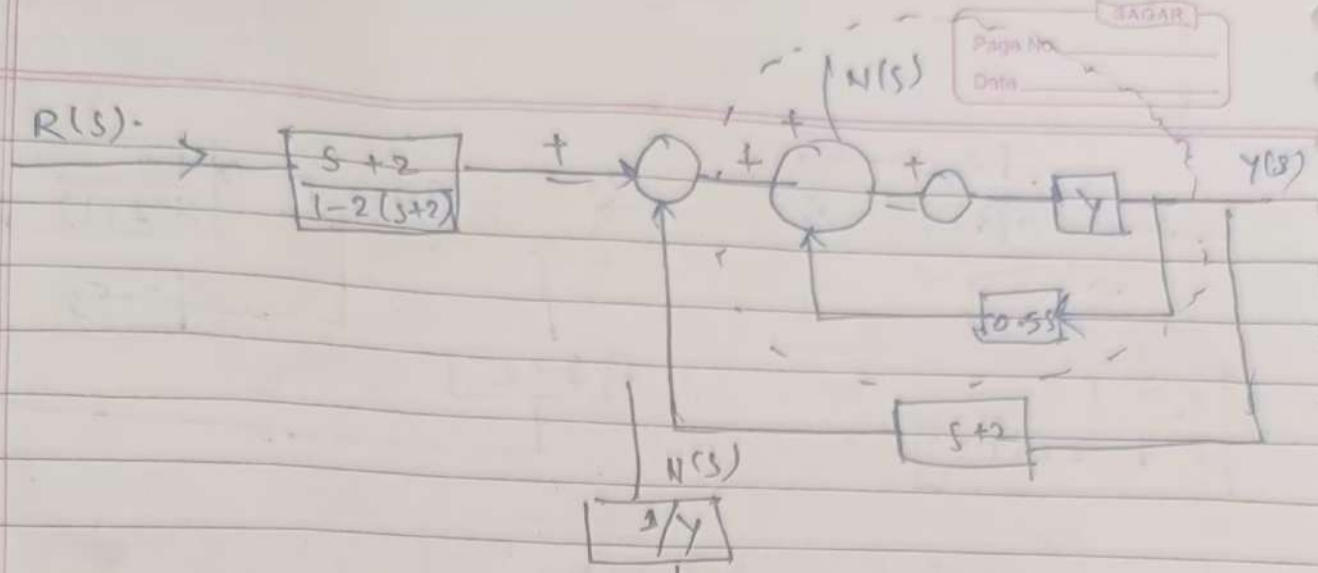
$$\frac{s+2}{1-2(s+2)}$$

$$\frac{G_c}{1-G_c \cdot H} = \frac{s+2}{1-2(s+2)}$$

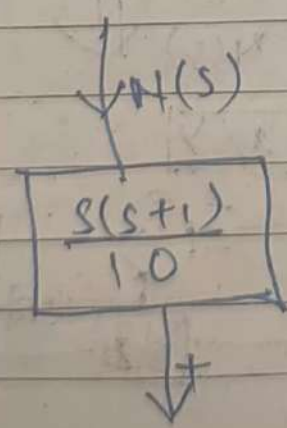


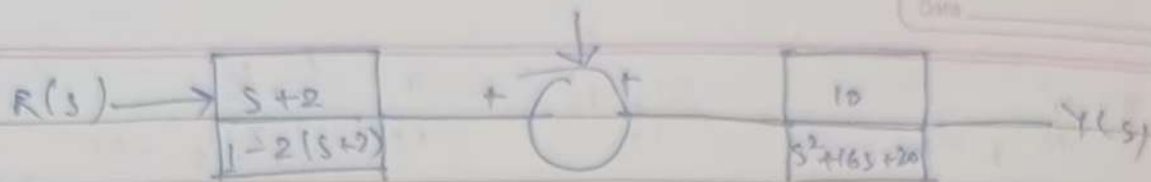
$$\frac{10}{s(s+1)} = Y$$





$$\frac{y}{1+y(0.5s)} \cdot \frac{1+y(s+2)}{1+y(0.5s)}$$





$$\frac{10}{s(s+1)}$$

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

$$1 + \frac{10}{s+1}$$

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

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

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

$$\frac{s(s+6)}{s^2+16s+20}$$

$$= \frac{10}{s^2+16s+20}$$

Eqn

$$R \left[\frac{s+2}{1-2(s+2)} \right] + N \left[\frac{s(s+1)}{16} \right] = 4 \left[\frac{10}{s^2+16s+20} \right]$$

a) $\frac{4}{R} \Big|_{N=0}$ Divide the eqn by R and put N=0

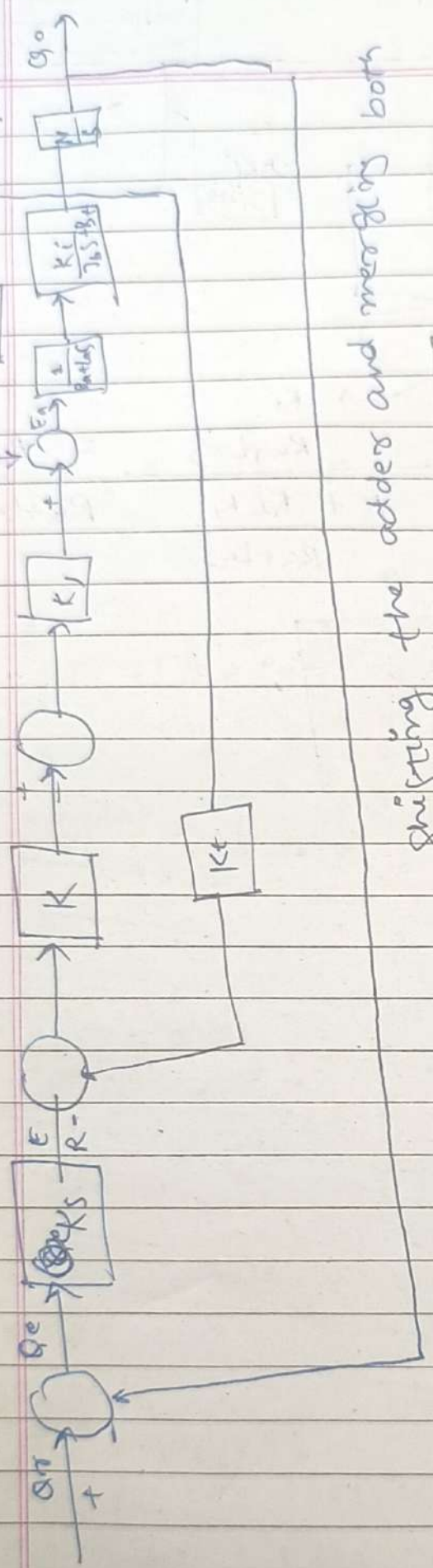
$$\frac{s+2}{1-2(s+2)} = \frac{4}{R} \left[\frac{10}{s^2+16s+20} \right]$$

$$\Rightarrow \frac{[s^2+16s+20] s+2}{10[1-2(s+2)]} = \frac{4}{R} \Big|_{N=0}$$

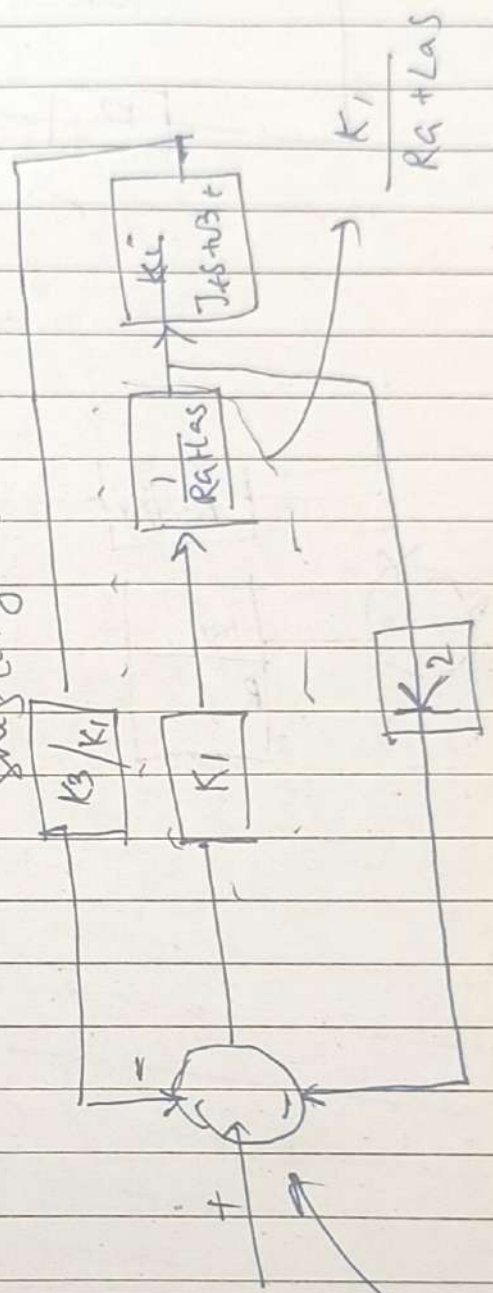
$$\frac{Y}{N} \Big|_{R=0} \quad \frac{S(S+1)}{10} = \frac{4}{N} \left(\frac{10}{S^2+16S+20} \right)$$

$$\frac{S(S+1)(S^2+16S+20)}{100} = \frac{4}{N} \Big|_{R=0}$$

Q.2

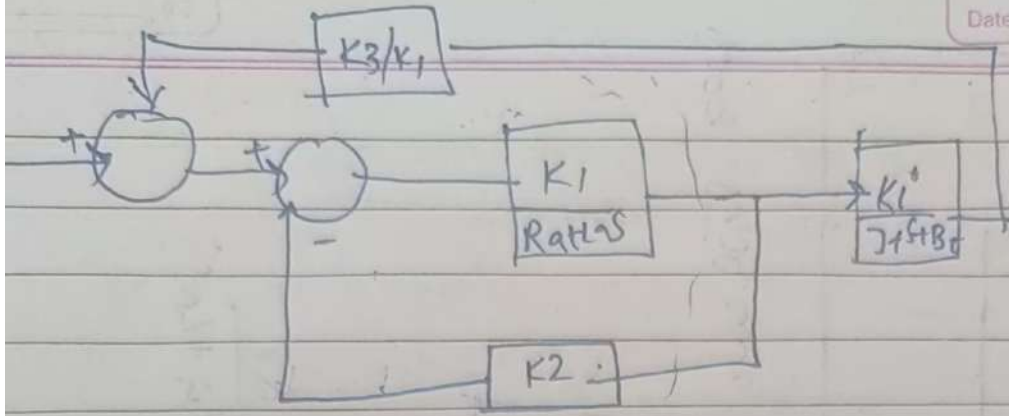


Shifting the adders and merging both

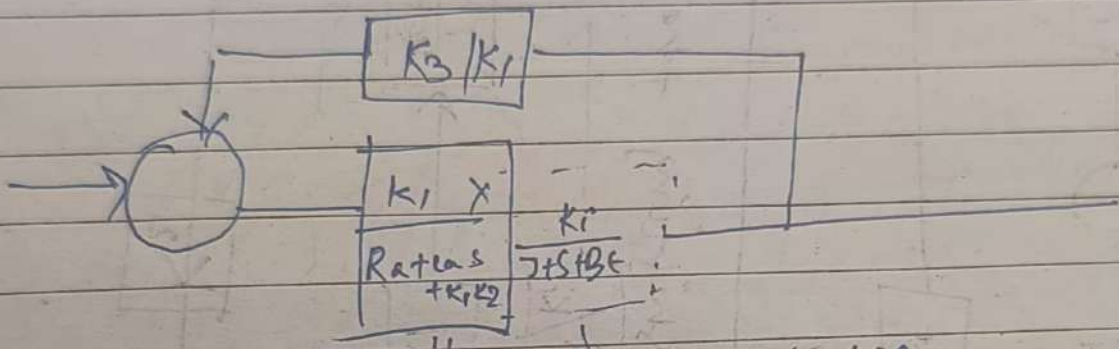


$$\frac{K_1}{R_s + Ls}$$

Splitting



$$\frac{K_1}{R+sL} = \frac{K_1}{1 + \frac{K_2 K_1}{R+sL} \cdot \frac{K_1}{R+sL} + K_1}$$



$$K_1 K_i^2 = Y$$

$$(R+sL+K_1 K_2)(J+sB)$$

