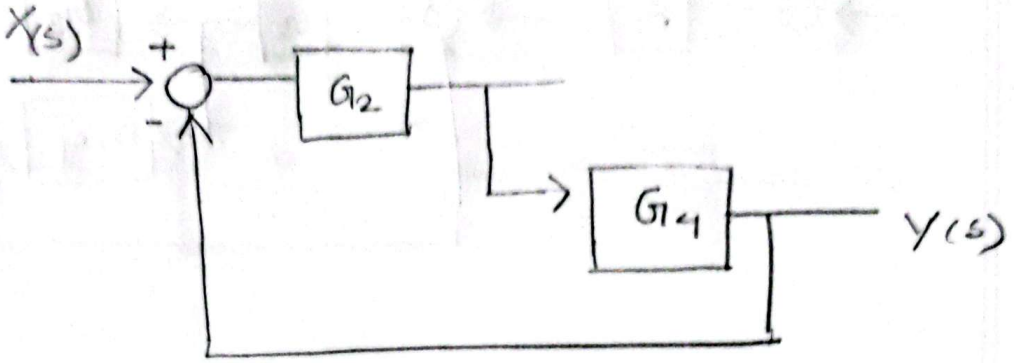
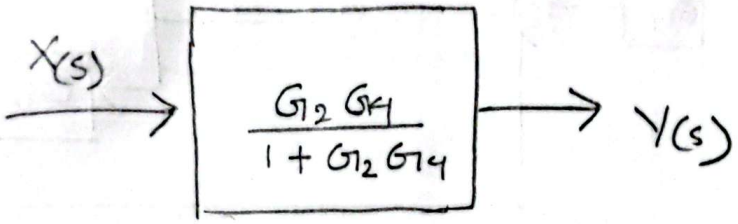
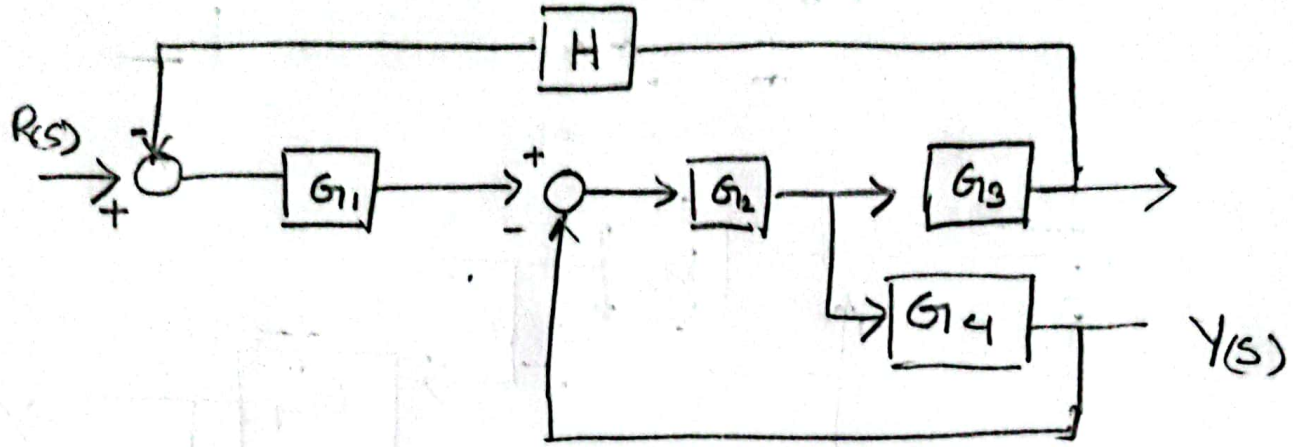
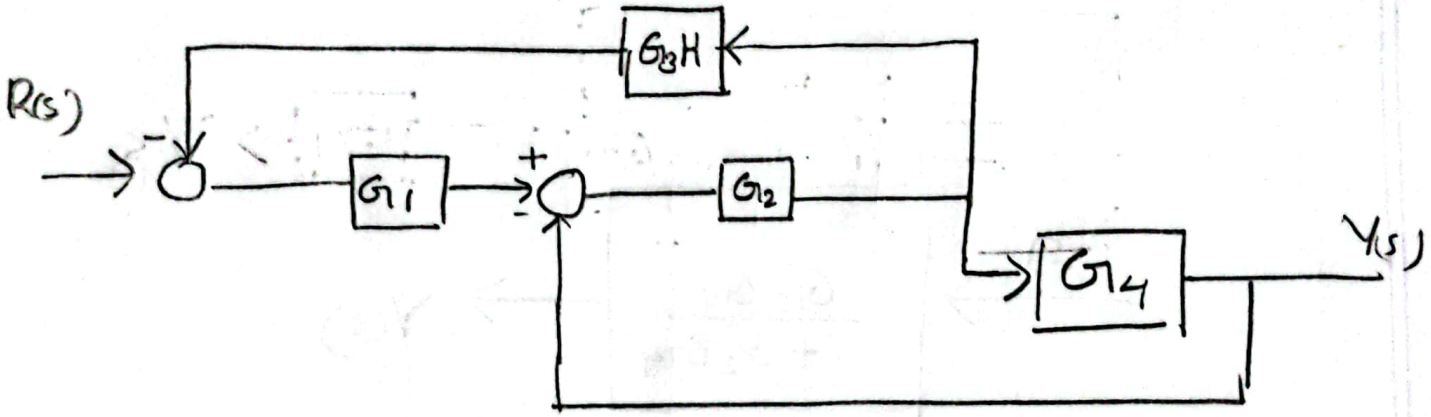
Ans to the ques No 1.

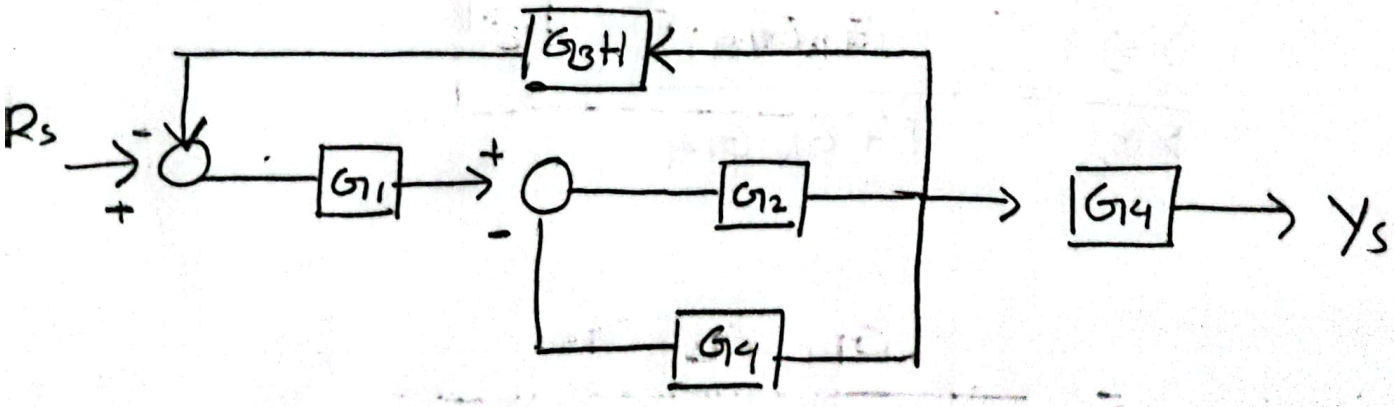


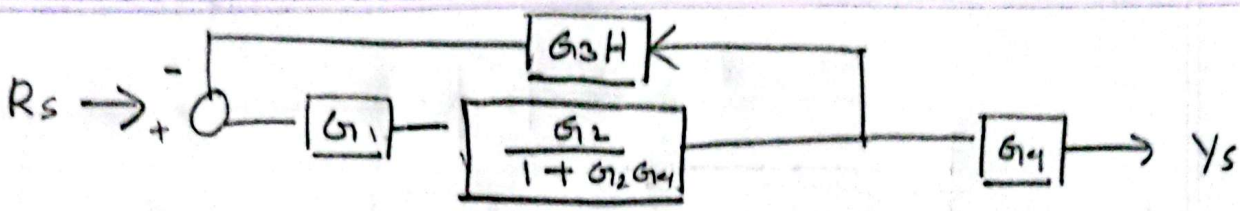


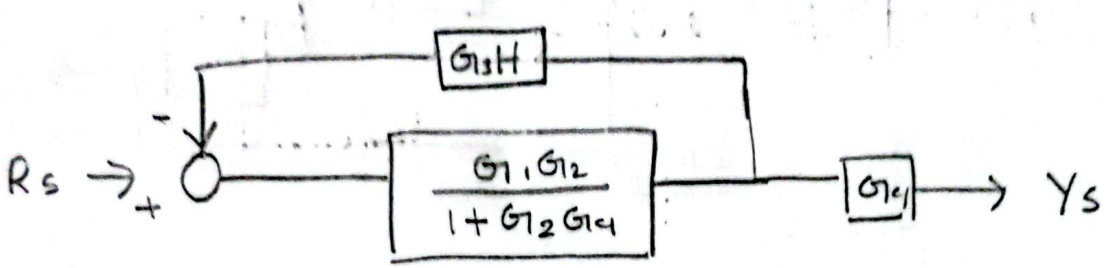
$$\frac{Y(s)}{X(s)} = \frac{G_2 G_4}{1 + G_2 G_4}$$

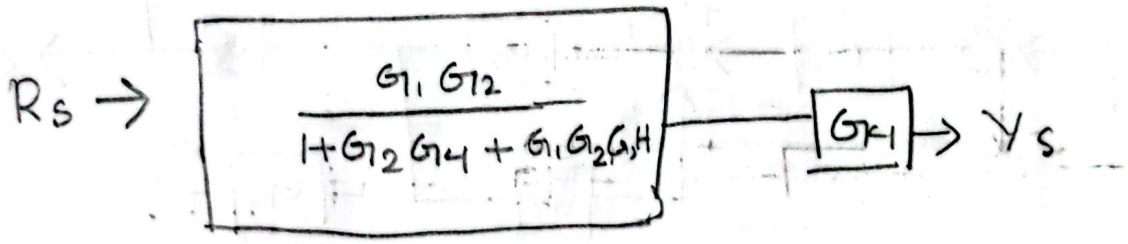

H
R(s)
G1
G2
G3
G4
Y(s)

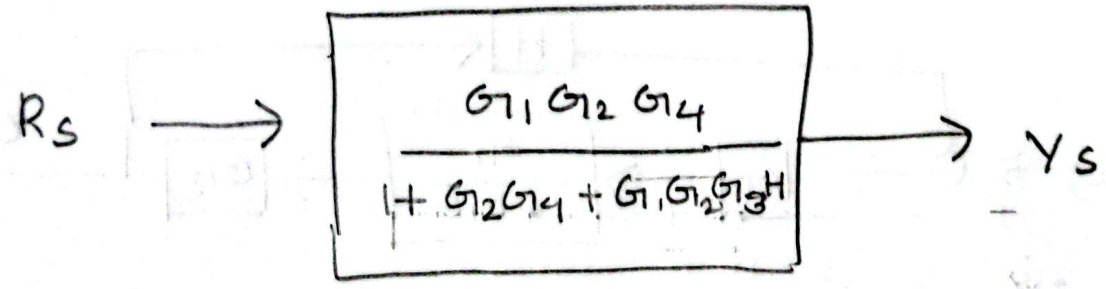

G3H
R(s)
G1
G2
G4
Y(s)


G3H
Rs
G1
G2
G4
Ys
G4

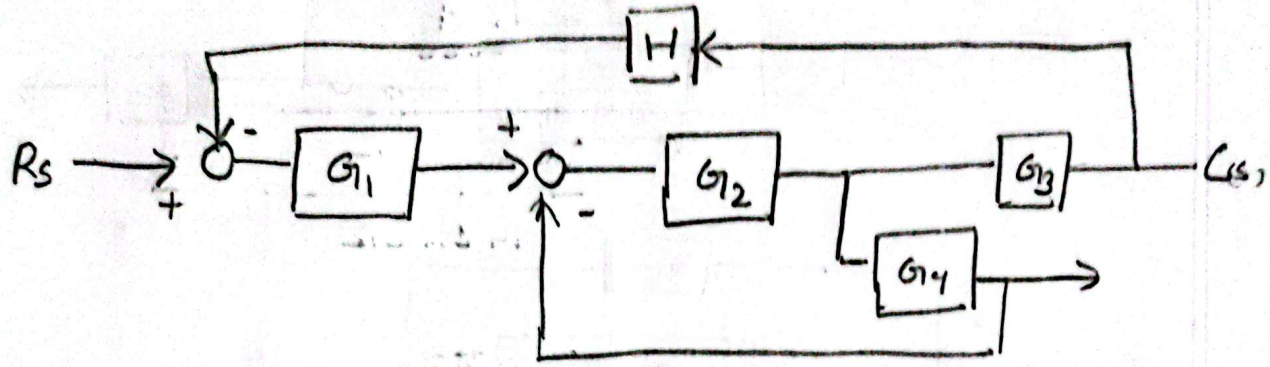


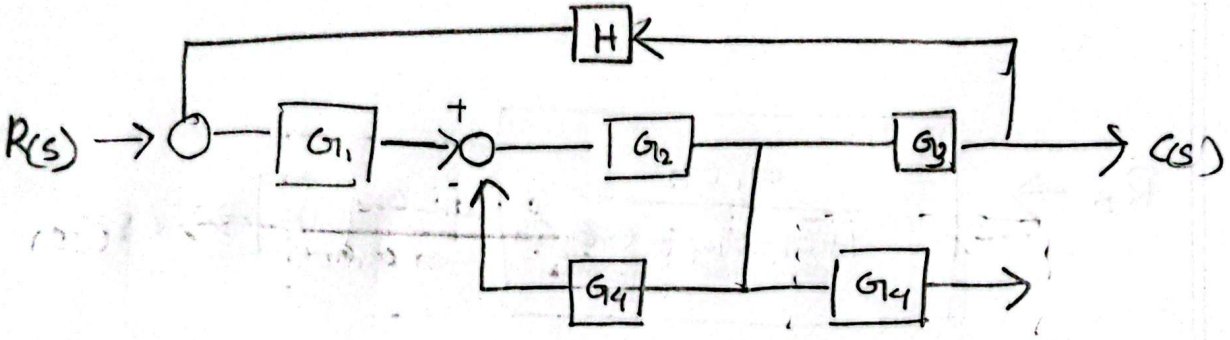




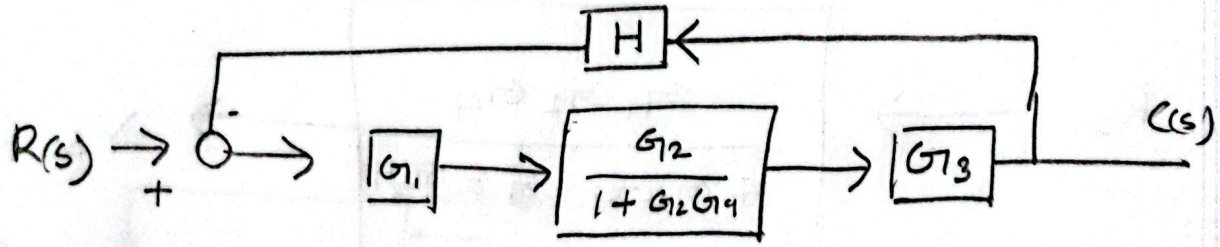


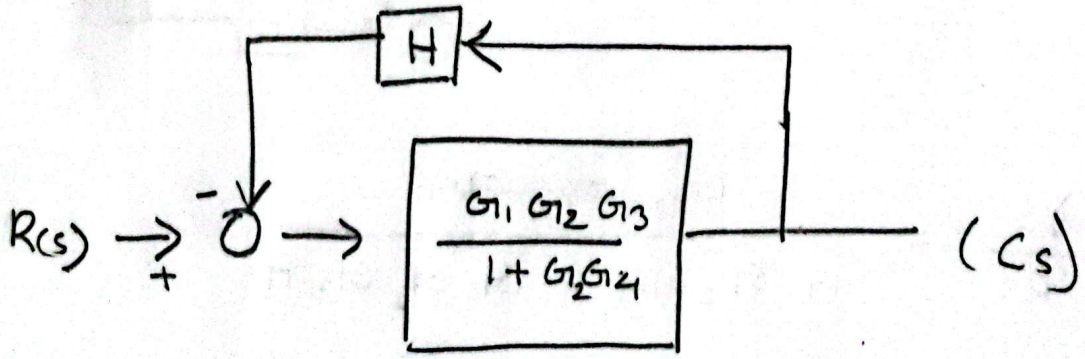
$$\therefore \frac{Y_s}{R_s} = \frac{G_1 G_2 G_4}{1 + G_2 G_4 + G_1 G_2 G_3 H}$$





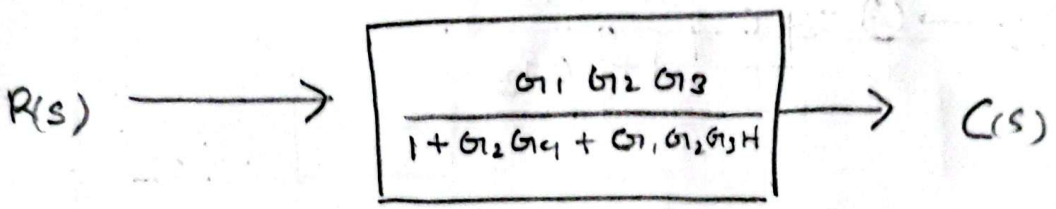
No need



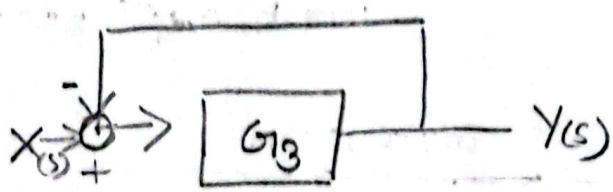


$$\frac{C}{R}(s) = \frac{\frac{G_1 G_2 G_3}{1 + G_2 G_4}}{\frac{1 + G_2 G_4 + G_1 G_2 G_3 H}{1 + G_2 G_4}}$$

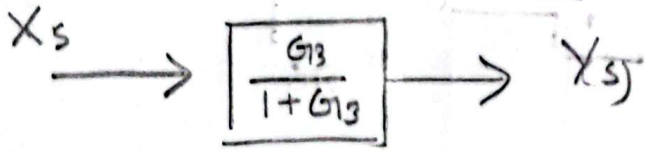
$$= \frac{G_1 G_2 G_3}{1 + G_2 G_4 + G_1 G_2 G_3 H}$$



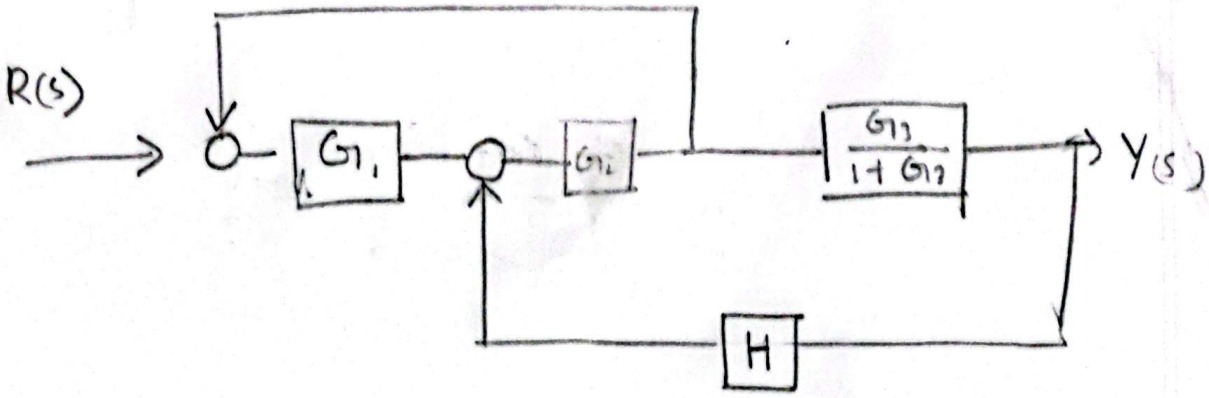
Ans to the ques No 2

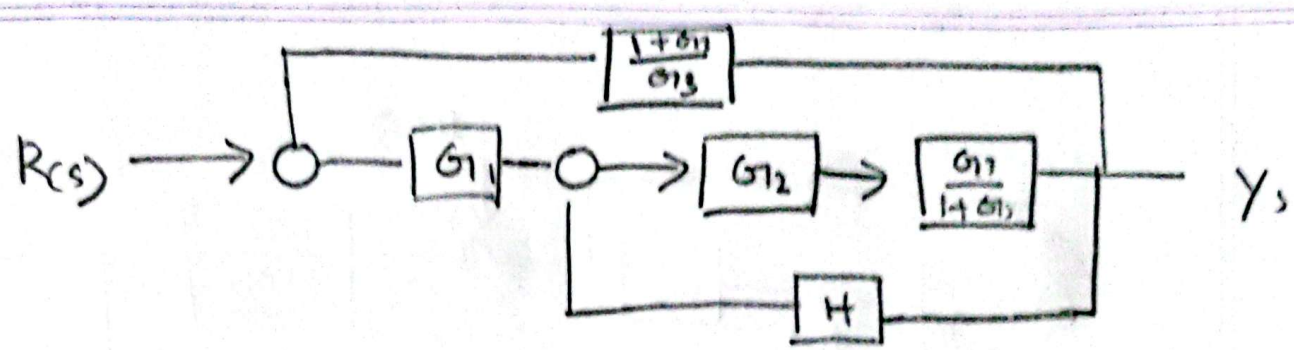


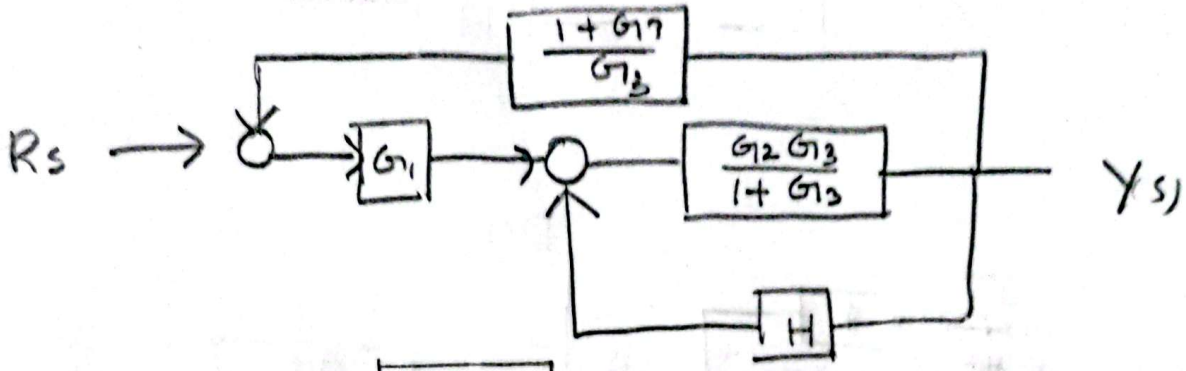
$$\therefore \frac{Y_s}{X_s} = \frac{G_{13}}{1 + G_{13}}$$

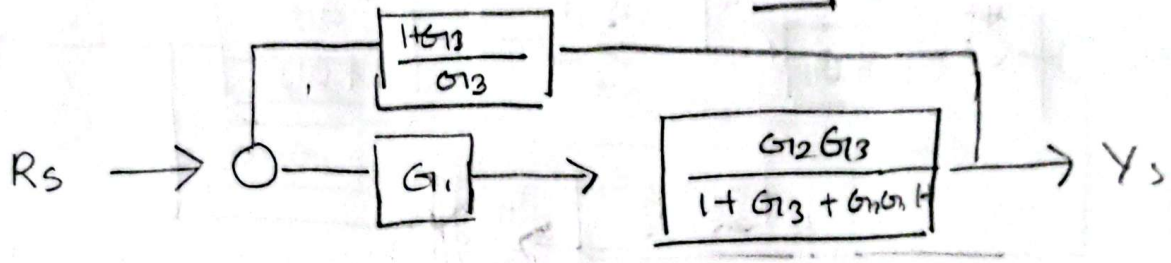


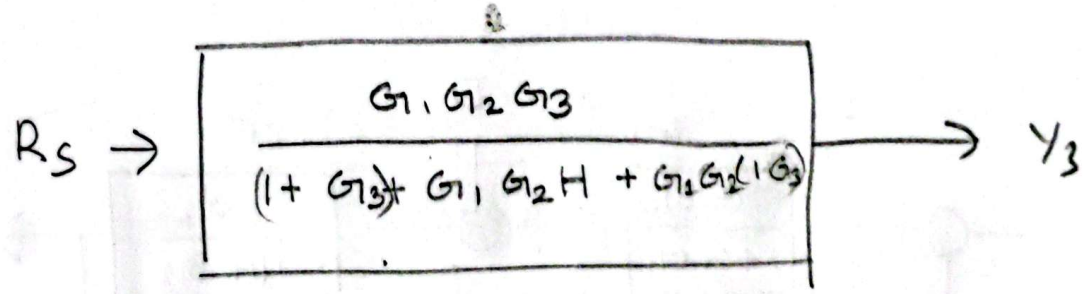
If, we consider D(s) = 0,



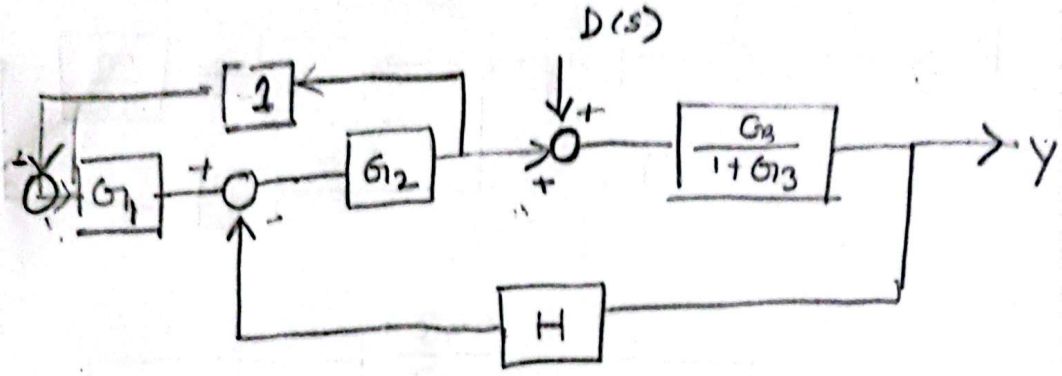


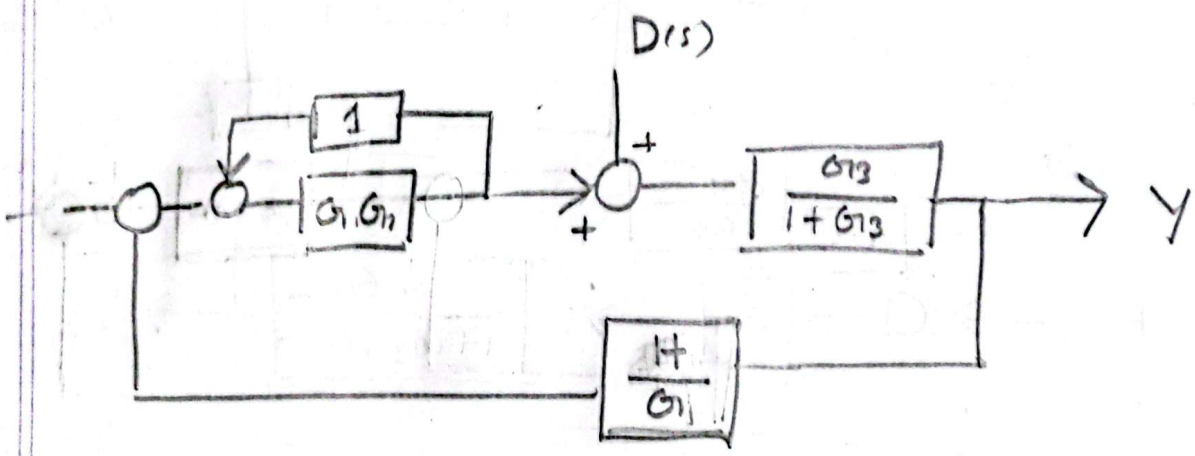


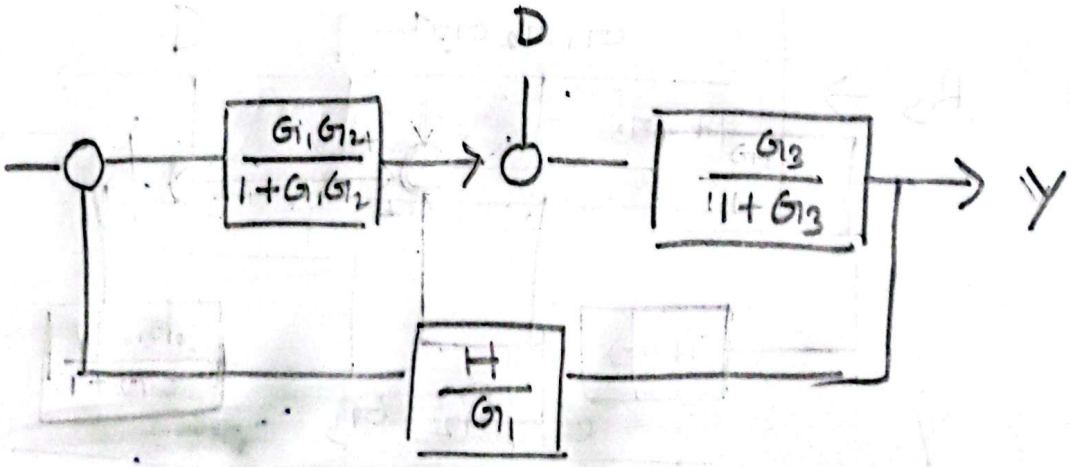


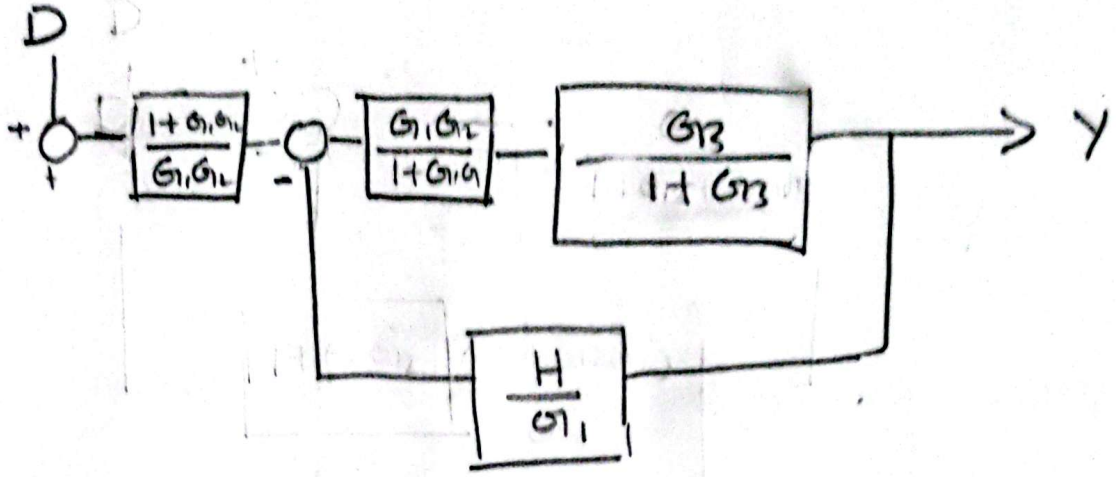


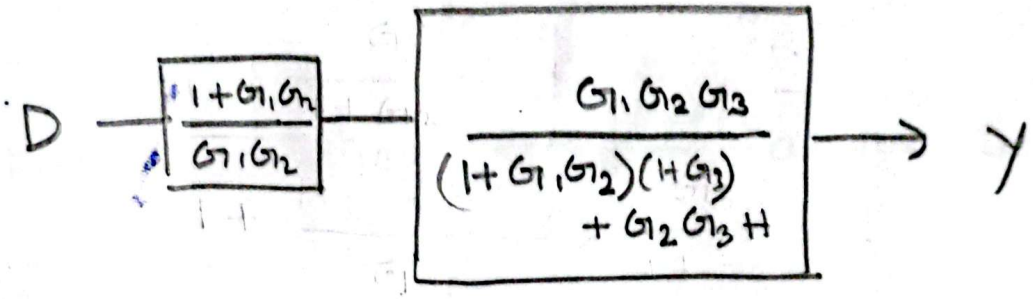
$$\therefore \frac{Y}{R}(s) \quad \frac{G_1 G_2 G_3}{(1+G_3)(1+G_1 G_2) + G_1 G_2 H}$$


D(s)
1
G1
G2
G3
1+G1G3
H
y


D(s)
1
G1G2
G3
1+G1G3
H
G1
y

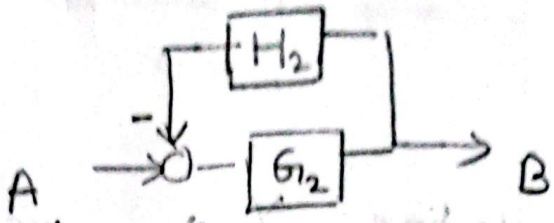

D
G1G2
1+G1G2
G3
1+G1G3
H
G1
y





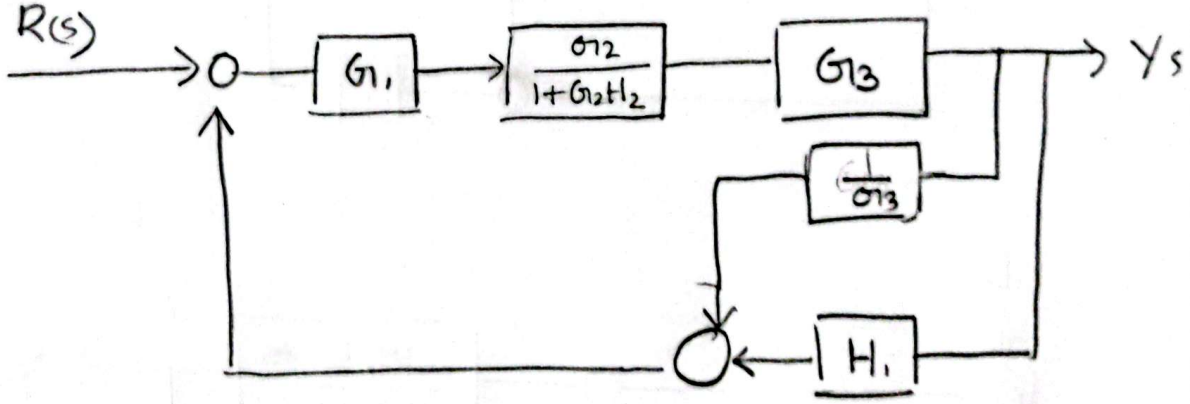
$$\frac{G_3(1+G_1G_2)}{(1+G_1G_2)(1+G_3)+G_2G_3H}$$

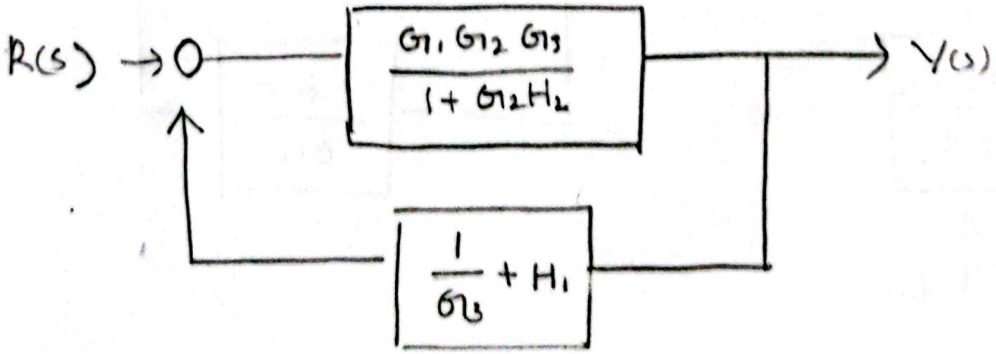
Ans to the ques No 3

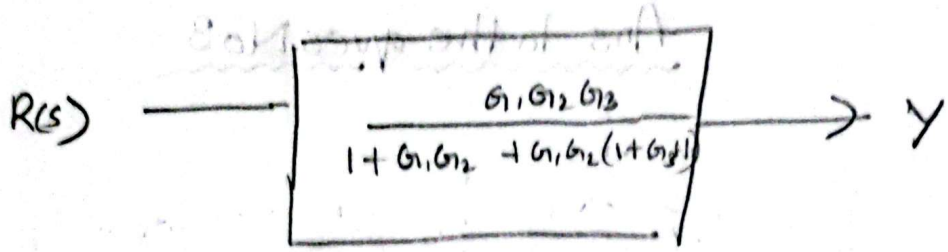


$$\frac{B}{A}(s) = \frac{G_{12}}{1 + G_{12}H_2}$$

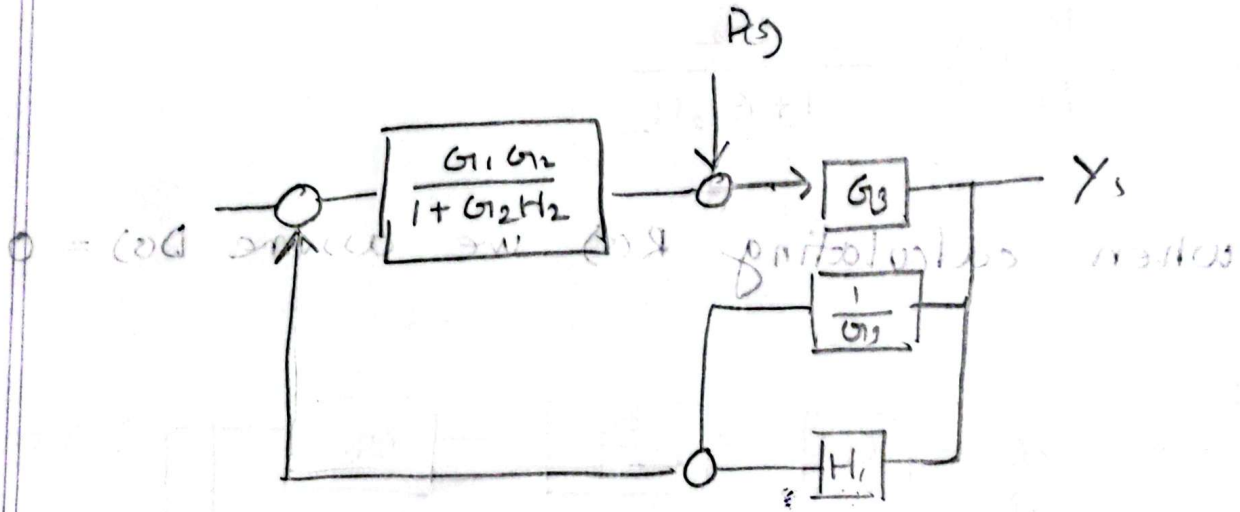
when calculating R(s) we assume D(s) = 0

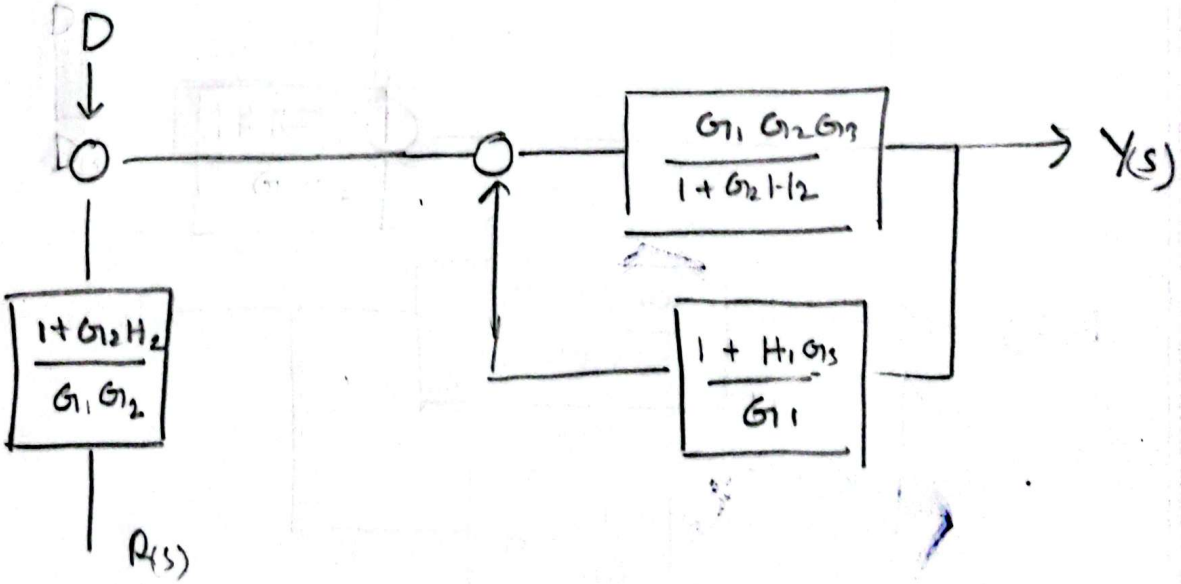


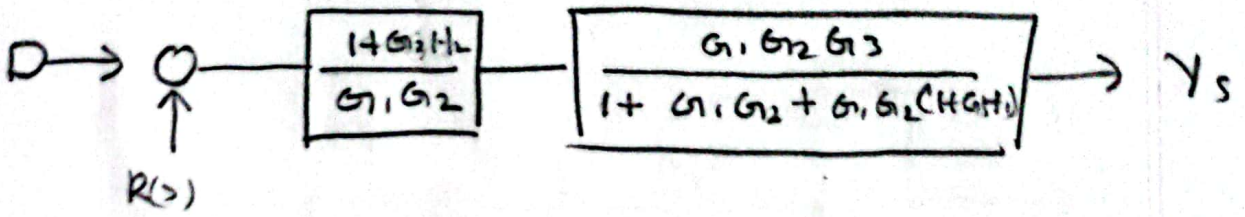


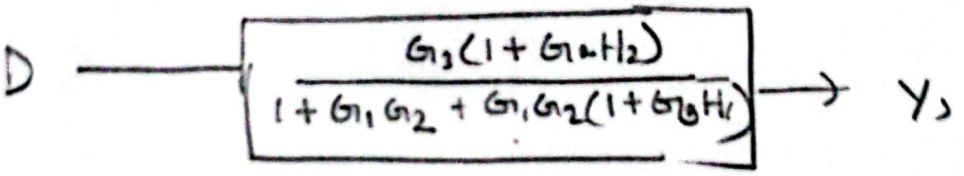


When calculating $\frac{Y}{D}(s)$ we assume R(s) = 0

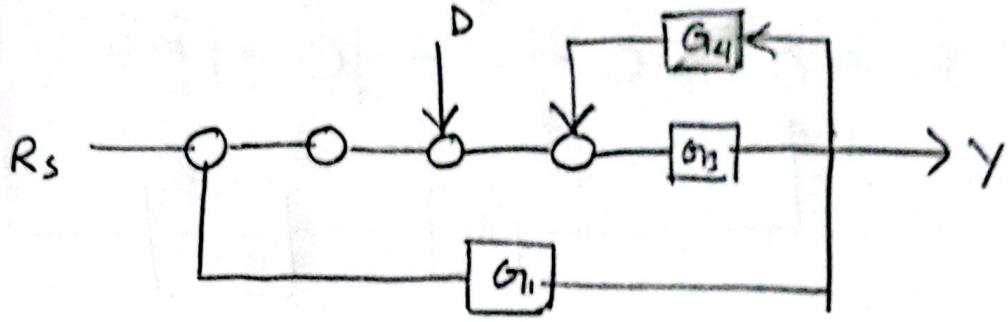


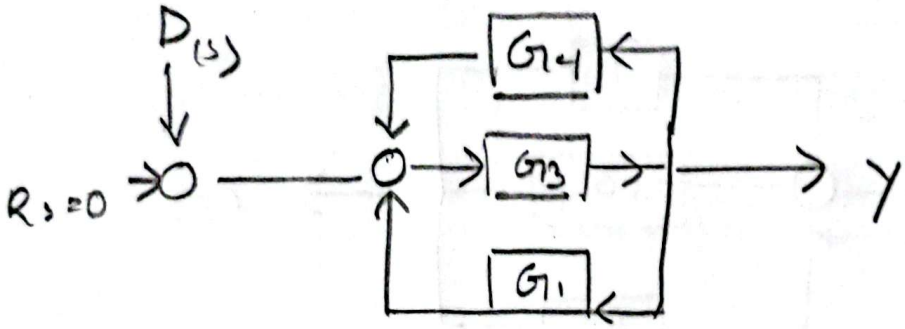




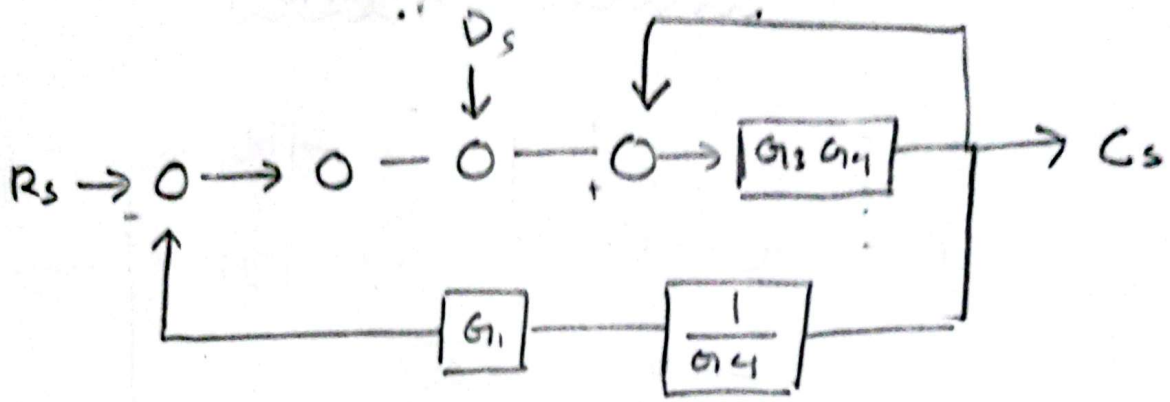


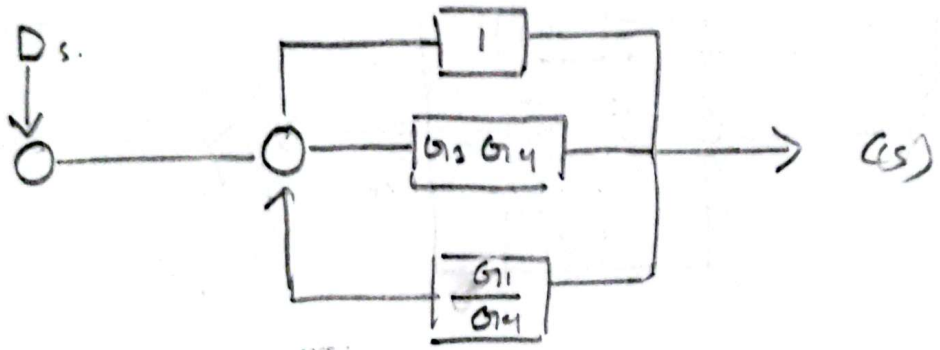
Ans to the quesNo 4



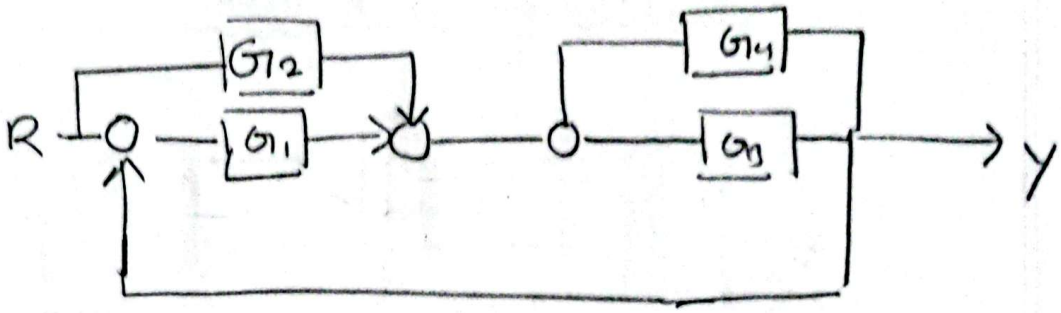


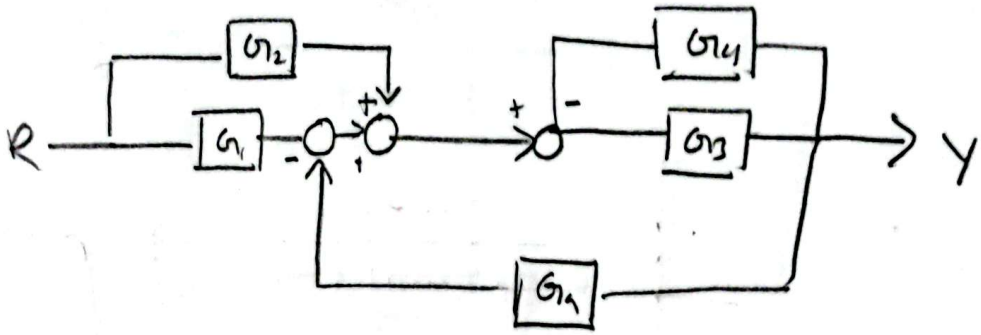
$$D_s \rightarrow \boxed{\frac{G_3}{1 + G_3(G_1 + G_4)}} \rightarrow Y$$





$$D \longrightarrow \boxed{\frac{G_3 G_4}{1 + G_3 (G_1 + G_4)}} \longrightarrow C(s)$$



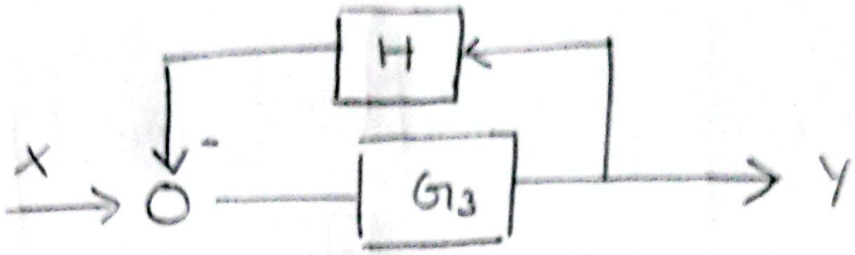


$$R \rightarrow \boxed{G_1 + G_2} \boxed{\frac{G_3}{1 + G_3(G_1 + G_4)}} \rightarrow Y$$

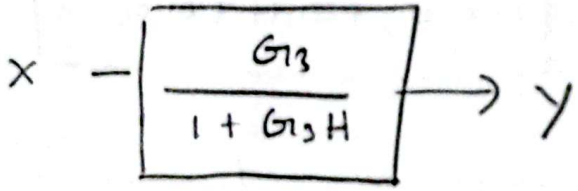
$$R \rightarrow \boxed{\frac{G_3(G_1 + G_2)}{1 + G_3(G_1 + G_4)}} \rightarrow Y$$

Ans to the ques No 5

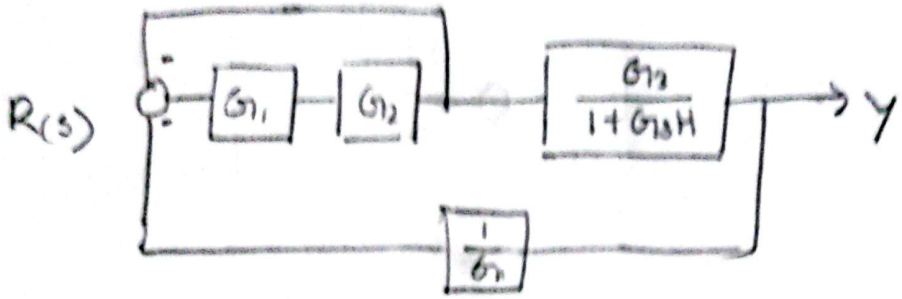
(a)

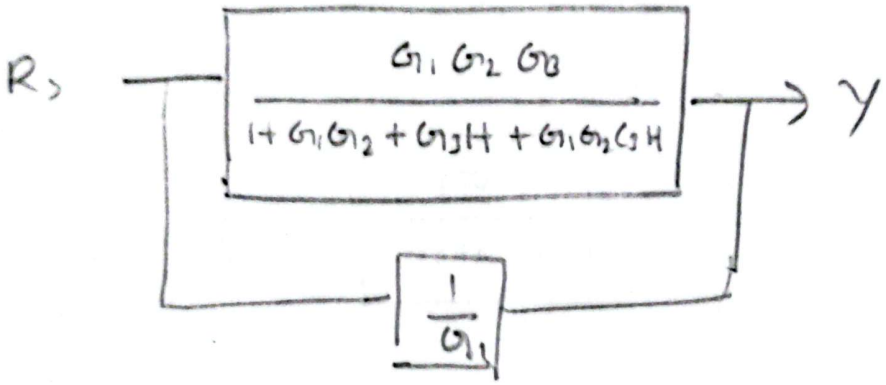


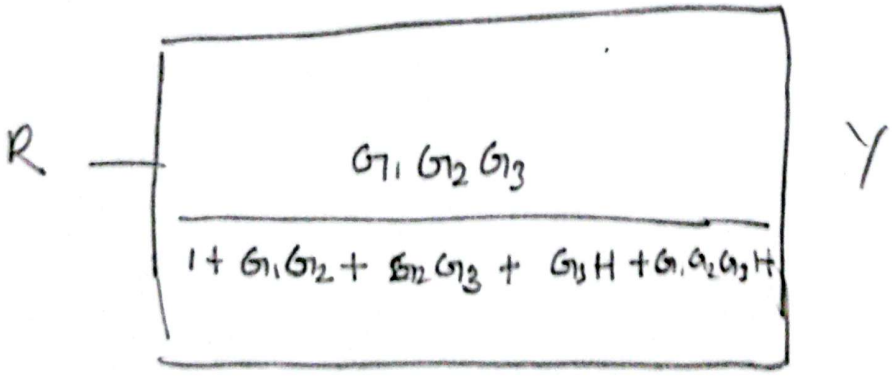
$$\frac{Y}{X} = \frac{G_1 G_2 G_3}{1 + G_1 G_2 G_3 H}$$



(b)







(c)