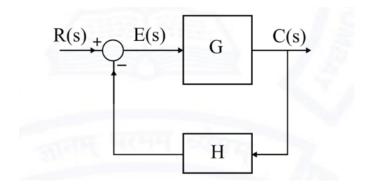
1

GATE:EE/63

EE23BTECH11208 - Manohar K*

Question: For the closed loop system shown , the transfer function $\frac{E(s)}{R(s)}$ is



- (a) $\frac{G}{1+GH}$
- (b) $\frac{1}{GH}$
- (c) $\frac{1+GH}{1+GH}$
- (d) $\frac{1}{1+G}$

(GATE EE 2021)

Solution:

Given,

G Forward path gain H Feedback path gain $R(s)$ Input signal $C(s)$ Output signal	symbol	description
R(s) Input signal	G	Forward path gain
1 0	H	Feedback path gain
C(s) Output signal	R(s)	Input signal
C(b) Cutput signar	C(s)	Output signal
Error signal	E(s)	Error signal

TABLE I PARAMETERS

$$C(s) = G \times E(s) \tag{1}$$

Feedback signal =
$$H \times C(s)$$
 (2)

Error signal = Input signal - Feedback signal

$$E(s) = R(s) - H \times C(s) \tag{3}$$

$$E(s) = R(s) - H \times G \times E(s)$$
 (4)

$$E(s) + H \times G \times E(s) = R(s)$$
 (5)

$$\therefore \frac{E(s)}{R(s)} = \frac{1}{1 + GH} \tag{6}$$