

# GATE CH-23 44

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Q: A cascade control strategy is shown in the figure below. The transfer function between the output ( $y$ ) and the secondary disturbance ( $d_2$ ) is defined as

$$G_{d2}(s) = \frac{y(s)}{d_2(s)}$$

Which one of the following is the CORRECT expression for the transfer function  $G_{d2}(s)$ ?

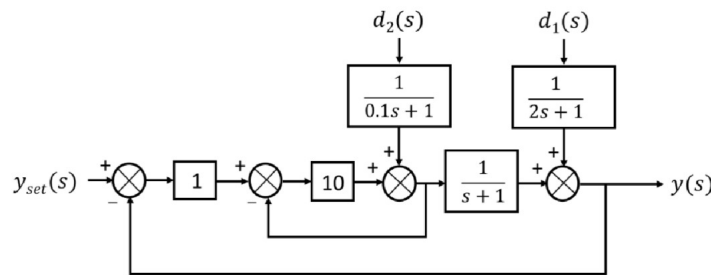


Fig. 0.

- A.  $\frac{1}{(11s+21)(0.1s+1)}$
- B.  $\frac{1}{(s+1)(0.1s+1)}$
- C.  $\frac{(s+2)(0.1s+1)}{(s+1)}$
- D.  $\frac{(s+1)}{(s+1)(0.1s+1)}$

**Solution:**

$$Transferfunction = \frac{Forwardgain}{1 - \sum loopgain} \quad (1)$$

$$G_{d2}(s) = \frac{y(s)}{d_2(s)} \quad (2)$$

$$= \frac{\frac{1}{(0.1s+1)(s+1)}}{1 - \left(\frac{-10}{s+1} - 10\right)} \quad (3)$$

$$= \frac{1}{(11s + 21)(0.1s + 1)} \quad (4)$$