

Hard

Assistant Engineer (Electrical), Class 2025

Building Department

What is the response of the feedback function with open loop transfer function $G(s) = 4/s(s + 5)$ and input is input step?

A

1 $\frac{1}{3}(4e^{-(t)} - e^{-(4t)})$

Correct

B

1 $\frac{1}{2}(6e^{-(t)} - e^{-(4t)})$

C

1 $\frac{1}{3}(6e^{-(t)} - e^{-(4t)})$

D

1 $\frac{1}{2}(4e^{-(t)} - e^{-(4t)})$

Correct Answer: A

Full Detailed Explanation

Concept & Reasoning The closed-loop transfer function is $\frac{4}{s(s+5)+4} = \frac{4}{(s+1)(s+4)}$. For a unit step, $C(s) = \frac{4}{s(s+1)(s+4)}$. Partial-fraction expansion gives $\frac{1}{s} - \frac{4/3}{(s+1)} + \frac{1/3}{(s+4)}$.

Taking the inverse Laplace transform produces the keyed result. How to Solve It in the Exam Unity feedback: close the loop before applying the input. Important Exam Point Check $c(0) = 0$ and $c(\infty) = 1$ as quick validation. Related Revision Path This question sits in the revision path Control Systems → Time Response → Closed-Loop Step Response .

Open live question on website:

<https://sarkariresultout.com/pyq/question/gpsc-ae-electrical-q211-unity-feedback-step-response/>