

Hard

Assistant Engineer (Electrical), Class 2025

Building Department

In the circuit shown below, find the Z-parameter Z .

A

15

B

10

C

5

Correct

D

1

Correct Answer: C

Full Detailed Explanation

Concept & Reasoning The Z-parameter definition is crucial. For a two-port network, $V_1 = Z_{11} I_1 + Z_{12} I_2$ and $V_2 = Z_{21} I_1 + Z_{22} I_2$. To determine Z_{12} , set $I_1 = 0$, which means port 1 is open-circuited. Because the left $10\ \Omega$ branch terminates at an open port, it carries zero current and therefore has zero voltage drop. Current I_2 entering port 2 flows through the $20\ \Omega$ series resistor to the central node and then through the $5\ \Omega$ shunt resistor to the common return. The central-node voltage is $5I_2$, and the open-circuit port-1 voltage is the same node voltage. Therefore $V_1/I_2 = 5\ \Omega$. This is why the final GPSC key changed the provisional choice. How to Solve It in the Exam For Z_{12} : open port 1 ($I_1=0$), inject current at port 2, then find V_1/I_2 . Important Exam Point Apply the Z-parameter test condition before combining resistors. Editorial / Answer-Key Note The official GPSC final answer key revised the provisional outcome for this question from B to C. Related Revision Path This question sits in the revision path Network Theory Two-Port Networks Z Parameters .

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