

Medium

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Consider the following statements regarding Thevenin's Theorem: 1. Thevenin's theorem states that any linear bilateral network can be replaced by

A

2 and 3 only

B

1 and 4 only

C**1, 2 and 3 only****Correct****D**

All of the above

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1, 2 and 3 only Quick Concept Explanation Thevenin's theorem replaces a linear two-terminal network by one voltage source V_{th} in series with an equivalent impedance.

For a network with independent sources, R_{th}/Z_{th} is found by suppressing independent sources; dependent sources remain and may require a test-source method. Key relation: $V_{th}=V_{OC}$; Z_{th} seen at the port with independent sources suppressed. Exam focus: In AC, use impedances not just resistances. Common trap: Dependent sources are not turned off when finding Thevenin resistance. Statement-wise Verification Statement 1 - Correct. Thevenin's theorem states that any linear bilateral network can be replaced by an equivalent voltage source in series with a resistance. Thevenin's theorem replaces a linear two-terminal network by one voltage source V_{th} in series with an equivalent impedance. Statement 2 - Correct. Thevenin resistance is calculated by deactivating all independent sources and finding equivalent resistance seen from terminals. $V_{th}=V_{OC}$; Z_{th} seen at the port with independent sources suppressed. Statement 3 - Correct. The open circuit voltage across terminals is equal to Thevenin voltage of the network. V_{th} is the open-circuit terminal voltage. Statement 4 - Incorrect. Thevenin equivalent is valid only for DC circuits and cannot be applied to AC circuits. Thevenin equivalence also