

Medium

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Consider the performance of a 3-phase VSI. Then

- 1. 180° conduction provides higher fundamental output than 120° conduction.**
- 2. 120° conduction is prone to short-circuiting**

A**1 only****Correct****B****1 and 2 only****C****3 only****D****2 and 3 only**

Correct Answer: A

Full Detailed Explanation

Correct Answer: A - 1 only Quick Concept Explanation In 180° mode three devices conduct at a time; in 120° mode only two conduct and one phase is disconnected during each step.

Waveform/fundamental comparison confirms 1. The 60° same-leg off interval of 120° mode contradicts 2, and switching-state neutral displacement contradicts 3. Key relation: Typical fundamental phase RMS: 180° mode $0.4502V_{dc}$; 120° mode $0.3898V_{dc}$. Thus 180° gives the higher fundamental component. Exam focus: 120° mode: two switches ON, one phase floating. 180° mode: three switches ON. Common trap: Assuming a balanced load forces the floating neutral to stay at zero under a non-sinusoidal switching waveform. Statement-wise Verification Statement 1 - Correct. 180° conduction provides higher fundamental output than 120° conduction. Standard six-step analysis gives higher fundamental phase/line output in 180° mode than in 120° mode. Statement 2 - Incorrect. 120° conduction is prone to short-circuiting the DC bus if "dead-time" is not provided. For the stated comparison: in 120° conduction each device conducts 120° and there is a 60° interval when neither device in the same leg conducts; this inherent blank interval reduces the overlap/shoot-through issue that is more critical in 180° complementary switching. Statement 3 - Incorrect. In 180° conduction, the potential of the load