

Easy

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Consider the following statements regarding Counters: 1. Asynchronous counters experience cumulative propagation delay due to ripple effect, limiting their operating

A

1 and 2 only

B

2 and 3 only

C

1 and 3 only

Correct

D

1, 2 and 3

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1 and 3 only Quick Concept Explanation Asynchronous or ripple counters clock each stage from the previous stage, so propagation delays accumulate. Synchronous counters clock all flip-flops together and are therefore faster, but combinational decoding can still exhibit hazards/glitches depending on implementation. Key relation: Ripple delay roughly accumulates with number of stages.Exam focus: Synchronous eliminates ripple-clock delay, not every possible logic hazard. Common trap: Synchronous does not mean glitch-proof. Statement-wise Verification Statement 1 - Correct.Asynchronous counters experience cumulative propagation delay due to ripple effect, limiting their operating speed in high-frequency applications.Asynchronous or ripple counters clock each stage from the previous stage, so propagation delays accumulate. Statement 2 - Incorrect.All synchronous counters are free from decoding glitches and hazards under all operating conditions.Synchronous clocking removes ripple delay but does not guarantee hazard-free decoding logic Statement 3 - Correct.Synchronous counters eliminate ripple delay by clocking all flip-flops simultaneously, thereby improving speed and reliability.Synchronous counters clock all flip-flops together and are therefore faster Core Concept Asynchronous or ripple counters clock each stage from the previous stage, so propagation delays accumulate