Medium | Deputy Executive Engineer (Electric | 2026 | orts Authority of Gujarat / Assistant Engineer (El

A system is represented in state-space form with two state variables and stable eigenvalues, then 1. The system order is two. 2. The system is stable since eigenvalues

A 2 and 3 only

B 1 and 3 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 A state-space model represents internal dynamics using a minimal set of state variables. Output generally depends on both state and direct input through y=Cx+Du. Key relation: x =Ax+Bu; y=Cx+Du.Exam focus: Eigenvalues of A are the state-model characteristic roots. Common trap: Output is not generally independent of state variables. Statement-wise Verification Statement 1 - Correct.The system order is two.X =Ax+Bu; y=Cx+Du. Statement 2 - Correct.The system is stable since eigenvalues lie in left half-plane.Eigenvalues of A are the state-model characteristic roots. Statement 3 - Correct.State variables completely describe system dynamics.A state-space model represents internal dynamics using a minimal set of state variables. Statement 4 - Incorrect.Output depends only on input and not on state variables.State-space output is generally y=Cx+Du and therefore depends on states Core Concept A state-space model represents internal dynamics using a minimal set of state variables. It naturally handles MIMO systems and incorporates initial conditions. Stability of a continuous-time LTI model is tied to eigenvalues of A: strictly negative real parts imply asymptotic stability. Output generally depends on both state and direct input through y=Cx+Du. Formula / Key Relationship x =Ax+Bu; y=Cx+Du. Why the Other Options Are Wrong