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

-

eigenvalues

A 2 3

B 1 3

C **1, 2 3** Correct

D

Correct Answer: C

Full Detailed Explanation

Correct Answer: C - 1, 2 and 3 onlyQuick Concept ExplanationA 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 VerificationStatement 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 statesCore ConceptA 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=Ax+Bu; y=Cx+Du.Why the Other Options Are WrongOption A is