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

With reference to stability of continuous-time LTI systems, consider the following statements: 1. A system is stable if all poles of its transfer function

A 1 and 2 only

B **1, 2 and 3 only** Correct

C 2 and 4 only

D All of the above

Correct Answer: B

Full Detailed Explanation

Correct Answer: B - 1, 2 and 3 only Quick Concept Explanation The impulse response uniquely characterizes an LTI system for a specified input-output relationship because any input can be decomposed into shifted impulses and the output follows by convolution. This concept applies in both continuous and discrete time. Key relation: y(t)=x(t)*h(t); y[n]=x[n]*h[n].Exam focus: For LTI questions, think 'impulse response + convolution'. Common trap: Impulse response is not a discrete-time-only concept. Statement-wise Verification Statement 1 - Correct.A system is stable if all poles of its transfer function lie in the left half of the s-plane.Y(t)=x(t)*h(t); y[n]=x[n]*h[n]. Statement 2 - Correct.Inclusion of the imaginary axis in the ROC ensures bounded output for bounded input.The impulse response uniquely characterizes an LTI system for a specified input-output relationship because any input can be decomposed into shifted impulses and the output follows by convolution. Statement 3 - Correct.Absolute integrability of the impulse response guarantees system stability.For LTI questions, think 'impulse response + convolution'. Statement 4 - Incorrect.Every causal system is automatically stable.A causal LTI system can have right-half-plane poles and be unstable Core Concept The impulse response uniquely characterizes an LTI system for a specified input-output