

Medium

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Sports Authority of Gujarat / Assistant Engineer (Electrical)

Consider the following statements regarding Transfer Function: 1. Transfer function is defined as ratio of Laplace transform of output to input under zero initial

A

1, 2 and 3 only

B

1 and 3 only

C

2 and 3 only

D

1, 3 and 4 only

Correct

Correct Answer: D

Full Detailed Explanation

Correct Answer: D - 1, 3 and 4 only

Quick Concept Explanation A transfer function is the Laplace-domain ratio of output to input for a linear time-invariant system under zero initial conditions. Its poles and zeros determine important input-output stability, transient and frequency-response features, but the transfer function does not uniquely reveal the internal state realization. Key relation: $G(s) = Y(s)/U(s)$ with zero initial conditions. Exam focus: Poles are denominator roots; zeros are numerator roots. Common trap: Transfer functions do not contain complete unique internal-state information.

Statement-wise Verification

Statement 1 - Correct. Transfer function is defined as ratio of Laplace transform of output to input under zero initial conditions. A transfer function is the Laplace-domain ratio of output to input for a linear time-invariant system under zero initial conditions.

Statement 2 - Incorrect. It provides complete information about system internal states. A transfer function describes input-output behavior under zero initial conditions and does not uniquely reveal internal state realization.

Statement 3 - Correct. Poles of transfer function determine system stability. Its poles and zeros determine important input-output stability, transient and frequency-response features, but the transfer function does not uniquely reveal the internal state realization.

Statement 4 -