

Medium

Deputy Executive Engineer (Electrician) 2026

Gujarat Public Service Commission / Assistant Engineer (Electrical)

**For a real-valued even signal in time domain, consider the following statements:**

**1. The signal satisfies the condition  $x(t) = x(-t)$  for all time. 2. Its Fourier Transform**

**A****1, 2 and 3 only****Correct****B****2 and 4 only****C****1 and 4 only****D****All of the above**

### Correct Answer: A

#### Full Detailed Explanation

Correct Answer: A - 1, 2 and 3 only  
Quick Concept Explanation: A real even time-domain signal has a real even Fourier transform and zero odd component. Fourier series represents periodic signals as harmonically related sinusoids or equivalent complex exponentials; non-periodic signals are handled by Fourier transform rather than ordinary Fourier series. Key relation: Real even  $x(t)$

$X(\omega)$  real and even. Exam focus: Symmetry can eliminate sine/imaginary terms immediately.

Common trap: Fourier series is fundamentally for periodic signals. Statement-wise

Verification: Statement 1 - Correct. The signal satisfies the condition  $x(t) = x(-t)$  for all time. A real even time-domain signal has a real even Fourier transform and zero odd component.

Statement 2 - Correct. Its Fourier Transform is purely real-valued without any imaginary component. A real even time-domain signal has a real even Fourier transform and zero odd component.

Statement 3 - Correct. The odd component of such a signal is identically zero. A real even time-domain signal has a real even Fourier transform and zero odd component. Statement

4 - Incorrect. The imaginary part of its Fourier Transform is an even function. For a real even signal the Fourier transform is purely real, so its imaginary part is identically zero. Core

Concept: Fourier methods decompose signals into frequency components. A real even time-domain