

# GATE 2021-EE-31

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## GATE 21 EE 31:

The causal signal with z-transform  $\frac{z^2}{(z-a)^2}$  is

### Solution:

Given z transform of the signal is  $\frac{z^2}{(z-a)^2}$

Let the signal be  $x(n)$

$$x(n) = \mathcal{Z}^{-1} \left( \frac{z^2}{(z-a)^2} \right) \quad (1)$$

$$x(n) = \frac{1}{2\pi j} \oint_c \left( \frac{z^2}{(z-a)^2} \right) z^{n-1} dz \quad (2)$$

$$\Rightarrow x(n) = \lim_{z \rightarrow a} \frac{1}{(1)!} \left( \frac{d}{dz} (z^{n+1}) \right) \quad (3)$$

$$x(n) = (n+1)a^n u(n) \quad (4)$$