

Q3) Bilinear transfer func.

$$H(z) = \frac{0.5792 (1 - z^{-1})}{(1 - 0.1584 z^{-1})}$$

$$\text{Let } \frac{y(z)}{x(z)} = \frac{0.5792 (1 - z^{-1})}{1 - 0.1584 z^{-1}}$$

$$\Rightarrow y(z) (1 - 0.1584 z^{-1}) = x(z) (0.5792 - 0.5792 z^{-1})$$

$$y(z) - 0.1584 z^{-1} y(z) = 0.5792 x(z) - 0.5792 z^{-1} x(z)$$

Taking inverse z -transform

$$y(n) - 0.1584 y(n-1) = 0.5792 x(n) - 0.5792 x(n-1)$$

$$\therefore y(n) = 0.1584 y(n-1) + 0.5792 x(n) - 0.5792 x(n-1)$$