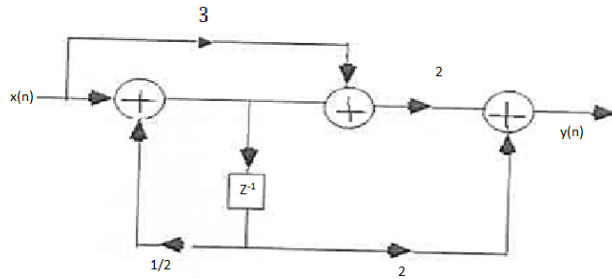


- c) Find the z transform of 6
- i) $X(n) = a^n \sin w_0 n u(n)$ ii) $X(n) = n 2^n \sin\left(\frac{\pi}{2}n\right) u(n)$

5. a) Obtain direct form I, direct form II, cascade and parallel form realization of the IIR system 12
 $y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$
- b) Describe Gibbs phenomenon in detail. 4

OR

6. Determine the system function and impulse response of the given system 16



7. a) Convert the analog filter with system function $H(s) = \frac{S+0.2}{(S+0.2)^2+9}$ into digital IIR filter 8
using bilinear transformation method. The digital filter should have resonant frequency of $\omega = \frac{\pi}{4}$

- b) Determine digital filter for the given analog filter using impulse invariance method 8
 $H(S) = \frac{S+a}{(S+a)^2+b^2}$

OR

8. a) Design a Chebyshev filter for the following specification using impulse invariance method. 12
- $$0.8 \leq |H(e^{j\omega})| \leq 1 \quad 0 \leq \omega \leq 0.2\pi$$
- $$|H(e^{j\omega})| \leq 0.2 \quad 0.6\pi \leq \omega \leq \pi$$
- b) Explain the finite word length effects in digital filter. 4

9. a) Explain with an example 16
- i) Decimation by factor D ii) Interpolation by factor I

OR

10. a) Describe sampling rate conversion by rational factor I/D. 8
- b) What is Multirate signal processing? Explain any four application of multirate signal processing. 8
