

- Q5** a) Establish the relation between DFT and Z-Transform (5)
 b) Convert the analog filter with system function $H(s) = \frac{(s+0.1)}{[(s+0.1)^2+9]}$ into a digital IIR filter using impulse invariance method. The digital filter is to have resonant frequency of $\pi/2$. (5)
- Q6** a) Explain Decimation in frequency FFT algorithm. (5)
 b) Examine the system $y(n) = \cos[x(n)]$ with respect to the properties like static or dynamic, linear or non-linear, time invariant or time varying, causal or non-causal. (5)
- Q7** a) Determine the response of the system $y(n) = \frac{5}{6}y(n-1) - \frac{1}{6}y(n-2) + x(n)$ to the input signal $x(n) = \delta(n) - \frac{1}{3}\delta(n-1)$ (5)
 b) Find the DFT of the sequence $x(n) = \{4,3,2,1\}$ using DIT FFT algorithm. (5)
- Q8** Write short notes on any two: (5 x 2)
 a) FIR filter using windowing technique
 b) DFT as a linear Transformation
 c) Overlap save filtering
 d) Bilinear transformation Technique