

OR

4.(b) (i) Find the Z-transform of $x[n] = (1/4)^n \cos(\pi n/8) u[n]$. Draw pole-zero plot and mark ROC. (8)

(ii) Find $x[n]$ whose Z-transform is $X(z) = \frac{1 - \frac{1}{3}z^{-1}}{(1-z^{-1})(1+2z^{-1})}$, if $x[n]$ is (A) right sided, (B) left sided. (8)

5.(a) Let a DT LTI system has transfer function $H(z) = \frac{1 - \frac{5}{6}z^{-1}}{(1 - \frac{1}{4}z^{-1})(1 - 3z^{-1})}$.

(i) Draw the direct form-II structure of the above system (6)

(ii) Find the impulse response $h[n]$ if the system is causal and comment on its stability (5)

(iii) Find the impulse response $h[n]$ if the system is stable and comment on its causality (5)

OR

5.(b) (i) Find the convolution sum of the two signals $x_1[n] = (3/4)^n u[n]$ and $x_2[n] = u[n]$ and plot the resultant signal for $n=0,1,2,3,4,5$. (8)

(ii) Consider a DT LTI system which produces an output $y[n] = (1/4)^n u[n]$ for the input $x[n] = (1/2)^n u[n]$. Find the frequency response and impulse response of the system. (8)