## Z-Transforms:

1. Find the z transform of the following signals:
a) $x[n]=u[n]-u[n-4]$
b) $\mathrm{x}[\mathrm{n}]=0.5^{\mathrm{n}} \mathrm{u}[\mathrm{n}]$
c) $x[n]=\left[\begin{array}{lll}1 & 4 & 8\end{array}\right]$
d) $x[n]=\left[\begin{array}{lllll}0 & 1 & 2 & 3 & 4\end{array}\right]$
e) $x[n]=2(0.8)^{n} u[n]$
2. Find the inverse Z-transforms of the following signals:
a) $\mathrm{X}(\mathrm{z})=\frac{(\mathrm{z}-1)(\mathrm{z}+0.8)}{(\mathrm{z}-0.5)(\mathrm{z}+0.2)}$
b) $\mathrm{X}(\mathrm{z})=\frac{(\mathrm{z}+0.8)}{(\mathrm{z}-0.5)(\mathrm{z}+0.2)}$
c) $X(z)=\frac{z^{3}+z+1}{\left(z^{2}-0.5 z+0.25\right)(z-1)}$
d) $X(z)=\frac{\left(z^{2}-1\right)(z+0.8)}{(z-0.5)^{2}(z+0.2)}$
3. Use the Final Value Theorem to determine the final value of $\mathrm{x}[\mathrm{n}]$ for each of the signals defined in Problem 2. Compare your answer obtained from the Final Value Theorem to the answer found by taking $\lim \mathrm{x}[\mathrm{n}]$
$\mathrm{n} \rightarrow \infty$
4. Solve the following difference equation using z-transforms:
a) $y[n]+3 y[n-1]+2 y[n-2]=2 x[n]-x[n-1] ; y[-1]=0 ; y[-2]=1, x[n]=u[n]$
