**Report: Lab 2**

Question 2:

(d) Frequency response:

Increases with increase in w -> p>0.

Decreases with increase in w -> p<0.

Impulse response:

For any system of form: H(Z) = A/ 1 - (a)Z

The impulse response h[n] = (a)nU[n].

Therefore, for p:

|P|>1 -> Increasing with w.

|P|<1 -> Decreasing with w.

P<0 -> Value Toggles between positive and negative for alternate N.

P>0 -> Only positive.

Question 3:

1. Zeroes : Cos() + iSin()

Cos() - iSin()

1. Poles : rCos() + riSin()

rCos() - riSin()

For R=1.5;

Ω = 600

Zeroes: 0.5 + 0.866025i and 0.5 - 0.866025i

Poles: 0.75 + 1.29904i and 0.75 – 1.29904i

Ω = 1200

Zeroes: -0.5 + 0.866025i and -0.5 - 0.866025i

Poles: -0.75 + 1.29904i and -0.75 – 1.29904i

(b)For Casualty: ROC must me outside a circle and extending to Inf

Stablity: ROC must contain |Z| = 1.

The ROC of this system can be either |Z|> r or |Z|<r

For Stability and Causality ROC |Z| > r and r < 1.

1. For a constant value of r as Ω increases the dip in the plot also shifts ahead, towards positive x axis.

Question 4:

Poles will be in conjugate pair.

There will be at-most 6 poles.