**ELEN 472: Introduction to Digital Control Systems**

**HW1 (100 Points)**

**10 Questions; Each Question is 10 Points**

Q1: Find the z-transforms of the following sequences:

Q2: Find the z-transform of .

Hint:

Notice: you need to use the **linearity property** to solve this problem (reference Lecture 2 – Page 20).

Q3: Find the inverse z-transform of the following functions:

Q4. Find the inverse transform of the functions using partial fraction expansion and table look-up.

Q5. Find the final value for the function:

Q6. Solve the following difference equations

1. (Hint: z-transform of )

Q7. Find the convolution of two sequences and

Q8. Find the transfer function of the following system:

Q9. Find the steady-state response of the systems due to the sinusoidal input

Q10. Find the suitable sampling periods for the following systems:

* First-order system with system bandwidth rad/s
* Second-order system with system natural frequency rad/s and the damping ratio is